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Despatch by Air Chief Marshal Sir Frederick Bowhill, KCB, CMG, DSO.,  
On the Air Operations Undertaken by Coastal Command,  
from September 1939 - June 1941.

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MINISTRY OF CIVIL AVIATION,

ARIEL HOUSE,

STRAND,

LONDON, W. C. 2.

31st May, 1947.

Sir,

I have the honour to submit a despatch on the operations of my Command for the period 3rd September, 1939 to 14th June, 1941.

Introduction.

1. Coastal Command, as that branch of the Royal Air Force especially created and trained to take part in maritime warfare, worked from the outset in close co-operation with the Admiralty. The latter laid down policy for the conduct of the war at sea, supplemented by urgent instructions to meet particular situations, and I deployed and operated the forces at my disposal to meet those requirements.
2. The Command was organised into three operational Groups. The whole Western Approaches to the British Isles were covered by No. 15 Group. The eastern part of the English Channel from longitude 3° west and the southern part of the North Sea up to a line joining Flamborough Head to Horn Reef on the Danish coast was covered by No. 16 Group. The remaining sector round Scotland and to a line running northwest from the Mull of Kintyre was covered by No. 18 Group (See Appendix H).
3. This organisation ensured that the closest collaboration was maintained between the respective staffs of the Admiralty and Command Headquarters, preserved at lower levels by establishing the Group's Air Headquarters in the same place as the headquarters of the geographically sited main Naval Shore Commands. Thus the resultant organisations at Plymouth, Chatham and Rosyth were known as Area Combined Headquarters. They enabled the local Naval and Air Commanders to work side by side in combined operation rooms which were staffed by Naval and Air Force Personnel.
4. In the above connection I had the honour of working with successive Naval Commanders including Admiral Sir Percy L.H. Noble, Admiral Sir M.E. Dunbar-Nasmith, Admiral Sir William James, Admiral Sir Reginald Plunkett Erle-Drax, Vice-Admiral Sir Max K. Horton and Vice-Admiral C.G. Ramsey, whose whole-hearted support and deep understanding was of the greatest value to me.
5. I also wish to put on record the excellent work of my Air Force Commanders, namely the late Air Vice Marshal C.D. Breese of No. 18 Group, Air Commodore R.L.G. Marix of No. 16 Group and later No. 18 Group, Air Commodore R.G. Parry and later Air Vice Marshal J.M. Robb of No. 15 Group, Air Commodore G.H. Boyce of No. 19 Group and Air Commodore Howe of No. 17 Training Group.
6. May I be permitted to mention Air Commodore A. Durston (Director of Operations Naval Co-operation) and his staff, who at all times gave my Command every possible help, advice and assistance.
7. Just before the outbreak of war the Admiralty sent me a small but very efficient Naval Staff, consisting of four Officers, whose work proved of the greatest value to the Command, and in this respect I would like to mention the names of Commander C. Meynell, R.N. (later promoted to Captain), the senior Officer, and Commander D.V. Peyton-Ward (later

/promoted

promoted to Captain) whose team and liaison work, combined with the wide knowledge of submarine warfare, was of the highest order and of the greatest value to the Command.

8. The Command was required to fulfil the following functions:-

- (a) Reconnaissance in Home Waters.
- (b) Co-operation with the Royal Navy in convoy protection,
- (c) Counter offensive action in defence of seaborne trade embodying attacks on the enemy fleet, air forces or submarines operating against our trade.

9. Offensive operations were thus subsidiary to the primary role of reconnaissance.

10. The forces at my disposal at the outbreak of hostilities were as follows:-

- (a) Ten squadrons of Ansons, of which four were auxiliary squadrons recently brought up to strength and whose training was still incomplete.
- (b) One squadron of Hudsons, which had only just arrived and was, therefore, only partly operational.
- (c) Six squadrons of flying-boats, only two of which were equipped with the up-to-date Sunderland I. Of the remainder, three Squadrons were of Londons and one of Stranraers. Both of these latter types were already obsolescent.
- (d) Two squadrons of Vildebeeste IV, another obsolescent type, which represented the sole striking power of my Command against enemy naval units.

11. Performance and Weapons.

<u>Type.</u>	<u>Radius of action in sea miles.</u>	<u>Endurance</u>	<u>Bomb Load.</u>
Anson	255	4½ hours	2 - 100 lb.
Hudson	490	6 hours	10 - 100 lb. or 4 - 250 lb.
Sunderland I	850	12½ hours	8 - 250 lb.
London	225	5¼ hours	8 - 250 lb.
Stranraer	330	7¼ hours	4 - 250 lb.
Vildebeeste IV	185	4¼ hours	4 - 250 lb. or 1 - 18" torpedo

12. The bombs used were the standard S.A.P. and G.P. for use against surface vessels and A/S bombs for use against submarines. Regarding the latter, the 100 lb. type was unfortunately found to be useless against even surfaced submarines. A direct hit was not lethal. The underwater blast effect of a near miss, on which the depth charge depends for its lethal qualities, was absent in the 100 lb. type and limited to less than 4 feet radius in the case of the 250 lb. type.

13. Throughout the period of my Command I made repeated representations to the Air Ministry for increase of aircraft, not only for reconnaissance, but for long-range fighter and long-range torpedo aircraft, which,

as the war developed, became more and more essential. The Vildebeestes as a striking force were useless owing to their slow speed and short range and were not used once as such. I also made representations for more aerodromes. I, of course, fully realised that many calls had to be met outside my Command, but the fact remained that shortage of aircraft and aerodromes made the task of my Command in the early days of the war very difficult. However, by examination of Appendix "A" and Appendix "E", the Order of Battle on the 3rd September, 1939 and that of the 1st June, 1941, it will be seen that considerable advances in both these respects had been made.

14. A point which I believe was not always fully realised, was that Coastal Command was actively employed against the enemy day and night after war had been declared: there was no respite.

15. In this Despatch I have mentioned very few names, because during my period of Command I forwarded periodically to the proper Authorities the names of officers, airmen and airwomen for honours and awards.

16. All my Squadrons carried out magnificent work, and the appropriate Battle Honours will be awarded to those Squadrons in due course. In this respect I would like to mention two Squadrons, namely, No. 10 of the Royal Australian Air Force commanded by Wing Commander L.V. Lachal, and No. 320 of the Royal Dutch Naval Air Service commanded by Lieut. Commander W. Van Lier. Both were formed within my Command during the early months of the war and carried out their allotted tasks with conspicuous success. Nor must we forget the most excellent work carried out by the various Fleet Air Arm Squadrons which were placed under my Command from time to time.

17. I again pay my sincere tribute to all officers, men and airwomen under my Command. They responded nobly to the many arduous and dangerous tasks they were called upon to perform, and their spirit remained undaunted. No Commanding Officer has ever had more loyal comrades-in-arms. We were very proud to be in such close co-operation with the Royal Navy, doing our part to help protect that lifeline of the British Empire, namely, the Merchant Navy and its gallant crews.

I have the honour to be, Sir,  
Your obedient Servant,

(Sgd.) F.W. BOWHILL.

Air Chief Marshal.

The Rt. Hon. P.J. Noel-Baker, M.P.,  
Secretary of State,  
Air Ministry,  
King Charles Street,  
S.W.1.

PART ONE

ANTI-SHIPING OPERATIONS

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PART I.ANTI-SHIPING OPERATIONS.SECTION I - MAJOR NAVAL UNITS.COMMITMENTS OF COASTAL COMMAND IN THIS SPHERE.

At the beginning of the war the battleship BISMARCK and her sister ship TIRPITZ were intended to constitute a major part of the naval might of Germany. The former was not completed until November, 1940, and the latter not until the following year. These vessels had been laid down in 1936, and were designed to be the most powerful warships in the world.

2. In addition, there were the battle cruisers SCHARNHORST and GNEISENAU, the three heavy cruisers GRAF SPIE, ADMIRAL SCHEER and DEUTSCHLAND, the latter soon to be renamed LUTZOW; these were sometimes called pocket battleships and were specifically designed as commerce raiders. The enemy had also recently constructed three Hipper class cruisers, ADMIRAL HIPPER, BLUCHER and PRINCE EUGEN, while a fourth, SEYDLITZ laid down in 1936, was never finished. Light cruisers comprised the EMDEN, LEIPZIG and NURNBERG and the three sister ships KOLN, KARLSRUHE and KONIGSBERG. Germany's only aircraft carrier, GRAF ZEPPELIN, was never completed.

3. So powerful a battle fleet was sufficient to keep a very considerable British Naval force confined to home waters, and at the same time seriously to threaten our merchant shipping with the danger of raids by single vessels operating in the Atlantic.

4. Coastal Command, were, from the outset, faced with a difficult task for a number of reasons. My operational strength did not in any way provide a suitable striking force, and the role of my Command was thus largely limited to reconnaissance in the early stages, and this in many ways had to be strictly limited, owing to shortage of aircraft.

5. The problem of neutralising the enemy's naval units was complicated by the following considerations:-

- (a) the Policy not to allow the bombing of ships in harbour, but only at anchor in open roadsteads, and then only when mercantile shipping was not endangered;
- (b) the appreciation by the enemy of this restriction, and their avoidance of open roadsteads;
- (c) the confinement of enemy naval exercises to the Heligoland Bight, an area heavily defended against aircraft attack;
- (d) the element as the over-riding factor in the interception of hostile vessels outside the Heligoland Bight;
- (e) the difficulty of maintaining an up to date Enemy Order of Battle without regular reconnaissance of the Battle bases.

6. The main plan adopted by my Command and set in motion on 23rd August, 1939, was to maintain standing patrols between Scotland and the limits of Norwegian territorial waters (see Appendix B). These were designed to detect outward or homeward bound enemy warships. In addition, the plan provided for special reconnaissance sorties which might sight fleeing targets at sea, or locate enemy ships lying in naval anchorages.

7. To take advantage of the opportunities for attack provided by this reconnaissance, a Strike force of 24 aircraft stood by daily at short notice of readiness by Bomber Command.

8. The routine patrols between Scotland and Norway were flown at first by Ansons, but these aircraft had not sufficient endurance, so that the southern Continuous Line Patrol, one of the most important, fell short of the Norwegian Coast by 60 miles. The gap was covered by five and sometimes only four submarines, a force insufficient to keep the area under constant observation.

9. The lack of a powerful striking force within my Command was a serious handicap, because it will be appreciated that enemy naval units would have to be sought and attacked near their own bases, in the North Sea and Heligoland Bight areas.

#### RECONNAISSANCE FLIGHTS AGAINST ENEMY RAIDERS.

10. The routine patrols were well maintained during shortening hours of daylight, and during deteriorating weather conditions which imposed a great strain on the crews. On 8th October an enemy force consisting of one Scharnhorst class battle-cruiser, one Konigsberg class cruiser and four destroyers was located off the south-west coast of Norway. Weather conditions however, prevented a Bomber force from making an attack. On the 23rd November a P.B.Y. flying boat, the only one in the Command, was airborne at Invergordon within 2½ hours of a message being received that the auxiliary cruiser RAWALPINDI, which had been sunk, had sighted the cruiser DEUTSCHLAND. The P.B.Y. continued searching throughout the night, in spite of severe icing conditions, and on succeeding days large areas S.E. of Iceland were kept under observation in the hope of sighting the "pocket battleship". This hunt, which continued into the first week of December, also provided another example of the excellent qualities of the Sunderland flying boat, and of the very high standard of navigational proficiency of the air crews. One Sunderland left Invergordon at 0400 hours to search an area to the South of Iceland, and was flying continuously until well after sunset. Over 1200 sea miles of ocean were swept, and although the aircraft was out of sight of land for more than twelve hours, a perfect landfall was made on its return to base.

11. The year ended with a very satisfactory achievement of 9,309 hours flown on reconnaissance.

12. In the beginning of the New Year there was a slight reduction in the hours flown on reconnaissance, due to severe weather conditions with the prevalence of frost and snow which made working conditions very difficult, and also to the fact that convoy escort and anti-submarine patrols were making greater claims on the available effort.

#### FIRST ATTACK ON CRUISER FORCE, APRIL, 1940.

13. On 8th April, 1940, at 1400 hours, a Sunderland flying boat sighted a battleship of the Scharnhorst class accompanied by two cruisers of the Leipzig class and by two destroyers. They were a hundred and thirty miles from the Alsboen Light off the west coast of Norway. Almost immediately the ships opened anti-aircraft fire which was both heavy and accurate. The Sunderland was soon hit, two of its tanks were holed, and the hull gradually filled with petrol. When it landed at its base it had lost 300 gallons. The same day German destroyers had been seen at various times in the neighbourhood of the Horns Reef, steaming on a northerly course. The German attack on Norway had begun.

14. Throughout the next day my aircraft were very busy reconnoitring the new area of battle. Before midday a London flying boat had

/reported

reported the presence of a German cruiser of the Koln class in Bergen. The intelligence was confirmed later by a Blenheim and by a Wellington. A Sunderland reported one Hipper class cruiser in Trondhjem Fjord, and Wellingtons sighted enemy warships and possible transports at Kristiansand South. The cruiser at Bergen was attacked that afternoon by Wellingtons, which dropped thirty armour-piercing 500 lbs. bombs from between 4,000 and 6,000 feet. They were met by heavy fire, but estimated one direct hit on her stern. On the next day a Hudson reported that, after a further attack by naval Skuas from the aircraft carrier H.M.S. FURIOUS, the cruiser subsequently identified as KONIGSBERG, had sunk.

SCHARNHORST ATTACKED OFF STAVANGER, JUNE 1940.

15. Though seizing every opportunity to attack, my Command continued throughout April and May to play its main role, that of reconnaissance. My Command was now reinforced with two long-range Blenheim Squadrons, Nos. 235 and 254, and four Hudson Squadrons were operating, namely Nos. 206, 220, 224 and 233. At the beginning of May the first Beaufort Squadron, No. 22, began operations based at North Coates, and the foundation stone of a striking force of Torpedo Bombers was laid.

16. At the end of May we were forced to withdraw at Andalsnes and Namsos, but Narvik was not evacuated until the 8th of June.

17. On the 10th June, two days after the evacuation of Narvik, a Blenheim, one of three on reconnaissance over Trondhjem Fjord, sighted the battle cruiser SCHARNHORST and two enemy cruisers. The warships were back from their successful encounter with H.M.S. GLORIOUS two days before. It was decided to attack them where they lay at anchor near a supply ship, and twelve Hudsons carried out a pattern bombing attack from 15,000 feet. They dropped 36 x 250 lb. armour-piercing bombs, losing one of their number to anti-aircraft fire, and another to an enemy fighter. SCHARNHORST probably escaped damage, but both the cruiser and the supply ship received direct hits. This was on the 11th of June.

18. On the night of the 13/14th June, naval aircraft took part. ARK ROYAL, escorted by NELSON and other units of the Home Fleet, arrived at a position 170 miles off Trondhjem, and at midnight fifteen Skuas took off for the attack. My Long Range Blenheims provided fighter cover over the objective, while my Beauforts created a diversion by attacking the nearby aerodrome at Vaernes in an attempt to prevent German fighters from taking off to engage the Skuas. Owing to the perpetual daylight in the area at that time of year, it was not possible to effect surprise. The Skuas found the enemy prepared and waiting, but pressed home their attack with the greatest gallantry and determination. Eight of them, more than half, were shot down, but two hits were scored on SCHARNHORST.

19. Two days later, reconnaissance showed that she was still at Trondhjem. On the 16th and 17th June I made two attempts to attack her, but clouds, lower than the hill tops, obscured the harbour. It was not until the 21st June that SCHARNHORST was again sighted by H.M. Submarine OLYDE at 0235 hours. This time she was at sea, eight miles West of Utyoer lighthouse, steaming South at 25 knots with an escort of destroyers. After an unsuccessful search by three Blenheims she was picked up at 1445 hours by a Sunderland of No. 204 Squadron. The flying boat was at once attacked by heavy fire endured for an hour. During this time the Sunderland crew watched a torpedo attack by six naval Swordfish, one of which was shot down. Shortly afterwards they themselves were engaged by four Me.109's. During the ensuing combat, which lasted about half an hour, all the Messerschmitts were hit, and one fell in flames to the sea. The Sunderland, slightly damaged, set course for base.

20. I consider that a very interesting example of dash and determination should be quoted here regarding the Commanding Officer of No. 42

Squadron. This Squadron was grounded, owing to the Taurus engines of their Beauforts being liable to sudden failure. I was talking to the Station Commander on the telephone about the position in regard to these engines. He informed me that Wing Commander H. Waring, Commanding No. 42 Squadron, had that minute approached him with a request that they should be allowed to go and attack, in spite of the uncertainty regarding their engines. This request had been made not only on his own initiative, but on that of his crews as well. I gave instructions that the grounding orders should be suspended in view of the importance of the target, and thus allowed this Squadron to join the attack. Shortly after 1630 hours, nine Beauforts of No. 42 Squadron arrived in the area.

21. The Beauforts were armed with 500 lb. armour-piercing bombs, and they made a dive-bombing attack, scoring at least three hits. It is probable, from the way in which the destroyers deployed to protect the capital ship, that the enemy anticipated a torpedo attack, and were, to that extent, taken by surprise.

22. The Beauforts were immediately attacked by a force of about 50 Me.109s. Three Beauforts were shot down, but the remainder reached base without any case of engine failure. Hudsons of Nos. 224, 233 and 269 Squadrons continued the assault until the bombing effort of the Command had been expended. These aircraft met with fierce opposition from an enemy now fully roused and only 25 miles from their base at Stavanger.

23. In this action five aircraft were lost, but SCHARNHORST had received sufficient damage to dictate her retirement to a floating dock at Kiel. She remained out of action for the rest of the year and did not put to sea again until early in 1941.

HELPER IN BREST - ATTACKS BY COASTAL COMMAND, JANUARY/FEBRUARY, 1941.

24. On 10th May, 1940, Germany invaded Holland, Belgium and Luxembourg. On 21st June, France accepted Armistice terms and hostilities ceased, so far as she was concerned, at 0135 hours on 25th June. Germany now controlled the whole European coastline from the North of Norway to the Spanish frontier.

25. These events had a profound effect on the role of my Command and on the tactical employment of the Squadrons. Having the control of the Skagorrak and the freedom of the Norwegian fjords and ports, the only surface raiders were free to move out from their bases in the North Sea or the Baltic, up the long Norwegian coast close inshore, through waters among the most sheltered in the world, into the Atlantic, where awaited then an area of battle vast in extent and, therefore, very difficult to patrol. Furthermore, excellent facilities for refuelling and for minor repairs were available in the harbours of the west coast of France.

26. The task of my Command had thus been made immeasurably harder, and this necessitated the acceptance of increased risks to maintain our reconnaissance over the Bay of Biscay, the North Sea and along the Norwegian coastline.

27. Moreover, the work had become more varied. Ships could now be attacked in harbour, and there began a period 12 months from June, 1940, during which coastal fringe targets, including aerodromes, marshalling yards, military supply depots, barracks and naval installations, were consistently attacked. Anti-invasion patrols were a further heavy commitment during the Summer and Autumn. When available, Squadrons of the Fleet Air Arm, Nos. 700, 812, 816 and 826, were placed under my control to assist in my varied commitments.

28. During the latter half of 1940, Photographic Reconnaissance and Naval Intelligence sources combined to provide regular information about the movements of the German major naval units.

29. It was not until the Hipper class cruiser arrived in Brest, at the beginning of January, 1941, that the Command again became actively engaged against major naval units. It is a matter for record that between 9th - 12th November, No. 98 Squadron, under the command of G.O.C. Iceland, co-operated in carrying out patrols in the Denmark Straits in connection with the possible movements of an enemy commerce raider.

30. P.R.U. reported a Hipper class cruiser in dry dock at Brest on the 2nd January, 1941, and it was evident that she had sustained damage in a recent action with H.M. ships BERWICK and BONAVENTURE in the Atlantic. HIPPER remained in dry dock until the 2nd February, and was attacked on eight occasions by my aircraft, which dropped forty tons of bombs and parachute mines. Unfortunately, bad weather prevented any attacks being carried out between the 17th and 31st January. Nevertheless, it was probable that the cruiser was damaged by the bombing attacks, because she was compelled to remain in dry dock for four weeks.

31. The cruiser had departed on the 3rd February but was back again on the 15th February. Although bad weather made reconnaissance extremely difficult, P.R.U. made 48 sorties between 15th February and the 12th March, obtaining photographs of the vessel on sixteen occasions, and a daily reconnaissance by Blenheim fighters was effected on nineteen occasions. During this period HIPPER was attacked, when opportunity presented, by 36 aircraft of my Command and by 103 aircraft of Bomber Command. The warship had departed by the 16th March.

#### SCHARNHORST AND GNEISENAU ARRIVE IN BREST.

32. Meanwhile the battle cruisers SCHARNHORST and GNEISENAU had been active against our trade in the Atlantic, and special patrols were organised in the Northern Approaches and off the west coast of France, in an endeavour to find these ships should they try to break back to Germany or to ports in occupied France. On the 21st March, two Hudsons of No. 220 Squadron were on patrol off Ushant for this purpose when, at 1955 hours, an A.S.V. contact was obtained by one of them just on the point of leaving the patrol to return to base. On investigation, two battle cruisers and one destroyer were observed on a course of 090° at 20 knots.

33. This force was shadowed until the aircraft was recalled at 2030 hours, but no offensive action was possible owing to low cloud. For some days after this, bad weather prevented the successful reconnaissance of Brest either by P.R.U. or by other aircraft, but eventually the presence of SCHARNHORST and GNEISENAU in the port was established, during the last week of March, 1941.

#### COMMENCEMENT OF ATTACKS ON BATTLE CRUISERS IN BREST, APRIL, 1941.

34. On 30th/31st March, the battle cruisers were attacked by 109 aircraft of Bomber Command, and thus began the long series of attacks which continued throughout the year. My Command attacked them on 63 occasions in 1941, either alone or in conjunction with Bomber Command operations.

#### GNEISENAU TORPEDOED BY A BEAUFORT.

35. It is fitting to describe in detail what was, in my opinion, one of the most desperate attacks that could possibly be conceived, which was carried out on the 6th April, 1941.

36. I ordered an attack by six Beauforts of No. 22 Squadron for first light against a German battle cruiser which the weight of evidence

left very little doubt was GNEISENAU, lying alongside the quay in the Rade Abri at Brest.

37. Three of the aircraft were bogged on take off and did not take part in the operation; a fourth was unable to find the target, while a fifth was forced to abandon an attempted attack in full daylight owing to fierce flak and a haze which hid the actual target.

38. The sixth Beaufort crossed the spit of land South-West of the harbour entrance at a low height and found an enemy battle cruiser, almost certainly GNEISENAU, lying alongside the quay on the north shore, where it was protected by a stone mole curving round from the West. The Beaufort flew in very low and at once came under the fire of some 270 anti-aircraft guns of varying calibre, established on the rising ground behind the ship and on the two arms of land which encircled the outer harbour. To the searing concentration of fire which these guns immediately produced was added the barrage from the guns of the warship itself and from those of three flak ships. Moreover, after penetrating these formidable defences and delivering its low level attack, the Beaufort would have the greatest difficulty in avoiding the rising ground behind the harbour. All these obstacles were apparent to the Pilot, who nevertheless resolutely carried out his attack. He passed over the anti-aircraft ships at less than mast height, skimmed over the mole and launched his torpedo at a range of 500 yards. The battle cruiser was hit and damaged below the water-line and subsequent photographs showed that she was undergoing repairs. But the Beaufort did not return. The Victoria Cross was awarded posthumously to the Canadian Pilot, Flying Officer Kenneth Campbell, and the Distinguished Flying Medal to Sgt. J.P. Scott his navigator. The other members of the crew were Sgt. W. Mallis and Sgt. R.W. Hillman, W/Op. and Air Gunner.

#### "STOPPER" PATROLS OFF USHANT.

39. With the presence of the battle cruisers SCHARNHORST and GNEISENAU in Brest, a series of "Stopper Patrols" was designed to give due warning of and, if possible, to frustrate an attempt at escape by either unit. These patrols were flown continuously and are shown at Appendix G.

#### COASTAL COMMAND'S PART IN BISMARCK OPERATION.

40. During 1941 aircrew trained for Coastal Command work, as well as aircraft of a type suitable for its tasks, were being diverted to the Middle East; yet the commitments remained both varied and widespread, and long range reconnaissance, extending to the North of Norway, was still an important feature of its effort. The determined way in which major naval units were consistently hunted is made manifest by the long-range flights ordered and undertaken at the end of April.

41. On the 22nd April a Sunderland of No. 204 Squadron, on a special reconnaissance to Narvik, reported the presence there of one battleship, two cruisers and two destroyers. Further long-range reconnaissance was undertaken by Sunderland and Catalina aircraft, but although the presence of the vessels in Narvik was confirmed, it was not possible to identify them. Adverse weather conditions hindered the successful conclusion of further sorties until, on the 27th April, a Sunderland of No. 210 Squadron obtained a good view of the anchorage at Narvik and confirmed that no enemy warship was present, either off Narvik or in the neighbouring inlets of Beisfjord, Rombasksfjord and Herjangsfjord. Final reconnaissance for the sighting of this enemy force was undertaken on the 29th April, when a Catalina of No. 210 Squadron, during a flight of 18 hours 56 minutes, looked at Tromso, Harstead and Hammerfest, but sighted no naval units.

42. On the 20th May, a report was received that at 1500 hours, two heavy ships, accompanied by three destroyers and five escort vessels, had passed through the Kattegat on a north-westerly course. A P.R.U. sortie at 1330 hours on the 21st May, located one battleship, and one 8" cruiser, with escort craft, at anchor in the fjords near Bergen. The photographs, from which it was appreciated that the vessels were BISMARCK and PRINZ EUGEN, showed that there was a possibility of launching torpedo and toraplane attacks, so the necessary preparations were made. As a prelude to these, a bombing attack by Whitleys and Hudsons from Wick was organised for the night of the 21st/22nd May, but this proved abortive owing to weather conditions. On the 22nd May, the weather remained bad over Norway, and it was not until the evening that a reconnaissance of the Bergen area was obtained.

43. This was carried out by a Maryland of the Naval Air Arm from Hatston, which reported that the enemy force had left. On the following day the weather again interfered with Norwegian coast reconnaissance, but cross-over patrols by Sunderlands and Hudsons were carried out between the Shetlands and Iceland throughout the day. Instructions were also sent to the O.C. No. 30 Wing (Iceland), to organise patrols in the Denmark Straits in anticipation of the enemy force attempting to break out into the Atlantic, North of Iceland, but bad weather prevented their implementation until the night of the 23rd May. At 2031 hours on 23rd May, H.M.S. NORFOLK sighted the enemy in position  $66^{\circ} 43'$  North,  $25^{\circ} 22'$  West, and subsequently a Hudson of No. 269 Squadron made contact at 0554 hours, followed by a Sunderland of No. 201 Squadron at 0610 hours.

44. H.M. Ships HOOD and PRINCE OF WALES joined action with the enemy in the early morning and, at 0710 hours, HOOD was sunk. At 0815 hours PRINCE OF WALES was hit and had speed reduced, but NORFOLK and SUFFOLK, assisted by Hudsons and Catalinas from Iceland, continued to shadow and, at 2335 hours, NORFOLK reported being in touch in position  $58^{\circ} 07'$  North,  $35^{\circ} 31'$  West, course  $180^{\circ}$ . At 0200 hours on the 25th May, Swordfish aircraft from VICTORIOUS attacked BISMARCK and obtained one hit. Bad visibility intervened, and contact with the enemy was lost at 0213 hours on the same day and, although a D/F fix at 1320 hours indicated her to be in the neighbourhood of  $55^{\circ} 15'$  North,  $32^{\circ}$  West, no further sightings took place until a Catalina of No. 209 Squadron sighted BISMARCK at 1035 hours on the 26th May. After careful analysis of the position and the probabilities of what she would do after contact was last made at 0213 hours on the 25th May, I decided that, in my opinion, her most probable course of action would be to make for the Biscay ports. I therefore ordered two cross-over patrols to cover the area  $52^{\circ}$  North,  $19^{\circ} 30'$  West, to  $48^{\circ}$  North,  $23^{\circ} 30'$  West. This cross-over patrol was so placed that if a sighting were made, it was hoped it would enable the Naval forces to overtake the enemy before she could get under cover of the protection of the Biscay ports. The sighting mentioned above was made in extremely bad visibility.

At the same time I had organised patrols to cover a possible break by the enemy either through the Denmark Straits or between Iceland and the Faroes. There was no sign of the cruiser, but aircraft continued to shadow BISMARCK. Throughout the day our Naval forces were converging on her, but it had now become a race against time, because unless her speed could be reduced there was every chance that she would be able to make a French port before KING GEORGE V. or RODNEY was able to overtake her. On the evening of the 26th May, however, aircraft from ARK ROYAL delivered two torpedo attacks and scored hits which resulted in BISMARCK'S speed being considerably reduced, and she was again attacked during the night by a division of destroyers led by COSSACK. Meanwhile, there was still no trace of PRINCE EUGEN, but a Catalina of No. 210 Squadron sent a report at 2344 hours on the 26th May which seemed to indicate that this ship might be some 40 miles S.E. of BISMARCK. Although it was too dark to identify the ship, the Catalina remained in touch until 0236 hours on

the following morning. In view of this report, sweeps and cross-over patrols were organised to intercept this ship on the assumption that she was steaming for Brest at 30 knots, and Bomber Command despatched a striking force of some 60 aircraft to try to make contact.

45. BISMARCK was engaged by KING GEORGE V and RODNEY on the morning of the 27th May, and she was finally sunk by torpedoes from the cruiser DORSETSHIRE at 1101 hours.

46. PRINCE EUGEN was not further sighted, nor was her whereabouts established, until the 4th June, when P.R.U. located her in Brest.

47. The story of the Bismarck operations ended on the 28th May, when those of our battleships and cruisers which were dispersing to ports in the U.K. were escorted throughout the day by relays of my aircraft, reinforced as far as possible by Fighter Command. Several combats with enemy aircraft occurred, during which one He.111 was destroyed and many others were driven off.

LUTZOW DAMAGED BY BEAUFORTS OFF S.W. NORWAY, 12TH JUNE, 1941.

48. On the early morning of the 11th June, information was received that a German naval force was on the move in the Baltic, and the possibility of a break out through the Skagerrak to the North was appreciated. Certain Coastal Command aircraft were engaged on offensive operations in the Skagerrak at this time, and they were warned to keep a sharp look out. In addition, instructions were issued for instituting the necessary Norwegian coast patrols and Photographic Reconnaissance to try to locate this force if it passed out of the Skagerrak. Further information received during the morning of the 12th June indicated the time at which the enemy force might pass the Skaw, and the patrols were re-arranged accordingly. There were no further indications of the whereabouts of this enemy force until the evening, when there was reason to believe that it might be approaching the line between Naze (in Norway) and Lodbjerg (in Denmark). The aircraft on patrol were warned, and an additional search from Horn's Reef northwards was ordered in case the enemy force might be going South to one of the German ports.

49. As no sighting had been made by 2230 hours, I came to the conclusion that if the despatch of the striking force were further delayed, what chance there might be of launching a torpedo attack before the enemy could seek the security of the Norwegian fjords, would be lost. I considered there was a reasonable chance of making an interception by working on an estimated course and speed of advance from the probable position of the enemy at 2030 hours. I therefore gave orders for the striking force to proceed. Accordingly, a striking force of torpedo bombers left Leuchars at 2300 hours to fly to a position off the Lister Light, thence northwards; a second force left Wick at 2330 hours for a position 58° 44' North 05° 30' East, thence southwards to Lister Light. This action had its reward when, at 2359 hours, a Blenheim of No. 114 Squadron on "Stand" patrol reported one cruiser and four destroyers in position 57° 48' North, 6° 50' East, course 270°. This information was passed to the Beauforts of No. 42 Squadron, which had been despatched from Wick and Leuchars, and at 0218 hours on 13th June contact was made by three of these aircraft. The heavy ship, subsequently identified as LUTZOW, was attacked in position 58° 21' North, 50° 45' East when, closely screened by destroyers, she was steaming on a course of 345° at 20 knots. The torpedo fired by aircraft 'W' hit the LUTZOW, but although 'R' made two attacks, his torpedo failed to release. The attack by aircraft 'Y' was most probably successful but the actual result could not be seen because the final part of the torpedo's run was obscured by smoke. Meanwhile, at 0230 hours, a further striking force of 11 Blenheims, and 4 Beauforts, armed with bombs, had left Leuchars to

proceed to Karmo, thence to sweep South-East to try to intercept the enemy. This force failed to make contact, but at 0600 hours a Blenheim of No. 114 Squadron reported, and unsuccessfully bombed, LUTZOW in position  $58^{\circ} 24'$  North,  $6^{\circ}$  East, Course  $180^{\circ}$ .

50. It had now become clear that LUTZOW was damaged to an extent sufficient to reduce her speed and to cause her to alter course for the Skagerrak again. One more attempt was made to launch a torpedo attack, but three Beauforts which left North Coates at 0930 hours failed to make contact. In this case, although the Beauforts were given the 1027 hours position of the enemy force which was being shadowed by a Blenheim of No. 248 Squadron, it is probable that, as the torpedo bombers were flying very low, the ships were hidden against the land. Throughout the day the crippled LUTZOW, with her escorting destroyers was given fighter protection, but in spite of this our aircraft made use of such cloud cover as there was and maintained contact until 1605 hours, when her position, as given by a Blenheim of No. 248 Squadron, was  $58^{\circ} 05'$  North,  $9^{\circ} 33'$  East, course  $095^{\circ}$ , speed 12 to 15 knots. After this, shadowing had to be discontinued, but a photograph had been obtained by a Spitfire of No. 1 P.R.U. when LUTZOW was ten miles South of Kristiansand South, and the belief that she had been seriously damaged by the torpedo attack on the night of the 12/13th June was confirmed when a photographic reconnaissance on the 17th June showed her to be in dry dock at Kiel.

PART ONE.ANTI-SHIPPING OPERATIONS.SECTION II - MINOR NAVAL UNITS.

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INTRODUCTION.

The anti-shipping policy of Coastal Command in the early days of the war did not include any specific plans for attack on the German minor units as a whole. Indeed, the anti-shipping role of the Command in the early days of the war was confined to reconnaissance. The necessity for a specific plan was, however, fully realised, and a policy for attacking these vessels and escort vessels of enemy convoys was formulated, ready for the time when the necessary aircraft would be available for this work, and when the situation should make it necessary.

THE TYPES OF VESSELS AVAILABLE AND THEIR USE BY THE ENEMY.

2. At the commencement of hostilities, the German minor naval units were a comparatively unimportant section of the enemy's sea forces. They consisted of a number of destroyers and torpedo-boats and escort vessels. Of these vessels only a small proportion was of new construction.

3. In September, 1939, Germany had at her disposal a total of twenty-two destroyers, and these she used throughout the war almost exclusively as escorts for naval units and merchant vessels of high importance. During the period of hostilities thirty-six more destroyers were built, including those of the 'Elbing' type, which were classed by the enemy as torpedo-boats, in spite of their tonnage and armament.

4. The thirty torpedo-boats which were available to the enemy at the outset, together with the further ten which were built during the war, were used largely as escort vessels, particularly in the Baltic and Kattegat, although they also carried out a limited amount of defensive minelaying.

5. Her main mine-sweeping force consisted of fourteen vessels of the M class. During the war, however, no less than two hundred of these useful vessels were built, to be used not only for mine-sweeping, but also as heavily armed convoy escorts and even as patrol vessels.

6. At the commencement of hostilities the escort vessels available to the High Command totalled only seven, but this number was rapidly and considerably increased by the conversion of many trawlers, whalers and other suitable types. These vessels were engaged in patrol work and mine-sweeping, in addition to their convoy escort duties.

7. The thirty motor torpedo-boats which Germany had at her disposal were the forerunners of the 150-200 formidable E-boats built during the course of the war. They were used for offensive patrols with torpedoes, for offensive minelaying and, towards the end of the war, as parent ships for the 'explosive motor-boats' (Linsen). They were also employed on a few notable occasions as escorts to vessels of great importance on passage through the English Channel.

8. The R-boats, of which forty were in existence at the outset, and up to two hundred more were built, played their part in a defensive role as fast minesweepers, minelayers and patrol vessels. They were also extensively employed particularly in the English Channel and the North Sea, as convoy escorts, often combining this role with the task of mine-sweeping ahead of the convoy.

9. Later in the war, when Allied minelaying by aircraft and surface forces had reached dangerous proportions, no less than a hundred merchant vessels of recent construction were converted by the enemy for special mine clearance duties, and operated mostly in the Baltic and the Bay of Biscay. These heavily armed "Sperrbrechers" often led the enemy's convoys, and made more difficult and more dangerous the task of our attacking aircraft.

### THE RECONNAISSANCE ROLE OF COASTAL COMMAND AIRCRAFT.

10. During the Autumn of 1939, the work of reconnaissance was often carried out under difficult weather conditions and in the face of determined enemy opposition. Sightings of minor naval units were made on a number of occasions, the most important of which was the finding, during the month of October, of a force of six enemy destroyers by a Hudson aircraft while on patrol between Borkum and Amsterdam.

### THE FIRST ATTACK BY COASTAL COMMAND ON MINOR NAVAL UNITS.

11. On the 13th of December, 1939, a Hudson of No. 220 Squadron sighted four enemy destroyers off the west coast of Denmark. This aircraft made a sighting report to its base and continued to shadow the enemy. At 1100 hours instructions to attack were received and the Hudson dropped two 250 lb. anti-submarine bombs from 2000 feet. No hit was scored. The aircraft, which had to face heavy anti-aircraft fire from the destroyers, was intercepted immediately after the attack by four He.115 float-planes but returned safely and undamaged to base. This was the first attack on an enemy minor naval unit by my Command and, indeed, the first attack made by aircraft of my Command on any enemy surface shipping.

### THE INVASION OF NORWAY.

12. When Germany invaded Norway and Denmark on the 9th April, 1940, my Command's struggle against the minor naval units began in earnest. During the first ten days of that campaign six attacks were made on these vessels, four by Hudsons with 250 lb. anti-submarine bombs and two by Blenheim fighter aircraft using only machine guns. These latter attacks were the forerunners of the highly successful cannon attacks made by the Strike Wing Beaufighters and Mosquitoes in later years.

### THE COMMENCEMENT OF THE ANTI-E/BOAT CAMPAIGN.

13. On the 10th May the enemy invaded the Low Countries, and the focal point of operations moved to that area. Eleven days later a battle flight of Anson aircraft of No. 48 Squadron began my Command's long campaign against the E-boats. They attacked a force of eight or nine E-boats off the Dutch Coast with 100 lb. bombs and machine guns. Light flak from the enemy force was intense and caused the loss of one Anson and damage to another.

14. Before the fall of France, on the 25th of June, no less than twenty-two attacks had been made on E-boats. Most of these were made on small forces at sea off the coasts of the Low Countries, but two attacks towards the end of this phase were made on boats moored in the harbour at Boulogne. Hudsons, Beauforts and Ansons all participated in these attacks, together with Albacores and Swordfish of the Naval Air Arm which were operating at the time under my control. The difficulties of attacking a small, fast and highly manoeuvrable vessel were well illustrated by the failure of any of these aircraft to claim bomb hits, although several of them were able to carry out successful machine gun attacks.

### THE INCREASE IN ENEMY PATROL AND ESCORT STRENGTH.

15. When the enemy's rapid military successes of the first half of 1940 did not bring the war to a spectacular conclusion, the German High Command was faced with the problem of combatting our blockade over a greatly widened area. Due in part to ever increasing difficulties with their very lengthy inland lines of communication, and in part to geographical considerations, they were obliged to develop rapidly a

large fleet of minor naval units to protect the shipping lanes used by their convoys, and also to maintain, as an important corollary to the U-boat campaign, the attacks against our coastal convoys.

16. To accomplish this the High Command had embarked upon an impressive building programme. In addition they had converted for use as escort and patrol vessels a large number of trawlers and ships of similar type, taken both from Germany and the occupied countries from whom already all available torpedo-boats, gunboats or naval auxiliaries had been requisitioned. When the invasion of the British Isles had ceased to be an immediate objective a number of landing craft intended for that operation were converted for use as anti-aircraft and patrol vessels.

17. During the year that followed the fall of France, a number of attacks was made on enemy destroyers when they were sighted either alone or as the escorting force for naval or merchant vessels. Hudsons, Blenheims and Beauforts carried out these attacks, which were not without some measure of success, despite the very heavy anti-aircraft defences of the vessels. The aircraft employed 500 lb., 250 lb., and 120 lb. General Purpose bombs, 500 lb. semi-armour-piercing and 250 lb. anti-submarine bombs. The Beauforts also made successful use of torpedoes. During the same period, attacks were also made on trawler type auxiliaries, M class minesweepers and a number of unidentified minor naval units. Some of these vessels were attacked at sea and others in ports.

PART ONE.ANTI-SHIPPING OPERATIONS.SECTION III - MERCHANT SHIPPING, LAND TARGETS, MINE-LAYING.

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PART I.ANTI-SHIPING OPERATIONS.SECTION III - MERCHANT SHIPPING, LAND TARGETS, MINELAYING.EMPLOYMENT OF AIRCRAFT FOR RECONNAISSANCE ONLY.

The role of Coastal Command during the first nine months of the war was limited, as regards merchant shipping, to that of reconnoitring suspicious vessels for subsequent "Visit and Search" by Naval surface forces. According to the "Hague Rules of Aerial Warfare", merchant ships, as such, were not legitimate targets for attack. An aircraft or warship could use force against a merchant ship in two cases only; these were (a) persistent refusal to stop, or to steer the course indicated by the escorting aircraft or warships; and (b) active resistance to visit and search. Only sufficient force might be employed to secure compliance with lawful orders at each successive stage.

STANDING PATROLS TO CLOSE NORTH SEA EXIT ROUTES.

2. Standing patrols between Scotland and the limits of Norwegian territorial waters, which formed the chief part of the Coastal Command War Plan, commenced on 23rd August, 1939. These patrols, which are shown at Appendix B, were the outcome of close study by my Senior Navigation Officer, his staff, and his opposite numbers in the Admiralty. At first the patrols were flown by Ansons. Owing to the limited range of this aircraft, the southern continuous line patrol which was an important component of the patrol system fell short of the Norwegian coast by 60 miles. The line patrol was therefore completed by 4 or 5 submarines, though it proved a difficult task for so few to keep this important area under constant observation. Between 23rd August and 31st December, 1939, 9,309 hours were flown on reconnaissance, a very creditable achievement having regard to the shortening days and the bad weather experienced towards the end of the year.

The institution of the blockade limited the area in which German shipping could trade with reasonable safety to the North Sea and the Baltic.

VARIETY OF SPECIAL RECONNAISSANCE TASKS.

3. Over and above the network of routine air patrols spread across the North Sea, designed primarily to detect onward and homeward bound enemy warships, a wide variety of special reconnaissance flights was undertaken which often entailed long searches far out at sea. Places of military importance on the German seaboard were photographed, and on information furnished by my Command reconnaissance aircraft, Bomber Command launched numerous attacks against enemy warships in the Heligoland area. An important task given to Hudsons of my Command in October, 1939, was the reconnaissance of the German minefields in the Heligoland Bight, with the object of discovering the navigational lanes through the minefield. Probably the greatest effort expended on searches for particular vessels during this first period of the war was made at the end of October and the beginning of November, 1939, when some 250 flying hours were spent in searches off Norway for the American ship CITY OF FLINT. This vessel had been stopped and seized on 9th October by the German warship raider DEUTSCHLAND about 800 miles West of Halifax. On 15th October the CITY OF FLINT was despatched to Tromsø with a German armed guard. An unconfirmed report on 27th October stated that the vessel, with prize crew on board, was sailing from Murmansk to Germany. Special patrols were flown by Coastal Command off Norway, and the CITY OF FLINT was finally located by a London flying boat on

2nd November off Bremanger, well inside territorial waters. She later put into a Norwegian port, discharged her cargo, and subsequently returned to the U.S.A.

#### FIRST ATTACK BY COASTAL COMMAND ON ENEMY SURFACE VESSELS.

4. Although a number of attacks on minesweepers, flakships and destroyers followed, yet the Hague Rules regarding direct attacks on merchant vessels continued to be observed. The G.A.F., however, carried out bombing and machine-gun attacks on Allied merchant shipping off the east coast of England from about mid-December, 1939, but it was not until June of 1940 that attacks on enemy merchant vessels by our aircraft became an accepted practice.

#### "ALTMARK" INCIDENT - COASTAL COMMAND'S PART.

5. Meanwhile, the general work of reconnaissance continued, supplemented from time to time by special searches for individual enemy or suspicious vessels, the best known of which was that carried out to find the ALTMARK. She was sighted at 12.52 hours on 16th February, 1940, by Hudsons of No. 220 Squadron, which had been searching since dawn in misty weather which cleared by mid-morning. The ALTMARK was picked up in position 58° 17' N, 05° 55' E. The aircraft approached and the pilot of one of them, diving down, was able to read the name which, though painted over, was clearly visible on the ship's side. More aircraft then took up the task of shadowing. As a result of the report from the aircraft, an Allied Naval force was able to reach the area barely an hour after the first sighting by the Hudsons. Later, the German vessel took refuge in Joessing Fjord, North-West of Lista, whither she was pursued by H.M.S. COSSACK, who boarded her and removed the prisoners. Hudsons provided an escort for the homeward voyage of COSSACK and the other warships engaged in the operation. Some Hudson aircraft stood by for a week, in order to attack the ALTMARK should she attempt passage back to Germany; but she remained aground in the fjord.

#### GERMAN INVASION OF NORWAY.

6. The German invasion of Norway and Denmark on 9th April, 1940, opened a new phase, and from the very start of this campaign, aircraft of my Command were kept busy reconnoitring the new battle area. Throughout the rest of April reconnaissance continued to be the main role of the Command, although 13 attacks were carried out during the period, 10 of them on minor naval vessels and the remainder on convoys and independent merchant ships. The weapons used in these first attacks were mostly 250 lb. anti-submarine bombs, but 250 lb. S.A.P. and 25 lb. incendiary bombs were also dropped. From the enemy's point of view this campaign resulted in a strengthening of resources both as regards shipping particularly suitable for enemy trade in Scandinavian waters, and in vessels suitable for conversion to the type of naval auxiliaries needed to safeguard his lengthening sea lines of communication.

#### EMPLOYMENT OF NEW AIRCRAFT TYPES.

7. April, 1940, was noteworthy in that it saw the introduction into the Command of the first long-range Blenheims. No. 235 Squadron, based at Birchan Newton and North Coates, and No. 254 at Birchan Newton with a detachment at Lossiemouth, were equipped with this aircraft and joined the Command just prior to the invasion of Norway. They were at that time the only aircraft which could be used as fighters over Norway, with the exception of the Naval Skuas operating from carriers.

8. Equally important was the commencement of operations by the first Coastal Command Beaufort Squadron, No. 22 Squadron based at North

/Coates,

Coates, which carried out its first attack on 7th May, 1940, in Holigoland Bight, and which, with other Beaufort Squadrons, achieved considerable success in torpedo attacks during the following year.

9. Coastal Command strength was further increased by the formation of a fourth Hudson Squadron, namely No. 206 Squadron, based at Bircham Newton. The other three Hudson Squadrons remained at their former bases, No. 220 at Thornaby, Nos. 224 and 233 at Leuchars.

#### INVASION OF HOLLAND AND BELGIUM.

10. Hudson aircraft on patrol off the Frisian Islands on 7th May reported a considerable concentration of German shipping, and that enemy destroyers were plying busily along the north-west coasts of Germany. It was obvious that something was in the wind. Early on 10th May, my Command Blenheims sighted eleven German aircraft crash-landed on the seashore West of Amsterdam and reported the airfield at the Hague to be strewn with parachutes. These were among the first indications that the invasion of Holland had begun.

11. The conquest of Holland secured for Germany unrestricted use of the port of Rotterdam, and the natural waterways of the Lower Rhine, which together provided by far the most convenient channel for the movement of bulk cargoes, notably of iron ore and coal, to and from the great industrial areas of Rhenish Westphalia.

12. No less than 25 attacks on shipping were carried out between 10th May and the end of the month, twice as many as in the same period of the previous month. These attacks ranged from West Norway to the southern North Sea and even spread into the Straits of Dover, where a Swordfish of No. 825 Squadron attacked an E-boat. This Squadron was one of three Swordfish Squadrons of the Naval Air Arm which operated under the control of Coastal Command in the southern North Sea during the latter part of May and in June, after which two of the Squadrons returned for a time to the Royal Navy. Near misses with 250 lb. G.P. bombs were claimed in a further Swordfish attack on a merchant vessel in the Scheldt area, while other attacks during May included one by a Battle Flight of three Hudsons from No. 233 Squadron on a convoy off South-West Norway.

#### COASTAL COMMAND COMMENCES ATTACKS ON LAND TARGETS AND HARBOURS.

13. The 28th May, 1940, saw the first attack on shipping anchored in a Norwegian fjord; two Hudsons of No. 224 Squadron dropped G.P. and incendiary bombs, but no damage was inflicted. In addition, Bomber Command attacks on Stavanger aerodrome were implemented by night attacks on the same targets on four nights during May by my Command Hudsons of No. 224, 233 and 269 Squadrons.

14. Meanwhile, further South, after five days of fighting over Holland, and escorting ships moving to and from that country with troops and refugees, I ordered that aircraft should devote a great part of their effort to attacking land targets. During the night 18/19th May, Hudsons and Beauforts carried out attacks on oil refineries at Hamburg and Bremen, and on the night 20th/21st May, five Beauforts of No. 22 Squadron, each carrying 4 x 250 lb. G.P. bombs, attacked the oil tanks at Rotterdam. The attack was most successful and several tanks were hit and fired. Later in the month Naval Swordfish and Skuas under Coastal control successfully attacked a tank column and enemy troop concentrations behind Calais; whilst night attacks by Hudsons and Beauforts and daylight attacks by Blenheims were carried out on oil tanks, gun batteries and wireless stations.

15. Thus began a period of twelve months, lasting until June, 1941, during which considerable effort was expended in attacks on coastal fringe

targets which included aerodromes, marshalling yards, military supply depots and barracks, as well as shipping in ports, and harbour and naval installations along the whole length of the German controlled western sea-board from Northern Norway to the Spanish frontier.

MINELAYING BY AIRCRAFT - DEVELOPMENT OF POLICY AND ACTIVITIES.

16. Probably the most arduous task carried out by the Royal Air Force was that of minelaying. It called for a very high degree of concentration and navigation, while giving no immediate satisfaction of knowing the success of the operation. In most cases information about minelaying operations only trickled through after a considerable lapse of time, if at all. While this form of offensive may be slow in producing positive results, there are certain directions in which it is quickly productive, since minelaying must be met with minesweeping, and it is the amount of negative effort involved in the counter measures which the enemy is called upon to employ, that rates it high in methods of offence.

17. The use of aircraft for minelaying had been quickly realised, and by February, 1940, a magnetic mine, known as the "A" Mark I mine, capable of being dropped from aircraft, had been developed and was in production. The strategical object of this mine was to menace enemy ships passing in and out of enemy base ports, and thus to achieve the maximum interruption to the enemy's sea communications. The mine, which weighed 1,500 lbs., could be carried by only two types of aircraft in use with the Royal Air Force at that time; these were the Beaufort, in service with my Command, and the Hampden, in service with Bomber Command. Naval aircraft of the Swordfish and Albacore types could also carry the mine fitted with a tail, as the use of a parachute was impracticable with these aircraft.

18. Trials were carried out by both Coastal and Bomber Commands to determine the range at which splashes could be seen on a moonlight night, and the training of No. 22 Squadron, still in the process of re-arming with Beauforts, was carried out with the utmost despatch during March, 1940, in order that the first operation could be laid on if possible during the moonlight period in April, i.e., between the 18th and 25th April. A joint meeting of representatives from Air Ministry, Admiralty, Bomber and my Commands was held at the Air Ministry on 8th April, 1940, to discuss the plan of minelaying operations. After careful consideration of all the factors, the boundaries of the laying areas were decided, as well as the allotment of areas to the two Commands. Due to their range, the Coastal Command Beauforts were restricted to operations off the Ems and Jade-Weser estuaries. The mining of these areas was therefore made the responsibility of Coastal Command, and the mining of all other areas that of Bomber Command. It was agreed that the first operation should be carried out in moonlight, and that it should be on the greatest possible scale and widely distributed. It was further agreed that it must be left to the Air Officers Commanding-in-Chief, Coastal and Bomber Commands, to decide the exact time when the joint action of their mining Squadrons should start. The first minelaying operation by Coastal Command aircraft was carried out two days before the period originally specified. Information had been received that German naval forces breaking back from the North Sea might be returning to the Elbe or Wilhelmshaven, and on the night 15/16th April, six Beauforts of No. 22 Squadron laid mines in Schillig Roads, just North of Wilhelmshaven.

19. Owing to my representations to the Admiralty that No. 815 Naval Air Arm Squadron, based at Bircham Newton, should be employed on minelaying, approval was given on 20th April for the employment of these Swordfish aircraft on those duties. The Squadron's first minelaying operation under Coastal direction was carried out on the night

22nd/23rd April, when six aircraft laid mines off Schiermonnikoog. Regular employment of the Squadron for minelaying continued until the end of May, 1940, when it returned to the Royal Navy. With the occupation of the Netherlands by Germany it was decided to extend minelaying by aircraft off German base ports to certain Dutch ports, namely, Texel, Yjmuiden, and to the estuary of the River Maas; a second Naval Air Arm Squadron, No. 812 just previously transferred to my Command, commenced minelaying operations in these new areas about the middle of May.

20. All minelaying operations during the latter half of May, 1940, devolved upon the three minelaying Squadrons of Coastal Command, Nos. 22 (Beaufort), 812 and 815 (Swordfish), as similar operations by the two Hampden Squadrons of Bomber Command previously engaged on this task were suspended owing to the situation in France. Operations were resumed soon after the beginning of June by one Hampden Squadron, under instructions contained in an Air Ministry signal of 3rd June. These instructions stated that the Hampden Squadron would remain under the operational control of Bomber Command but that, as previously, the details of targets would be given by Coastal Command. These requirements were increased after the fall of France by the request for the mining of certain areas on the North French coast, and in July the Admiralty asked that activities should be extended to cover all the remaining ports on the northern coast, with the addition of the west coast ports of Brest, Lorient, La Rochelle and St. Nazaire.

21. A letter from the Admiralty dated 16th July, 1940, stated that it was considered that the enemy had probably developed some method of sweeping the 'A' Mark I mine, since the dropping of them had been proceeding for some weeks. It had therefore been decided, for the future laying of the mines, to fit (a) a Clicker or period delay mechanism, and/or (b) double acting firing mechanism. The use of period delay mechanism was to be put into effect immediately, and 40 per cent of all 'A' mines issued would in future be fitted with varying period delays.

22. Meanwhile, the arrangements for the co-ordination of the mining efforts of Bomber and Coastal Commands and for the supply and distribution of the mines were not running smoothly. On many occasions, in both Commands, aircraft and crews were kept standing by on the promise of a delivery of the mines, when they could have been employed on other vital operational tasks. Also a certain amount of confusion then arose as to notifying the two Commands of minelaying requirements. I strongly represented this to the Air Ministry, and these representations were also fully endorsed by the Air Officer Commanding, No. 5 Group, Bomber Command, who provided the three Hampden Squadrons engaged on minelaying, who also had made representations. A reply was sent, in a letter dated 9th August, 1940, from the Director of Operations (Naval Co-operation), which stated that arrangements had been made for the Admiralty to re-commence passing direct to Coastal Command details of the areas to be mined, and that Coastal Command would be responsible for passing these details on to Bomber Command. Further, it had been decided that Coastal Command should act as the mine distributing authority, receiving all demands for mines, and, in consultation with the Admiralty, regulating their distribution in the light of existing and projected operations.

23. Backed by the policy defined in the Air Ministry directive of 9th August, 1940, the co-ordination of the minelaying efforts of Bomber and Coastal Commands proceeded more smoothly during the next six months. The individual effort of my Command still suffered severely from the lack of sufficient aircraft suitable for the laying of the 'A' Mark I mine, for No. 22 (Beaufort) Squadron and No. 812 (Swordfish) Squadron, Naval Air Arm, were the only minelaying Squadrons in the Command throughout the period. These Squadrons continued to operate in the areas between the Scheldt and the Ems estuaries, though I transferred No. 812 Squadron at a later date from North Coates to Thorney Island for operations in the Brest area and in the mouth of the Seine.

24. Minelaying by aircraft in areas between Flushing and Cherbourg was suspended from mid-September, 1940, to the end of the year. Many of the fields in this area were in positions where our Light Naval Forces might be required to operate and, so long as the normal 'A' Mark I mine with an active life of just over a year was being employed, some fifteen months had to elapse before an operation by our surface forces could be carried out with safety. By the end of 1940, however, a sterilising device was being developed which, when fitted to the mine, limited its effective life, in steps of a week, to a maximum of six weeks. The device was perfected and became available in April, 1941.

25. Meanwhile, the Bomber Command Hampdens were being employed in laying mines in the Elbe estuary, in the Western Baltic, and off ports on the west coast of France, including Brest. Their effort during the period under review, (August 1940 to January 1941) was reduced from that of the previous period, owing to the fact that they were carrying out full training for their primary objective, namely, the bombing of targets in Europe, which only allowed more inexperienced crews to be employed on mining operations. Therefore it was not always possible for Bomber Command to carry out their mining according to the "priority of areas", promulgated periodically by Coastal Command, since unsuitable weather conditions precluded the employment of inexperienced crews on long range operations.

26. The statistics for the first ten months of minelaying, that is, up to and including January, 1941, show that during this period 798 mines were laid by Bomber Command and 436 by Coastal Command. I expressed considerable anxiety as to whether the mining effort expected of the Royal Air Force could be maintained, since with the reduction of Bomber Command's effort it was not possible to guarantee a steady minelaying programme over the whole range of mining areas. Further anxiety concerning the Bomber Command programme was caused by an Air Ministry directive dated 25th January, 1941, which laid down the circumstances in which sea mining might be undertaken by Bomber Command at the discretion of their Air Officer Commanding-in-Chief. Those included sea mining with operational Hampden Squadrons only when conditions were unsuited to the prosecution of their main bombing tasks. Otherwise, minelaying could either be carried out by Stirlings and Manchesters, if the modifications needed for this task were completed before they were operationally fit for bombing duties, or could be undertaken during the training of inexperienced crews. However, due to the Battle of the Atlantic and to the movements of enemy raiders, Air Ministry ordered further minelaying by Bomber Command towards the end of March, 1941. Also, about this time, two additional Squadrons of Coastal Command began minelaying operations. These Squadrons No. 217 (Beaufort) and No. 827 (Swordfish) Naval Air Arm, were mainly employed in the Brest and Cherbourg areas.

27. It was estimated that about 160,000 tons of enemy shipping had been sunk or disabled as a result of minelaying carried out by aircraft during the first twelve months of operations, that is up to the end of April, 1941. News of our successes achieved by minelaying reached us only after long intervals, then usually in unconfirmed reports, so that the total tonnage estimated as sunk or damaged by this means probably represents only a bare minimum of what was actually achieved. This total may be considered a very creditable achievement, taking into account the changes of policy which occurred through an administrative period.

28. The consideration of minelaying operations as a whole during the period covered by this despatch has brought us to the Summer of 1941, and makes it necessary to revert now to the main struggle that was being waged in May, 1940.

EVACUATION FROM DUNKIRK.

29. On the 30th May, the evacuation of the British Army from Dunkirk was begun. In this operation it was the task of my Command to cover the area of the Narrow Seas while Fighter Command provided closer protection. On the last day of May and on the first three days of June, when evacuation operations were at their height, aircraft of No. 16 Group made 327 sorties over or near Dunkirk. Not only were German bombers and their escorts attacked, but also, where possible, German troops, and on the 31st May direct hits were scored by Naval Albacoros and Skuas operating under the direction of my Command, in an attack on pontoon bridges over the Nieupoort canal and on piers on the foreshore. Aircraft of the Command also helped in directing vessels to the rescue of men in the sea and other adrift in small boats, and on more than one occasion enemy aircraft which appeared on the scene were destroyed or driven off. After Dunkirk, escort continued to be provided for the evacuation still taking place from ports between Le Havre and St. Nazaire, and throughout these days no German aircraft attacked any of this shipping.

30. So ended the immediate part played by Coastal Command in the battle of the Netherlands, Belgium and France.

THE EFFORT AGAINST GERMAN PREPARATIONS FOR INVASION.

31. With Germany in command of the coastline of Europe from the Arctic Circle to Bayonne, long lines of communication, particularly those at sea, presented vulnerable and attractive targets for Coastal Command aircraft. The enemy, by his attacks on Allied shipping, laid himself open to retaliation, and all German and German controlled merchant shipping became fair game for Allied aircraft. An Air Ministry directive dated 4th June, 1940, included in a list of military objectives which could be attacked, "naval auxiliaries of whatever description and whether or not attendant on the fleet; troop transports and military supply ships whether at sea or in port". A qualification was given that all shipping could be treated as enemy transport or military supply ships in areas which would be specially notified. A copy of this directive is attached at Appendix C.

32. From 6th June, 1940, measures were taken by Coastal Command to keep a close watch on all ports from which an invasion fleet might be expected to sail. A series of anti-invasion patrols was instituted, and these were flown daily up and down the coastline of the occupied countries. The build up of these patrols, which are shown at Appendix D, was intended as far as possible to cover either one of the two alternative plans which it seemed possible the enemy might adopt in his operations against the British Isles. One plan was, of course, the actual invasion of these islands, while the other would have the effect of starving us out. The means employed would be intensive bombardment on the dock facilities of the East Coast, especially London, also of Southampton and West Country ports, coupled with the most intensive war against our shipping by U-boat, E-boat and aircraft attacks.

33. In addition to their anti-invasion reconnaissance role, Coastal Command aircraft carried out consistent bombing attacks on anti-invasion objectives during the next few months. The primary aim of these operations was to destroy the major concentrations of barges, small craft and merchant vessels at the enemy ports, with the secondary object of harassing the facilities and communications within and adjoining the ports.

34. Barge activity above normal was first noticed on the Beveland, the Ghent - Terneuzen and the Bruges - Ostend canals. From these canals concentrations gradually shifted to their mouths and eventually to the sea. By September, 1940, shipping and barges were spread all along the coast from Den Helder to Brest, the merchant vessels mostly at ports at

either end of the areas and the barges in the centre. It was estimated that the total amount of merchant shipping available in the area was about 240 ships, with a maximum carrying capacity of 400,000 tons. The total number of barges assembled by this time was assessed at 2,500, nearly half of which were situated at the port of Antwerp and the mouths of the above-mentioned canals, with major concentrations of the remainder at Ostend, Calais, Boulogne and Le Havre.

35. A total of some 400 attacks on land targets was made by my Command aircraft between 21st June, 1940, the date of the Armistice between France and Germany, and the end of December, 1940. Places visited included Den Helder, IJmuiden, Willemsoord, Rotterdam, Calais, Boulogne, Cherbourg, Le Havre, Brest and Lorient. Attacks were made on harbours, docks, shipyards, aerodromes, oil installations, canal works, factories, marshalling yards, A.A. positions and barges and shipping in harbours. As 1940 drew to a close, Coastal Command carried out raids more and more frequently and in the final month twice as many attacks were made as in July.

36. The Squadrons which were employed in these attacks on the "invasion" coast were two Hudson Squadrons, No. 206 (based at Birchan Newton) and No. 220 (at Thornaby); two Blenheim Bomber Squadrons No. 53 (at Detling) and No. 59 (at Thorney Island), transferred from Army Co-operation Command; two Squadrons of Ansons, No. 217 (St. Eval) and No. 500 (Detling); and two Squadrons of Battles, Nos. 12 and 142 (at Eastchurch), transferred from Bomber Command. In addition, two Squadrons of Blenheim Fighters, Nos. 235 and 236, were based at Birchan Newton and Thorney Island respectively. During the last four months of 1940, No. 217 Squadron converted from Ansons to Beauforts, making a total of three Beaufort Squadrons in the Command. The other two, No. 22 (at North Coates) and No. 42 (at Wick), which had been converting from bombs to torpedoes, recommenced operations in September and October respectively.

37. Of the total figure of 400 attacks on land targets mentioned above, only a very small number, apart from attacks on aerodromes, were carried out on targets in Norway. On the other hand, the majority of attacks on shipping at sea during July and August took place off the Norwegian coast, though later in the year, from September to December, they became fairly evenly distributed from Norway to West France. The Order of Battle of the Squadrons operating in the Northern area was as follows:-

Three Hudson Squadrons, Nos. 224 and 233 (at Leuchars), and No. 269 (at Wick); one Anson Squadron, No. 612 (at Dyce); one Torpedo Beaufort Squadron, No. 42 (at Wick); and one Squadron of Blenheim Fighters, No. 248 (at Sumburgh).

#### EARLY TORPEDO ATTACKS.

38. On September 11th, 1940, two Beauforts of No. 22 Squadron carried out the first torpedo attack of the war by my aircraft. They attacked, off Ostend, three merchant vessels, one of which, a vessel of 6,000 tons, was hit and reported to be sinking.

39. This Squadron quickly got into its stride, and had carried out a further seven attacks by the end of the month. Of the total of 38 torpedo attacks carried out during the 3½ months up to the end of 1940, all but two were carried out by No. 22 Squadron and ranged from the Hook to Heligoland. Torpedo operations off the Norwegian coast were confined to the only two attacks by No. 42 Squadron based at Wick, whose conversion was not yet completed.

40. Final figures of the attacks by the two Torpedo Beaufort Squadrons from 11th September to 31st December, 1940, showed satisfactory

/results.

results. Of 55 vessels attacked, 10, totalling 51,100 tons, were hit. The percentage of success expressed in number of attacks and number of vessels hit was 18.5 per cent. The average range of release was 670 yards, and the average height 68 feet.

#### ATTACKS ON AERODROMES BECOME A FEATURE OF OPERATIONS.

41. In line with the bombing policy of my Command, enemy shipyards, submarine building yards, naval dockyards and mercantile ports continued to receive the main bombing effort, although special mention should be made of the effort expended against aerodromes in enemy-occupied territory, the next in order of priority as regards bombing targets.

42. From the time of the German invasion of Norway, occasional attacks had been carried out on enemy aerodromes, but during November and December, 1940, they became a leading feature of the operations against land targets. During these two months, 105 bombing attacks were carried out, mostly by single aircraft, on aerodromes in the coastal strip between Lorient and Ostend. Blenheim bombers of Nos. 53 and 59 Squadrons were mainly employed for this task, though on a few occasions Hudsons and Beauforts were also used for night attacks. Only one Norwegian aerodrome received attention during the period, Stavanger/Sola, on which a small number of night attacks were carried out by Hudsons of Nos. 233 and 269 Squadrons.

#### CRYSTALLIZATION OF ANTI-SHIPPING OFFENSIVE.

43. During the period 1st June, 1940, to 31st December, 1940, one hundred and forty-one bombing attacks were made by my aircraft on merchant shipping at sea. Thirty merchant vessels received direct hits, of which sixteen were scored by Hudsons, thirteen by Blenheims and one by an Anson. In addition, near misses were claimed against forty-seven further vessels. It is estimated that, as a result of this total of one hundred and forty-one attacks, thirty-seven merchant vessels received varying degrees of damage. In assessing the measures of success achieved it has not been possible to compute any really accurate figures for the total tonnage sunk during this first period of attacks, as in many cases the result of hits were not seen, nor were any reports received of the ultimate fate of the vessels attacked. The following statistics, however, indicate the main trends during the period and their effect on the future anti-shipping policy.

44. The 250 lb. A.S. bomb, which was the type most widely used at the beginning of the period, gradually gave way to the 250 lb. G.P. bomb, though use of the 100 lb. A.S. bomb still continued. A number of smaller types, such as the 20 lb. fragmentation and 25 lb. incendiary bombs were also used, particularly by the Fighter Blenheims.

45. The height of release of the bombs tended to be lower during the latter months, there being a substantial increase in the percentage of "low level" attacks, that is, at or below 1,000 feet. Of the 63 level bombing attacks in which results were observed, nearly 50 per cent were carried out from between 500 feet and 1,000 feet, 19 per cent from between 1,000 feet and 2,000 feet, and 11 per cent from below 500 feet. The percentage of ships hit in relation to the total number of bombs dropped, however, was greatest at the lowest level, that is, below 500 feet. The value of attacks at low levels and the sharp decline in success when attacks were carried out at over 1,000 feet were realised, and the adoption of a low-level bombing policy early in 1941 soon began to produce profitable results.

46. At the beginning of 1941, land and port targets in France, the Low Countries and Norway still continued to be the chief target for the Hudsons, Bomber Blenheims and bomb-carrying Beauforts. At the end of

1940, after I had made a careful analysis of the general bombing policy of the Command, vis-a-vis the somewhat severe casualties amongst the General Reconnaissance aircraft employed in these attacks, I forwarded a request to the Air Ministry to issue a directive to Coastal Command defining afresh the Government's bombing policy as and when changes and modifications occurred, as well as for a periodic review of the "fringe targets" which could be attacked by Coastal Command aircraft as alternatives to the primary targets. In March, 1941, Air Ministry issued a new list of such targets, situated within 30 miles of the enemy-occupied coast, which included petrol and oil installations, aeroplane construction plants, and submarine and shipbuilding yards. However, the arrival of the enemy battle cruisers in Brest at the end of March, 1941, dictated the concentration of a considerable portion of the Command's effort on that port for the next few months by the bomber as well as the reconnaissance Squadrons.

47. The attack on shipping at sea was sufficient to force the enemy to adopt a system of convoy, and the early months of 1941 saw the attack on the shipping routes between Hook and the Elbe, and also on those along the Norwegian coast, begin to crystallize.

48. In some respects the results of the bombing attacks on shipping at sea during the first three months of 1941, compared with the results of the previous seven months, would seem to show a slight decline. Hits obtained on ships fell from 21 per cent during the last seven months of 1940 to about 18 per cent in the first quarter of 1941, though poor weather conditions were probably mainly responsible for the decrease. The important feature of the period was again to emphasize the fact that attacks carried out at low levels, under 1,000 feet, were by far the most successful in their damaging effect. The percentage of ships hit and attacks carried out from below 500 feet emphasised the greater accuracy obtained at the low levels, and how sharply the accuracy declined as the height was doubled or trebled.

49. It should be mentioned that in addition to the foregoing commitments of the Command against land targets, and the increasing call upon aircraft caused by the development of anti-shipping operations, normal anti-invasion patrols had still to be carried out over the North Sea and English Channel. In February, 1941, I transferred from the Eastern to the Western sea-board of the British Isles more aircraft because of the expected U-boat "Spring offensive" in that area, and, on urgent representations to the Air Ministry, my depleted force in the East was re-inforced by Nos. 107 and 114 Squadrons equipped with Blenheims, which were transferred to my Command from Bomber Command. For three months from mid-March these two Squadrons helped to maintain the anti-invasion patrols over the North Sea, and in addition carried out several attacks on shipping off South-West Norway.

#### FORMATION OF ANTI-SHIPPING OPERATIONS ASSESSMENT COMMITTEE.

50. As from 1st March, 1941, it is possible to include in this despatch the number and total tonnage of enemy merchant ships sunk or damaged by aircraft of Coastal Command in any specific period, according to the official assessment of what was originally termed the "Anti-Shipping Operations Assessment Committee". This committee, composed of representatives from the Air Ministry, Admiralty, Coastal and Bomber Commands, held its first meeting on 31st July, 1941, and assessed attacks carried out from 1st March, 1941, onwards. There are two main points which illustrated the need that existed for reliable and official figures of the damage being inflicted on enemy shipping by the various Commands of the Royal Air Force and the Navy. Firstly, considerable planning at the highest levels depended on the enemy's shipping losses; and secondly, exaggerated claims of tonnage sunk had been made outside. The Committee decided that there should be three categories of claim:-

I - Sunk; II - Seriously damaged; and III - Damaged. A category IV, No Claim, was also to be put in, in case evidence of damage was received later which would call for re-assessment.

#### BEAUFIGHTERS COME INTO OPERATION.

51. It is of interest to note the introduction of Beaufighter aircraft into Coastal Command operations, amongst the quite appreciable amount of Squadron re-arming which took place during April, 1941. This re-arming of various Squadrons, of course, affected, during the period of re-arming, their operational efficiency. The first Squadron to complete re-arming with the Beaufighter was No. 252, and their first task in Coastal Command was the interception of the F.W.200's carrying out reconnaissance flights and attacks against Allied shipping off Ireland.

#### CHANGE-OVER FROM MEDIUM TO LOW-LEVEL BOMBING.

52. The change-over from medium to low-level bombing may be said to have taken place during the period April-June, 1941, although as has been seen, it had its beginnings six months earlier. The 250 lb. G.P. bomb was by this time being used for almost all attacks on merchant shipping; during the period April-June, 68 per cent of the bombs used in such attacks were of this type, whereas only 12 per cent were of the 250 lb. anti-submarine type. There was also an increase in the number of 500 lb. G.P. dropped, the percentage for this type, 7 per cent, being double the percentage dropped during the previous three months. The fusing of the 250 lb. G.P. bomb, which, prior to the commencement of low-level tactics, had been instantaneous, was then altered to 11 second delay to ensure that the aircraft carrying out the very low-level attacks, often at mast height, would be well clear of the target at the time of explosion. The tactics of swift approach and swift "get-away" were carefully worked out and studied in order to reduce to a minimum the number of casualties suffered almost inevitably in attacks of so hazardous a nature. Bomber Command had also developed this form of attack, and had brought it to a fine art with conspicuous success.

53. During the period March-June, 1941, seven merchant vessels, totalling 16,629 tons, were assessed as sunk as a result of bombing attacks by Coastal Command aircraft, while a further four vessels, totalling 16,100 tons, were assessed as sunk by torpedo attack. In the damaged categories, three vessels, totalling 9,000 tons, were given as seriously damaged by bombs, while four vessels, totalling 11,000 tons, were seriously damaged by torpedoes. In addition, sixteen vessels, totalling 41,600 tons, were damaged by bombs.

#### CONCLUSION.

54. On June 14th, 1941, I handed over to my successor, Air Chief Marshal Sir Philip Joubert de la Forté, K.C.B., C.M.G., D.S.O. Our anti-shipping offensive had developed into a carefully planned and co-ordinated attack on the enemy's sea communications. Low level bombing tactics, first developed by Bomber Command, had proved to be the most profitable of those that had so far been adopted, and it was possible that some time might elapse before effective counter-measures were developed by the enemy. Given sufficient aircraft we could now forge ahead, and, with our attacks on the shipping routes, add to the transport and supply problems of the enemy in like measure with the bombing attacks on his inland communications.

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PART TWO.ANTI-U-BOAT OPERATIONS.

1. Concurrently with the enemy's strategy of threatening our sea communications by surface warships was his institution of a U-boat offensive.
2. It was estimated that the U-boat fleet consisted of 50 to 60 units. About half of these were of ocean going type, and the remainder of limited range and endurance suitable only for North Sea operations. Of the former, about five or six were already stationed in waiting positions in the Atlantic before the declaration of war.
3. Attacks on our shipping commenced on 3rd September with the sinking of S.S. ATHENIA in the north west approaches to the British Isles. The offensive increased rapidly for a fortnight, and died away towards the end of the month, while during the last week attacks developed against neutral shipping in the Skagerrak which also died away by 30th September. These periods represented the effective time on patrol of ocean going U-boats in the former area and the smaller type of U-boat in the latter.
4. Trade had not been put into convoy at the outbreak of war, but, in lieu, a "controlled" route was instituted through the south west approaches. This was patrolled by groups of anti-submarine vessels. The shipping itself was not escorted.
5. Convoy was ordered as soon as possible when it became clear that unrestricted U/B warfare had commenced, but due to the unavoidable lag in time, it was not till early October that both inward and outward bound shipping was in convoy. Even then it was not complete as regards inward bound ships.
6. The pre-war agreement as to Coastal Command's functions in War had stated that the minimum force necessary to carry out these duties was 261 aircraft of all types. At the outbreak of war the total was only 200. The primary task of reconnaissance in the North Sea took the majority, and it was only the residue that could be employed on the protection of convoys and offensive action against U/Bs in the Atlantic.
7. The policy I endeavoured to carry out was to provide one aircraft during daylight hours with every convoy under way within range of my squadrons, and to co-operate in addition with eleven of the anti-submarine groups operating in areas round the British Isles as specified by the Admiralty.
8. When trade was ordered into convoy, the number of destroyers was inadequate to provide escorts, so that the anti-submarine groups had to leave their areas and join in forming escorts to ocean shipping in the south west approaches. Similarly, the aircraft detailed for these areas had to be utilised to help with convoy work.
9. Due to the fact that the Command was well below the minimum numbers considered adequate before the war, it was not possible to give air escort to all convoys in danger areas; moreover, the limited radius of action of such aircraft precluded continuous escort to little more than coastal waters. These inadequacies were pointed out by me in letters to the Air Ministry. The need for air bases in S.W. Ireland to extend the range of escort was also stressed.
10. Very early in September I diverted much of the operational effort of the only two long range squadrons I possessed - Sunderlands - from convoy work to anti-U-boat work. The shipping that was being sunk was either that not yet organised into convoys, or independently routed ships or stragglers

/from

from existing convoys, and was taking place outside the range of any aircraft but Sunderlands.

11. In addition, organised and regular A/U patrols were further hindered in No. 15 Group by a constant stream of S.O.S. signals from sinking ships, D/F fixes of U/Bs. using their W/T, and sighting reports of U/Bs. from various sources, all of which required an aircraft sortie to help or investigate.

12. Regarding the answering of S.O.S. signals, much useful work was done by aircraft in locating survivors' boats, and directing rescue ships to the spot while at the same time giving A/U cover and assisting in any local hunt for the U/B. In one outstanding case the locating Sunderlands landed on the sea and themselves rescued the crew of a torpedoed vessel. <sup>#</sup>

13. During the first four months of the war it was inevitably a case of doing as much convoy escort as possible while leaving the groups with sorties in hand to fulfil emergency calls. This adjustment to circumstances makes it impossible to give a concise chart illustrating the A/U cover afforded during the period. Briefly, all East Coast convoys had one A/U escorting aircraft from dawn to dusk, all ocean convoys had continuous daylight escort while in the English Channel, Irish Sea, and St. George's Channel and in the south west approaches up to 200 miles from my air bases, but outside that range escort could only be given occasionally by Sunderlands who were being used extensively on duties already enumerated above.

14. 3,178 sorties of a total of 12,834 hours flying were devoted during the first four months to convoy escort and A/U duties.

15. Meanwhile in No. 18 Group was being developed a side of the U/B war which had not been envisaged before the war. U/B tactics at the commencement of this war were governed by the principles learnt in the First German War. Passage to and from their bases in Germany was made on the surface. Many sightings of surfaced U/Bs. were made from the outbreak of war by the Standard North Sea reconnaissance patrols. From the positions and courses reported, it was obvious that these U/Bs were on passage. By the 21st September it was possible to draw up plans estimating the tracks and probable time schedule used by U/Bs. when rounding the north of Scotland.

16. My naval staff, consisting as it did of ex-submarine officers, initiated this analysis. Acting under my direct supervision, and together with my Command navigator, special A/U patrols were designed and placed to effect the maximum harassment of these U/Bs. All No. 18 Group's aircraft which could be spared were thus utilised, and by November 1939, the results were increasingly successful in locating U/Bs at various stages of their passage route between the North Sea and the Atlantic.

17. A policy signal was therefore made on 13th November, that the location of and attack on U/Bs was to be of equal importance to the locating of enemy surface warships and merchant vessels. All routine patrols were to be flown at such a height as to afford the best chance of successful attack on enemy submarines. Henceforth my Command became increasingly U-boat minded. (See Appendix H).

18. Whenever possible, attacks were delivered, but it soon became clear that the anti-U/B armament supplied was inadequate seriously to damage, let alone kill, a modern submarine. My views were confirmed by my naval staff, and some form of depth charge was advocated. The matter was followed up, and as a result of suggestions at an Admiralty/Air Ministry meeting on 8th December, 1939, the Vernon Torpedo and Mining  
/Establishment

<sup>#</sup> The crew of S.S. "KENSINGTON COURT" rescued by two Sunderlands of Nos. 228 and 201 Squadrons.

Establishment at Portsmouth was directed to investigate and experiment along this line. This resulted in the production of a modified Naval Mark VII depth charge suitable for use from flying-boats. However, these were not in use in Sunderland squadrons until the late summer of 1940.

19. This offensive against the U/Bs. on passage, though not lethal, by reason of the innocuousness of the weapons, did harass them and was effective in forcing them to dive for the majority of the daylight hours, and in some cases brought the unwelcome attentions of asdic fitted surface craft. By thus prolonging their passage times it materially reduced their effective time in patrol areas.

20. During November, the U/B campaign against shipping at sea was subordinated to the exploitation of the magnetic mine. This was laid by U-boats, surface craft and aircraft. Predominantly it was aimed against the East Coast shipping, but U-boats carried it far afield to ports and focal areas in Western England and Scotland. To make up for the shortage of aircraft in providing reconnaissance close inshore against this threat, I decided to employ Tiger and Hornet Moths on A/U coastal patrols. These aircraft were organised in six flights disposed at various points around the British Isles. They carried no major weapons, but their function was to act as a "scarecrow" and to report the movements of U/Bs operating in inshore waters. Institution of these patrols commenced at the end of November, and continued until July 1940, being highly successful in their object. After the latter date, all U/Bs operated in the Atlantic and the "Scarecrows" were no longer needed.

21. Shipping losses by U/B declined from October onwards, due to the convoy policy, the magnetic mine campaign, the successes of surface hunting craft and to a slowly growing harassing programme from the air, until by April 1940, with one exception, the monthly total was insignificant.

22. The exception was the period at the end of January to the middle of February, when there was a flare up in the Moray Firth area. Two points of significance for Coastal Command here arose. Firstly, the U/Bs attacked at night, which made our day air escort abortive, and secondly, I tried out the recently equipped A.S.V. Mk. I aircraft at night, in an endeavour to protect the shipping and to co-operate with the escort vessels. However, this initial mark of A.S.V., although capable in a well trained operator's hands of locating convoys at 20 miles and land at 40 miles, was unequal to the location of such a small object as a submarine's conning tower even at the closest range, and my aircraft had to remain as helpless to prosecute any night A/U operations as before. The experience added a spur, however, to the efforts being made to produce an A.S.V. set which would enable aircraft to locate U/Bs. by night as well as day.

23. During April and May 1940, U/B operations were confined to the support of the German Norwegian campaign, the occupation of Denmark, and the offensive campaign against France. In the Norwegian campaign a great deal of A/U escort work was carried out by my Command, particularly during the evacuation of the British forces from Andalsnes and Namsos. Altogether 182 merchant convoys were escorted, in addition to 176 special convoys which included naval vessels, transports etc. Losses by U/B action were negligible.

24. Systematic plotting of air sightings of U/Bs had succeeded in placing air patrols in the best areas to locate U-boats on passage, and to indicate the rough patrol areas occupied by them. The great problem was how to make the air attack lethal. It was recognised at my headquarters that real decisive success lay in close co-operation with surface asdic craft, but at this time shortage of surface craft made it impossible to form "killer groups" or to specialise in the necessary training with the air. The alternative solution was to make the aircraft into a "killer".

Here the weapon was the limiting factor. Efforts had been made to hunt the once located U-boat by air alone, but shortage of aircraft precluded the necessary relief sorties to keep the U-boat down until battery and air exhaustion forced it to surface; in addition, the absence of A.S.V. at first, and latterly the limitations of the Mark I set, made it useless to keep up a night search. Much experience had been gained in the technique of cloud cover on the approach, and the best method of losing height rapidly to make a low level attack, but here again the limitations of the anti-submarine bomb prevented a real low level and therefore accurate attack. Nothing less than a bullseye shot with heavy explosive was of the slightest use against such tough and elusive targets. Direction in methods and technique were distributed to groups and stations in readiness for the days when numbers of aircraft and weapons should improve.

25. The situation regarding numbers and types of aircraft at my disposal caused me grave concern, not only because the strength was still below the minimum considered necessary to undertake the initial requirements of co-operation with the Navy, but because the war had revealed many new tasks which had not been envisaged. The most pressing of these was the provision of long range fighter protection to naval units, the need to employ long range fighter types to obtain reconnaissance near the enemy coasts, and the extension of A/U operations in scope and to ranges never contemplated in pre-war appreciations. Moreover, the re-equipment programme designed to replace the obsolescent types was crippled by the failure of the Lerwick flying-boat and the Botha landplane. The case of the former was particularly unfortunate in that the order for more Sunderlands could not become effective for many months because the jigs had been dismantled in favour of the Lerwick. 30 American P.B.Y. flying-boats were ordered, but deliveries could not commence before October 1940.

26. The fall of Norway and France profoundly altered the strategic situation. As far as Coastal Command was concerned it provided many new tasks and no additional resources:-

- (i) the existing North Sea reconnaissance patrols had to be discontinued and re-organised on the basis of fighting for any reconnaissance in addition to such reconnaissance being required along the whole of the deeply indented coastline of Norway;
- (ii) in addition to purely German waters, the coasts and ports of Holland, Belgium and France had to be kept under surveillance;
- (iii) special anti-invasion patrols had to be provided in the North Sea and English Channel (See Appendix D);
- (iv) long range fighter protection was required in the Atlantic approaches;
- (v) air escort and A/U measures had to be extended to distances and in areas unthought of in earlier months;
- (vi) increased and fresh commitments overseas for trade protection.

27. The U/B offensive re-opened at the end of May, and developed in the south west approaches. The pre-occupations of Air and Naval forces with the evacuation of the B.E.F., and the subsequent French campaign together with anti-invasion measures, left the Atlantic shipping protection forces far below a minimum safety standard, and shipping losses were very heavy. The entry of Italy against us was an additional drain on my inadequate resources. By the middle of June it was clear

/that

the Channel and south west approach traffic were gravely menaced by enemy aircraft, destroyers and E-boats. Convoys were re-routed to enter British Ports via the north west approaches and North Channel to the northward of Ireland. By mid-July the English Channel and south west approaches had been abandoned.

28. The problem of convoy protection was thus re-gravitated to the North west of the British Isles - an area in which I had few airfields or flying-boat anchorages. I again put forward the need for air bases and anchorages in S.W. Ireland.

29. During July, the U/B offensive continued to increase, and shipping losses were aggravated by long range enemy bombers operating from Western France which were reporting and bombing ships out as far as 9°W. U/Bs. were commencing to use Biscay ports as bases, which doubled their effective time in the Atlantic and avoided the harassing time previously spent on passage round Scotland.

30. The re-routeing of Atlantic shipping to the north of Ireland gave but a short respite as the new traffic lane was quickly discovered by the enemy long range air reconnaissance, and the U/Bs were re-directed to areas astride it and extending out to 18° W. longitude far out of reach of the majority of my aircraft.

31. The weakness of surface escorts and the reduction in air cover were not unnoticed by the U/B command, and attacks on shipping occurred much closer in to the focal point off Ireland. Moreover, they were showing increasing boldness in attacking convoys.

32. At this time I represented the need of immediate re-inforcements, at the minimum of 3 flying boats, 1 General Reconnaissance and 2 long range fighter squadrons, and pressed for a combined air and surface operation against these U/Bs. threatening our one remaining Atlantic life line.

33. August 1940 saw a revolution in U/B tactics. Profiting by their experiments in the Moray Firth earlier in the year, U/Bs now commenced night attacks on ships and weakly escorted convoys. Relying on their very small silhouette at night, they easily avoided the few escort vessels, and closed in on the surface to fire aimed shots or salvos into the convoy. Immediately after firing, the U/B would retire at high speed still on the surface, and when clear of pursuit reload at leisure ready to repeat the attack.

34. No air cover could be given at night in default of an efficient A.S.V. set, and the U/Bs' surfaced tactics entirely defeated the escort vessels' asdic detector. By adopting the role of submersible destroyers at night the U/Bs had achieved virtual immunity from counter-attack, and enormously increased their destructive powers. The proximity of bases in the Biscay enabled more of them to operate for longer periods, against our one trade route.

35. In the face of this grave situation, I again brought up the suggestion for combined action in the area to the northwest of Ireland. After discussion with the Admiralty on 10th August this was planned between my air forces based in the N.W. area and a small naval force based, at first, at Belfast and subsequently at Londonderry. Operations were controlled from H.M.S. TITANIA, in which was the senior naval officer and a joint staff composed of naval and air force officers. This combined force was hampered by lack of surface craft, and air action alone could not kill or seriously damage U/Bs because the weapon was still inadequate. The land based aircraft still only carried the anti-submarine bomb - 100 lb. or 250 lb., and the supply of modified naval depth charges was not large enough to permit of more than two being carried in the flying boats. The depth setting of these could not be adjusted to a shallower depth than

/100 feet,

100 feet, which was of no avail against a still visible U-boat. Once it was under, and became vulnerable to the depth charge, the chances of putting the latter within lethal distance varied inversely to the time elapsing since the U/B's disappearance. However, the much larger explosion from a depth charge, even though a near miss, was, I considered, a great advance in psychological effect over the small anti-submarine bomb.

36. Another inherent obstacle to the small force was the difficulty of handling prompt orders and changes of intention, so necessary to this type of hunting, while the senior officer was still under the jurisdiction of the larger command based far away at Plymouth. During its life - 16th August to 8th September - this "North West Striking Force" killed no U/Bs, but the resultant experiences, suggestions and constructive criticism made by it were of value in drawing attention to the specialised nature of anti-U/B warfare, the vital necessity for training and combined team work, and the existing difficulties of working sea and air craft together.

37. I viewed with concern the end of this promising scheme, and represented my recommendations to the Air Ministry. The operation and reports were considered at a joint meeting in the Admiralty on 23rd September, and it was decided to hold a weekly meeting henceforth to review all existing methods and receive suggestions for new methods of trade protection. Amongst other conclusions were the necessity for a new Command based in the N.W. area for the operation of naval and air forces in the western approaches, and that depth charges were the proper and recognised armament for all aircraft employed on anti-U-boat duties.

38. September had brought still another factor into the U/B war. To achieve long range reconnaissance and bombing attacks on shipping in the Atlantic, the Germans had adapted the civil air liner "Focke-Wulf Courier" to war purposes under the name Focke-Wulf Condor, or F.W. 200. These aircraft mounted cannon and a varying load of bombs depending on the range desired to operate from their base near Bordeaux. No merchant ships carried A/A. armament, so that these aircraft increasingly attacked single ships or stragglers from convoys out as far as 18° west longitude. Convoys, however, were not attacked but shadowed and reported to base. These reports were rebroadcast out to the U/Bs; who were able to intercept those convoys within their reach, shadow them by day and attack at night. This gave rise to another development in that several U/Bs. could intercept the same convoy, shadow it by day and unite in the night attack.

39. Counter-action was ineffective. Convoys within reach of my medium ranged aircraft were escorted, but the close escort which it was considered necessary to maintain served no purpose except for morale of the merchant ships, for no attack was delivered by day. I had not sufficient aircraft to provide sweeps at a distance from the convoy so as to harass the shadowing U/Bs., and at night the lack of A.S.V. made air escort of no value. Moreover there was a lack of night landing facilities on the western airfields.

40. The weekly Trade Protection meetings alluded to in para. 37 commenced on 1st October. As these provided a common meeting place for all those concerned in countering the threat to our shipping, I attended in person together with members of my staff on all occasions.

41. During October, at these meetings, a number of measures were approved or suggested which directly affected my Command. The most important were the hastening of the fitting of A.S.V. Mark II in No. 502 Squadron, the development of the special R.A.F. depth charge which could be carried by all types of aircraft, the fitting of R/T in all aircraft and escort vessels for better intercommunication, and the more northerly

/routeing

routing of Atlantic shipping to avoid the F.W.200 reconnaissance. This latter measure also had my full concurrence because I had always envisaged Iceland as a future base for my aircraft so as to enable a "reach out" of air escort further into the Atlantic.

42. At this time No. 200 Group based at Gibraltar, and hitherto under the A.O.C., Mediterranean, was transferred to my Command. It consisted of No. 202 Squadron of 6 London flying-boats and a detachment of Swordfish aircraft. Energetic measures were proceeding to enlarge the flying-boat bases and to remake the land airfield. Until more up-to-date aircraft could be provided, the operations were confined to anti-U-boat patrols in the Straits.

43. The crystallization of U/B tactics during September and October had been, from the air protection angle, the study of myself and my staff. Shortage of aircraft was to prevent its adoption, but the ideal aimed at was to replace the rigid close escort with a much more extensive and flexible cover. The underlying principle was to employ sweeps covering the water traversed by the convoys, together with more distant, than heretofore, escort of individual convoys. The whole design was to keep the U/Bs submerged by day, and to frustrate the closing in movement just before sunset. As soon as sufficient aircraft were fitted with A.S.V. Mark II, night sweeps around and ahead of convoys would be carried out.

44. Shipping losses in October from U/B attack reached a record figure, while counter measures were again ineffective. The aircraft situation showed little sign of improvement, and to aggravate the shortage I was called on to provide pilots and crews for urgent reinforcements to the Mediterranean.

45. A sense of frustration in the face of enemy successes was widespread. In this atmosphere of dissatisfaction, the memorandum of 4th November in which the First Lord of the Admiralty requested immediate and long term increases in the strength of Coastal Command, became in the Defence Committee of the Cabinet a claim for operational control if not complete transference of the Command to the Navy.

46. Ultimately it was agreed that I should immediately be reinforced by 3 G.R. squadrons and that the establishment of certain existing squadrons should be raised. All deliveries of the American P.B.Y. flying-boats (Catalinas) were to be put into the first line (fifty-seven due to reach this country by the end of April 1941) and a medium term programme was approved for the addition to my Command of 15 squadrons by June 1941.

47. Regarding the future of the Command it was agreed that no transference should take place, but that the operational control of Coastal Command should be exercised by the Admiralty through me. Actually this made little difference to the day-to-day control of my aircraft. The existing close co-operation between myself and the Admiralty, whereby I carried out the naval requirements according to my resources, remained unchanged. However, the transfer of operational control, which took effect finally on 15th April, 1941, did three things:

48. Firstly, it emphasised the predominance of the Naval element in the existing operational partnership. Secondly, although leaving the ultimate responsibility for administration, technical development and training with the Air Ministry, it provided, in the Admiralty/Coastal Command Committee and Liaison Section which were set up, an effectual means whereby Admiralty views and naval requirements could be incorporated. Thirdly, it gave definition to the constitutional position of Coastal Command which hitherto had remained rather nebulous.

49. During November the U/B operations in the Western Approaches continued, but on a slightly lesser scale. The activities of the F.W.200

/squadrons,

squadrons, however, increased rapidly and covered a large area of the Atlantic between latitudes 50°N and 60°N and as far west as longitude 20°W. I had moved two of my long range Blenheim fighter squadrons in October to Aldergrove in Northern Ireland, and I now stationed another in Cornwall in an endeavour to intercept these enemy aircraft off S.W. Ireland.

50. The frequent W/T signals sent out by these aircraft during their sorties were D/Fd, and a running plot of their course could be maintained, but the actual interception was difficult. Long range fighter escort was given to shipping, whenever possible, but it was impossible to afford general protection even in the small area east of 10°W. One of the enemy's long range aircraft was intercepted on 30th November off S.W. Ireland by three of my Blenheims, but after a dog-fight the enemy got away into cloud. The Blenheim fighter was not sufficiently gunned, nor had it a decisive superiority in speed, and I made representations for early re-equipping with Beaufighters.

51. In face of the difficulty of getting to grips with the U/B menace at sea, due to shortage of both surface and air craft, I made repeated requests for bombing attacks to be made on the growing U/B bases in the Biscay area. Although I obtained permission to use my limited bombing resources in this mission, it was not found possible to direct other than a few light raids by Bomber Command on these concentrated wasps' nests.

52. Regarding the Focke-Wulf activities, I suggested the fitting of assisted take-off gear and light flight decks to oil tankers and grain ships, whose clear decks would lend themselves to some such measure, from which to fly off Hurricane type of fighters, and the possibility of employing a "Q" type of trap ship with masked A/A armament to appear as a straggler and lure the enemy aircraft into attacks.

53. By the end of the year I had more short range aircraft available in the north west approaches, and was able to put into limited operation distant escort and sweeps in dangerous areas covering convoy routes out to 15°W longitude. This hampered the U/Bs in their interception and shadowing tactics, and they commenced moving further out beyond the reach of air patrol. For the same reason they commenced to exploit areas off Portugal and Freetown, in operations against our Gibraltar, West Africa and Far East traffic, though the better weather conditions in these latitudes no doubt was a considerable factor.

54. Resulting from my recommendations regarding basing aircraft in Iceland, and hastened by the events in the Atlantic which were forcing our trade route further and further to the north, approval was given on 1st January, 1941, to the formation, as soon as squadrons became available, of an Iceland Air Force. This became operational as No. 30 Wing in March and April 1941, with 1 squadron of Sunderland flying-boats, 1 squadron of Hudsons, and 1 squadron of Battles. By May, a Norwegian squadron of Northrop float planes had been formed, which replaced the Battles early in June.

55. In February 1941, the new Western Approaches Command took over the conduct of shipping protection on our main Atlantic routes. It operated north of latitude 53°N and west of a line joining Cape Wrath to Iceland. It had been forming at Liverpool since October, and was organised as an Area Combined Headquarters which housed the new Naval C.-in-C., Western Approaches and the R.A.F. No. 15 Group which had shifted up from Plymouth. To take its place, a new group was created - No. 19 Group - which occupied the existing Area Combined Headquarters with the Naval Commander-in-Chief at Plymouth. The

area controlled lay between No. 16 Group's western boundary of longitude 3° West in the English Channel and southern boundary of No. 15 Group along latitude 53° North. (See Appendix H).

56. Early in 1941, the situation in the Atlantic was a great deal quieter, due largely to the tempestuous weather. There was evidence that the U/B expansion programme was bearing fruit, and that at least fifteen U/Bs were now maintained at sea in the Atlantic. Sightings and other intelligence indicated that these U/Bs were being divided into groups of four or five which were disposed in areas athwart our trade lines, some being placed well west of 20°W, and some closer to the British Isles. The Focke-Wulf aircraft were active in reporting convoys and bombing single ships. It was plain that with improving weather conditions an intensification of the campaign against our trade would develop.

57. I made strong representations that the north west area should be heavily re-inforced. Resulting from discussions between Coastal Command, Admiralty and Air Ministry, certain measures were considered in a Chief of Staffs' meeting and were approved by the Defence Committee of the Cabinet. These measures included the re-disposition of eight of my squadrons from easterly and southerly stations to the north west area, and the loan of two Bomber Command squadrons to meet my consequent reduced ability to maintain anti-invasion patrols.

58. It was realised that further re-inforcement of this area was limited by the lack of airfields, and the Prime Minister minuted the departments concerned, stressing the vital need for completing the sites commenced at Eglington, Ballykelly, Nutts Corner and Killadocs in North Ireland, with Tírce, Port Ellen, Benbecula and Stornoway in the Hebrides.

59. As the enemy's spring offensive developed during March, involving much increased shipping losses, the gravity of the situation was realised to the full. At the end of March, the Prime Minister inaugurated a special meeting at the highest level, called the "Battle of the Atlantic Committee", with weekly sessions, thus assuring priority consideration of all measures suggested or recommended by the active Commands, the Admiralty and the Air Ministry.

60. Due to this a number of long advocated measures developed or came into being. Three squadrons of medium range aircraft were equipped with the Mark II A.S.V. and five short range squadrons were being converted from the Mark I. Four flying-boat squadrons were re-equipping with Catalinas, so that by the end of May the obsolescent Stranraers and Londons had been replaced. The Londons at Gibraltar in No. 202 Squadron were replaced by Catalinas, and a squadron of Sunderlands was being built up in the Freetown area. The Hudson squadron in Iceland was reinforced, and the Wing Headquarters there was brought under the operation of No. 15 Group.

61. The increase in the number of aircraft in the north west area and Iceland made it possible to implement the policy I aimed at regarding defensive measures against the combined U/B and Focke-Wulf activities. This policy was in the nature of an offensive defence. Offensive sweeps were carried out into the Atlantic to a depth of 400 miles. Individual escort was provided for convoys out to 300 miles but such escort was at a distance of 15 to 30 miles from the convoy and was made a priority requirement in the later afternoon up to sunset. The aircraft on this duty from time to time contacted the convoy for communication with the senior naval officer of the escorting vessels.

62. The effects of this increasing air cover were immediate. The U/B groups were forced to retire further still to the west and south, to the Freetown and Cape Verde Isles areas, where they could develop their intercepting and shadowing tactics free of harassment from the air.\*

/Although

\* In February, 3 Sunderlands were sent to Bathurst to form No. 95 Squadron. They were added to from time to time and operated to provide A/U cover in the Freetown area.

Although it showed that the policy was correct and that ultimately really long range aircraft disposed at bases on both sides of the Atlantic could provide continuous cover, it had no immediate effect on shipping losses, because U/Bs now operated beyond air reach and often beyond the range at which surface escort could be provided.

63. U/B tactics had by now become standardised. Groups, which were increasing in numbers, were stationed in various areas in mid-Atlantic. Where possible Focke-Wulf aircraft reported the positions and courses of convoys, otherwise one U/B of the many strung out groups would sight and report a convoy. Such reports were received by the U/B Command in France, and orders issued to particular groups as to how general concentrations were to be effected. U/Bs, as they closed in on the surface and sighted the convoy designated, reported in turn that they were in contact. Not until sufficient were thus shadowing did the Command order the attack to commence.

64. There was in consequence an immense amount of W/T signalling which could be D/Fd and added to sighting reports by aircraft or ships, and it was possible in the Admiralty Tracking Room to gain a fairly accurate picture of the U/B dispositions and which convoys were threatened.

65. A very close liaison had been maintained between the naval staff at Headquarters Coastal Command and this Tracking Room from the earliest months of the war. It had resulted in the placing to the best advantage my offensive sweeps and much of my A/U operations. Now, at this time, it played a large part in the harassing of any U/B concentrations which were or were believed to be within reach of my aircraft. It also enabled me to dispense with escort or sweeps round convoys which were not immediately threatened, and so to concentrate on convoys threatened or reported by U/Bs or Focke-Wulf aircraft.

66. By February 1941, I had established fair immunity from attack by U/Bs on shipping out to 250 miles from our coasts, though the Focke-Wulf aircraft, operating now from Norway as well as France, inflicted heavy casualties inside this area due to the absence of A/A armament in ships, and the small numbers and short range of my fighters. By the end of May 1941, there was immunity out to 400 miles from the British Isles and Iceland, and the U/B packs had retired to mid-Atlantic, where they finally lost the aid to location of convoys which they hoped to obtain from their long range air reconnaissance.

67. Anti-U-boat operations, since they are to protect our shipping, are strategically defensive. But within the framework of defensive strategy, tactics can be both offensive and defensive in character. The close protection of convoys, which may be classified as purely defensive tactics, was continued up to early April 1941.

68. By that date, however, notable advances had been made both in respect of types and numbers of aircraft. This, together with the previous study of the technique of air action against U/Bs, pointed to the high desirability of offensive tactics. Such tactics involved the hunting of U/Bs in areas unrelated to the convoy routes, but through which they had to pass between their bases and the areas of operation. There were two such areas, namely the Bay of Biscay, and the Northern waters between Iceland and the Shetlands. The latter was of importance because it was the only route out from German or Norwegian ports, and through these waters new U/Bs manned by unskilled raw crews proceeded into the Atlantic on their first patrol, or direct to Biscay bases.

69. Using the comparatively short range aircraft which the U/B Pack retirement from our coasts had released, I inaugurated patrols

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and sweeps in these two transit areas from Nos. 19 and 18 Groups.

70. It will be appreciated that during this first phase of the Anti-U/Boat war, the influences of technical and supply problems were frequently brought into sharp focus. Problems connected with the conversion of A.S.V. equipment in aircraft, difficulties (to which the weather frequently contributed) associated with the delivery of aircraft built in the United States, and minor teething troubles among equipment newly arrived, combined to disturb the even progress of the Command's expansion programme and to affect adversely the standard of operational serviceability of my air strength.

71. These difficulties, however, were gradually and effectively reduced, and by the midsummer of 1941 the full strength at my disposal for all commitments was forty squadrons. At this date there were available for operations in the North West Approaches a total of 269 aircraft. Under the expansion programme which had provided for the formation of fifteen squadrons by the end of June, fourteen had been established, and under the programme for equipping aircraft with A.S.V. a total of 212 aircraft had been fitted.

72. There was, in addition, the pressing urgency for securing with all possible speed, bases and airfields from which intensive operations in the North West Approaches could be conducted. Progress in the Western Isles, at Tiree, Benbecula, Port Ellen and Stornoway; in Northern Ireland at Ballykelly, Kirkistown, Long Kesh and Nutts Corner; and in Iceland at Kaldadarnes and Reykjavik, was at one time or another hindered by reason of supply, transport, labour or climatic difficulties.

73. Consideration may now be given to the factors which had to be taken into account in planning our operations. In the first place, the average rate of progress of a submerged U-boat was 2-3 knots, except for short bursts of 6-7 knots, which if maintained, would exhaust the batteries in less than an hour. Secondly, at that time, the standard type U-boat was compelled to come to the surface for several hours in every twenty-four, in order to recharge its batteries and to ventilate the boat. If, therefore, the area through which a U-boat could pass at submerged speed in twenty-four hours could be kept under constant observation by aircraft, sightings of surfaced U-boats at some time during that period were in theory a certainty.

74. But even in the clearest weather there is a limit to the range at which a U-boat can be detected from an aircraft. Statistical analysis of anti-U/Boat operations up to May 1941 showed that in visibility of the order of twelve miles, the average sighting distance of a surfaced U-boat by an aircraft was six miles, and in inferior visibility the range was, of course, considerably reduced. The patrol areas of individual aircraft had therefore to be close enough to each other to ensure that there was no gap between the visual ranges of adjacent aircraft. Furthermore, if we were to be sure of catching the enemy on the surface, we had to ensure that every spot in the patrol area was under observation at least once during the minimum period of time required by the U-boat for recharging its batteries. At night, except in bright moonlight, the chances of sighting a U-boat were negligible, since there was no reliable means of illumination in service at that time. (See para. 81).<sup>#</sup>

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<sup>#</sup> Regarding the range at which an aircraft was visible to a U/B, "Surprise" tactics had been studied in connection with using "base of cloud" cover. Reliable A.S.V. made this much more effective. In April, I directed experiments in camouflage which resulted in some A/U aircraft being painted white. This was most effective in concealing the aircraft from U/B look outs and was afterwards adopted as standard practice.

75. It was appreciated that although the aircraft position had much improved in recent months (the Order of Battle at June 1941 is given at Appendix "E") the Command still had insufficient aircraft to embark on this policy with a confident anticipation of complete success, yet its implementation was considered to be justifiable, and in spite of the limitation in numbers of aircraft, it produced immediate results. U-boat captains found themselves compelled to submerge in areas where they had formerly moved freely on the surface. This slowed up their rate of progress, shortened their time on patrol, and materially reduced the potential threat to our shipping.

76. The conclusion of the policy of escorting every convoy for which aircraft could be made available, marked, therefore, the first clearly defined phase in Coastal Command's part in the U-boat war. This first phase had been one in which effective anti-submarine aircraft, tactics, weapons and radar had had to be developed with little experience of this type of air warfare.

77. Even so, the development was yet far from complete. Notable advances had been made in respect of types and ranges of aircraft, and in tactics. Depth charges were released at a height of 50 to 100 feet, but the lethality of attack, at about 1.25 per cent was still too low. From the beginning of hostilities until the 1st June, 1941, the sightings of U-boats numbered 233, from which 164 attacks resulted. The Command was credited with one kill by aircraft alone, and two shared in co-operation with the Navy. The number of U-boats damaged was assessed at twenty-two by Coastal Command aircraft, with three others shared with surface vessels.

78. A statistical analysis of the results of anti-U/boat operations during the first twenty months of hostilities is given at Appendix "F".

79. Two factors emerge in considering the reasons for this failure to kill the U-boats attacked. In the first place, the destructive power of the anti-submarine bombs was nil, and even the Amatol-filled depth charge was inadequate. Secondly, the form of attack was largely designed to deal with the well-submerged U-boat. Depth charges could not be set to explode at shallower than 100 feet, and delays on anti-submarine bombs of one to two seconds were used, together with wide stick spacing. With the exception of perhaps one Italian submarine, all the submarines sighted during the period submerged, or attempted to submerge, before being attacked. But practically all successes obtained were against U-boats on or near the surface. The probability of a direct hit in plan in such cases was limited only by the bombing error. But for the U-boats out of sight when attacked, there was the additional error due to the uncertainty in the position of the target, both in depth and plan.

80. Developments in scientific research, particularly in radar, had made considerable advance, but the number of U-boats sighted by means of A.S.V. up to this time was negligible and had had little effect on results, expressed in the number of sightings and attacks.

81. It was not until A.S.V. became reliable that night operations could become profitable, or that the illumination of and attack on U/Bs could become practicable. The latter problem was solved in theory and well under way to practical results before I relinquished the Command. The originator - Squadron Leader H. de V. Leigh - was employed at my headquarters in "P" staff duties. On 13th October, 1940, he placed his proposal before me. Briefly, it was to instal a naval type of search-light in an aircraft to be used in conjunction with A.S.V. for detection and final attack on a U/B. This light would bridge the gap of  $\frac{1}{2}$  to 1 mile left between the target and the point at which the A.S.V. fades out, and would brilliantly illuminate the U/B, enabling an accurate and

low level attack. I gave my full support and encouragement to this project, and under the energetic drive of Squadron Leader Leigh, a prototype installation was completed in a D.W.1 Wellington, using standard equipment whenever possible, for quick results by the 20th January, 1941. Fitting of A.S.V. Mark II, and further experiment, lasted till April, when trials were carried out using one of our own submarines as target. These trials established beyond all doubt that the project was a successful proposition. Further refinements, alterations and improvements were made in the ensuing two months, and full scale trials with bomb load were being carried out at sea from Carew Cheriton when I left the Command on 15th June. This invention went on to become one of the major influences in the air war against the U/Bs under the name of its author - the "Leigh Light".

82. Another cardinal factor which cannot be ignored is that major units of the German Navy were active against our trade in the Atlantic, particularly in the latter period of my appointment. Special patrols to locate these vessels, the HIPPER, the SCHARNHORST and GNEISENAU and the BISMARCK, were a constant burden on the limited resources at the disposal of the Air Officers Commanding the Groups engaged in the U-boat war. In June, 1941, the total number of U-boats sighted increased considerably, but it was to be some time before any appreciable increase in the number of kills was recorded.

83. In this month I handed over to my successor, Air Chief Marshal Sir Philip Joubert de la Ferté, K.C.B., C.M.G., D.S.O. The first phase of the struggle was over, and our early difficulties and problems had been largely overcome. Perhaps the greatest achievement of this period was that the value of air power in the war against the U-boats had been recognised. With the air potential firmly established and fully appreciated, we could see clearly, rather than feel cautiously, our way into future battles.

PART THREESECTION ONEPHOTOGRAPHIC RECONNAISSANCE

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PART III.SECTION I - PHOTOGRAPHIC RECONNAISSANCEINTRODUCTION.

1. As the result of a conference held at the Air Ministry, Whitehall, on the 10th June, 1940, the Photographic Development Unit (P.D.U.) Heston, and the Photographic Development Unit Interpretation (P.D.U.I.), Wembley, were placed under the control of Coastal Command with effect from the 18th June, 1940. From the outbreak of war until this date the organisation had been administered direct from the Air Ministry.

PAST HISTORY.

2. Originally formed in October, 1939, from a peace time Survey Unit, the new organisation contained many civilian specialists, several of whom had actually carried out very important photographic survey work over the Continent during the year 1939. To a large extent the standard civilian equipment continued to be used, and the units were organised on similar lines to those of the civilian set-up, which had been found to work satisfactorily. Photography at this time was carried out at varying levels, but mainly from very considerable heights. Fighter type aircraft were employed to obtain the performance necessary at great heights, and although at first other types were used, ultimately the equipment was composed of Spitfires, with one or two Hudsons for photography in quieter areas.

3. On the 6th November, 1939, a detached flight went to France, and returned to Heston on the 11th January, 1940, with many photographs, particularly of German aerodromes. The flight again went to France on the 19th January, 1940, and during the next two months increased in size until it became established as No. 212 Squadron. This unit finally returned to Heston on 14th June, 1940.

4. When Italy entered the war on 10th June, 1940, the scope of photographic reconnaissance was further extended. Plans were adopted to photograph the northern half of Italy from bases in southern France and Corsica. On the collapse of France, the detachment of the unit detailed for this work returned safely, either by air, or by sea via Algiers and Gibraltar. From Malta too, many extremely useful photographs were obtained of the surrounding Axis occupied countries.

EMPLOYMENT AND RE-ORGANISATION OF P.R.U.

5. On assuming the responsibility of photographic reconnaissance, I issued an Operational Instruction in July, 1940, outlining the future employment and re-organisation of the Photographic Reconnaissance Unit. It was the intention that the unit should provide photographs and interpretations as required for the combined Intelligence Committee, Air Ministry, Admiralty, War Office and R.A.F. Commands. A change in designation was effected immediately; the Photographic Development Unit, Heston, was re-named the Photographic Reconnaissance Unit (P.R.U.), and came under my operational control; the Photographic Development Unit Interpretation, Wembley, became known as the Photographic Interpretation Unit (P.I.U.) and was administered by P.R.U. but under the direct control of H.Q. Coastal Command. A Liaison Officer was appointed at my Headquarters, to deal with all matters connected with the two units.

6. Four operational Flights were established for P.R.U., each comprising 3 Initial Equipment and one Long Range Spitfire aircraft, one

/Hudson

Hudson and one Tiger Moth. Two of these flights were detached, one to Wick and the other to St. Eval, but they remained under the control of the Officer Commanding, P.R.U. for operational purposes.

7. All requests for photographic reconnaissance were made to my Headquarters, where the degree of priority for each task was determined and a daily programme drawn up and issued to those concerned.

8. The area covered in operations at this time was limited to Northern Germany to Western France.

#### AIR RECONNAISSANCE OF ENEMY FORTS.

9. With the fall of France almost all our other sources of intelligence were cut off, and the menace of invasion was brought into sharp relief. It became of the utmost importance to obtain information relating to enemy preparations for invasion, and I gave orders for the two operational flights at Heston and the flight at St. Eval to concentrate on those ports from which invasion seemed imminent. Photographs were taken at least twice daily, weather permitting, sometimes from low levels.

10. Bomber Command made available their facilities for night photographic reconnaissance in order to supplement the daylight reconnaissance of the P.R.U. I indicated to Bomber Command the ports for which night reconnaissance was required, and, provided this could be achieved without prejudice to the primary task of their offensive sorties, Bomber Command routed their aircraft so as to cover the ports indicated.

#### AIRCRAFT AVAILABLE FOR PHOTOGRAPHIC RECONNAISSANCE.

11. At the end of July, 1940, I had at my disposal, for photographic reconnaissance purposes, eight medium range Spitfires, three long range and two super-long range Spitfires. In addition, three further Spitfires were being modified for their long range photographic reconnaissance role. This gave a total of sixteen aircraft, which did not include two training Spitfires. A few odd aircraft, including one Blenheim, one Lockheed XII, two Wellingtons and a few Hudsons and Tiger Moths, made up the establishment.

12. For future requirements, thirty long range Spitfires were on order, and it was expected that this demand would be completed by the beginning of October, the first six becoming available by the middle of August. I had made enquiries as to the possibility of including some of the latest Spitfire IIIs among this order, but unfortunately there was little chance of this new type coming available before December, 1940.

13. The particulars of the various types of Spitfires available were as follows:-

<u>Type</u>	<u>Extra Tankage</u>	<u>Safe Range</u>	
Medium range	30 gallons	750 miles	} All at 30,000 feet and 300 m.p.h.
Long range	60 gallons	1100 miles	
Super long range	90 gallons	1300 miles	
Extra super- Long range	14.5 gallons	1800 miles	

/As

As only two of the Super-Long Range Spitfires were available to the Command, this limited our zone of photographic reconnaissance to 650 miles from bases in the United Kingdom.

#### AIR RECONNAISSANCE OF ENEMY AERODROMES.

14. On the 20th July, 1940, approval was received from the Air Ministry for the addition of a flight of 6 Initial Equipment plus 2 Immediate Reserve medium range Spitfires to the establishment of the Photographic Reconnaissance Unit; for the purpose of photographing enemy aerodromes at regular intervals, especially those in Holland, Belgium and Northern France.

15. It was anticipated that the production of these aircraft and the equipment would take some time, but in the meantime it was requested that P.R.U. should attempt with their present resources, the photographic reconnaissance of enemy occupied aerodromes in the countries mentioned, once a week. This reconnaissance was not on any account to prejudice the photographic cover of ports and shipping.

#### METEOROLOGICAL OBSERVATION.

16. Another constant commitment for the unit was the observation of the weather. Experience had shown that meteorological information obtained from daylight flights was of considerable assistance when forecasting weather conditions likely to be experienced during Bomber Command's night operations over enemy territory. It was therefore arranged that, on returning from long flights over enemy territory, the pilots of P.R.U. should render weather reports through the normal meteorological channels, and in this way provide vital weather information to the Meteorological Office.

#### PROPOSAL TO FORM A PHOTOGRAPHIC RECONNAISSANCE GROUP.

17. Since the time when the P.R.U. had first been established, the threat of invasion had been increased, and consequently the effort of the unit had been mainly devoted to anti-invasion reconnaissance. In these circumstances it had been impossible fully to meet the several requirements of Bomber Command, of the War Office and of the Admiralty.

18. To provide for the future expansion of P.R.U. and P.I.U. proposals were formulated to form a Photographic Reconnaissance Group and were the subject of a conference held at the Air Ministry on the 2nd October, 1940.

19. Opposition to the proposal to form a Photographic Reconnaissance Group was encountered. It was agreed, however, that re-organisation and increase in establishment was necessary in connection with the P.R.U. and P.I.U. working under my Command.

20. At this conference it was also decided to establish a Deputy Directorate (Photography) at the Air Ministry to look after photographic interests generally and to carry out future planning. Among the many proposed functions of the new Directorate was that of advising on the organisation and function of a Central Unit which would undertake detailed interpretation of reconnaissance photographs.

21. On the question of obtaining and interpreting photographs of air raid damage, the meeting decided that Bomber Command would be self contained, but it should be necessary to send prints of all photographs of this nature to a Central Unit for further study and general distribution as required by Air Ministry.

22. Coastal Command was asked to investigate and to forward recommendations to the Air Ministry.

/RE-ORGANISATION

RE-ORGANISATION OF P.R.U. AND P.I.U.

23. I convened a staff meeting at Headquarters, Coastal Command, on the 4th October, 1940, to discuss the future organisation of P.R.U. and P.I.U.

24. In my subsequent recommendations to Air Ministry, I stated that I regarded the position of the P.R.U. and P.I.U. with grave anxiety and that under the conditions which then prevailed, I did not consider that Heston was a suitable station for the parent P.R.U. Its proximity to London, a factor which originally counted so much in its favour, had now become a definite disadvantage. It lacked runways and was subject to bad weather and poor visibility during the winter months. Every action had deprived it of the main hangar, and makeshift arrangements for photographic work and aircraft maintenance had to be improvised. In the circumstances I recommended that the P.R.U. be moved to another aerodrome where it would be less liable to interference from air raids and where it would have more favourable flying conditions and larger areas for dispersal. I considered that BENSON appeared to fulfil these requirements.

25. I also recommended the reconstruction of the P.I.U. into a C.I.U. under Coastal Command was definitely advantageous. The main functions were to provide detailed interpretation of photographs taken in all theatres of war, and to provide a Training Section to supply not only its own interpreters, but those required for first phase work at the P.R.U. and its detached flights. The chief factors in determining the location of an independent Central Interpretation Establishment were communications and security, but there was much to be said also for putting it alongside the parent P.R.U. There was no doubt that this could be arranged if the P.R.U. moved to Benson, in which locality it would be reasonably near London, H.Q. Coastal Command and H.Q. Bomber Command.

26. At this juncture it was not intended to make any recommendations in regard to establishments, but I emphasised that this omission need not hold up the move of the units to a position of greater security, and I earnestly requested a speedy decision on that point at the earliest possible date.

THE MOVE OF P.R.U. TO BENSON.

27. After a further conference at Air Ministry on the 18th October, 1940, to discuss the move of P.R.U. and P.I.U., recommendations were called for as to the suitability of the aerodromes at Cranfield and Benson.

28. It was eventually decided that No. 1 P.R.U. be moved from Heston to Benson, a Bomber Command station, as a lodger unit, but that it should remain under the control of Coastal Command. The move became fully effective as from the 4th January, 1941.

REVIEW OF THE P.R.U. ORGANISATION.

29. Owing to the recent Air Ministry decision to provide a P.R.U. for Bomber Command (No. 3 P.R.U.) and to move the existing Coastal Command P.R.U. (No. 1 P.R.U.) it was considered necessary at this stage to review the subject of the entire P.R.U. organisation and establishment. It was for this purpose that a conference was held at Air Ministry on the 27th November, 1940. Various decisions were reached at this meeting, among which were those dealing with the training of pilots, modification of aircraft, types of aircraft to be employed, establishment and replacement of aircraft and the organisation and establishments of the units concerned.

/FORMATION

FORMATION OF A CENTRAL INTERPRETATION UNIT.

30. Up to this period, the Photographic Interpretation Unit had been under the direct control of Coastal Command, because the Command had been operating the P.R.U. of which it was a part. However, with the increased requirements of the Admiralty for photographic reconnaissance in widely spread theatres of operation, the Army's need for reconnaissance for Combined Operations, and the growing demand for photographic information on a variety of subjects by the Intelligence Staffs of the Service Ministries, it was considered by the Air Ministry that the centre where all such information was extracted and collated should be under Air Ministry control.

31. A meeting was convened at the Air Ministry on the 29th November, 1940, to review this proposal, when it was decided that the new unit should be known as the Central Interpretation Unit (C.I.U.) and that the technical control of the unit should be placed under the Assistant Chief of the Air Staff (G) through the Deputy Directorate of Photography.

32. For purposes of discipline, accounts, stores and accommodation, the unit was to be administered by Coastal Command. The location of the unit at Thame Park, Medmenham, was also confirmed and it was understood that the preliminary steps had already been taken to requisition that property. During the early days of April, 1941, the move from Wembley to Medmenham was effected.

STATUS OF THE AIRCRAFT OPERATING COMPANY.

33. Under an assessment dated the 30th August, 1940, the Air Ministry had undertaken onerous financial obligations in return for the use of the Aircraft Operating Company's premises and equipment at Wembley, and for the civilian staff who were expert in interpretation of air photographs.

34. With the absorption of the P.I.U. into the C.I.U. and the move of the unit from Wembley to Medmenham, the question of the status of the civilian company and its employees was the subject of discussion between myself and the Air Ministry.

35. I gave my opinion that the power to terminate the agreement with the company, reserved to Air Ministry under Clause 17 of the agreement, should be invoked and the staff and equipment absorbed in a strictly Service unit.

FUTURE ORGANISATION AND CONTROL OF PHOTOGRAPHIC RECONNAISSANCE AT HOME.

36. On the 8th April, 1941, I was informed by the Air Ministry that, in view of the increasing volume of requests for photographic reconnaissance, it had been found necessary to review the organisation and control of Nos. 1 and 3 Photographic Reconnaissance Units and the Central Interpretation Unit, and that it had been decided to centralize in the Air Ministry the operational control of these units, and to place them under Bomber Command for administration. The formation of a Photographic Reconnaissance Headquarters which would be accommodated at Benson to take charge of these units was contemplated, and plans were in train for the institution of a system whereby all requests for photographic reconnaissance were referred to Air Ministry (A.D.Ph.1) where priorities would be allocated and the necessary instructions passed to Photographic Reconnaissance Headquarters for executive action.

37. I strongly opposed this policy, and in a communication to Air Ministry stated that, whilst I appreciated the necessity for meeting the increased volume of requests for photographic reconnaissance, particularly from other Service Departments, I considered it was unfortunate that the

method adopted should have necessitated such a departure from the accepted system of operational control in war, by the setting up of a special unit for the purpose of photographic reconnaissance, with that control centralised in the Air Ministry, and thus depriving Coastal Command of an essential part of the organisation for fulfilling its primary role of reconnaissance.

38. I expressed the view that it was impracticable to divorce the role of photographic reconnaissance from that of general reconnaissance; if experience had suggested that the existing organisation was inadequate to meet the demands from various departments, then the logical way of meeting this requirement would be by increasing either the number of Reconnaissance Units or their establishments.

39. I requested that the whole subject be reconsidered before the proposals to withdraw the control of the Photographic Reconnaissance Unit from Coastal Command were put into effect.

40. The matter was considered by the Chiefs of Staff early in May, and in a communication from the Air Ministry dated 7th June, 1941, it was stated that in accordance with the decision of the Defence Committee (Operations), Nos. 1 and 3 Photographic Reconnaissance Units were to be amalgamated and placed under the operational and administrative control of Headquarters, Coastal Command with effect from 16th June, 1941.

41. In the matter of requests for photographic reconnaissance, it had been decided that the policy should be for Bomber and Fighter Commands and for the Admiralty to make their requests direct to Headquarters, Coastal Command, but that demands from other Departments should be made to the Assistant Director of Intelligence (Photos), who would also deal with any demands for the services of the Central Interpretation Unit.

#### CONCLUSION.

42. In the first six months of 1941, regular reconnaissances were made of the German North Sea ports, the Frisian Islands and of Dutch, Belgian and French ports, usually at 20,000 or 30,000 feet, but at low levels on many occasions. In addition to the continual watch on enemy shipping activity, regular reconnaissances were also made far inland over hundreds of aerodromes, well into Germany. At the request of the War Office, a photographic record was maintained of military activity at dumps and marshalling yards, and of troop concentrations. Detachments were also sent to Gibraltar to observe French ships at Dakar and Casablanca and on the north and south coasts of the Mediterranean.

43. The flight in the north of Scotland also recorded enemy naval activity. Photographs obtained of the BISMARCK and PRINZ EUGEN at Grimstead on the 21st May, 1941, led to the sinking of the former by the Royal Navy.

44. The flight in the south-west specialised in work over ports in the Biscay area, and gave particular attention to U-boat bases and aerodromes between Cherbourg and Brest. With the arrival of the HIPPER early in January, 1941, followed by SOHARNHORST and GNEISENAU two months later, Brest became increasingly important and was constantly watched by this detachment. On four occasions the whole of Brest was photographed as a panorama from 500 feet.

45. By the end of my term of office, photographic reconnaissance had become the principal means of obtaining intelligence of enemy movements and intentions on the continent. The greater part of Europe had been occupied by the Axis powers, and, in consequence, the demands upon

our photographic reconnaissance resources had grown out of all proportion to the means available for their immediate satisfaction. It had become increasingly clear, however, owing to the very valuable and outstanding work of the Unit under Coastal Command, that in the successful execution of operations of all kinds, photographic reconnaissance was indispensable.

PART THREESECTION II - AIR/SEA RESCUE.

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PART III.SECTION II - AIR/SEA RESCUE.INTRODUCTION.

In 1938, when our war plans were being formulated, it was envisaged that the operation of the main part of our Striking Force would be across the North Sea, which meant that aircraft of all types would be obliged to fly a great deal over the sea and the possible causes of forced landings would be increased by enemy action and adverse weather.

2. This increased demand for rescue facilities was the subject of a conference held at the Air Ministry on 28th February, 1939, at which it was decided that the whole high speed launch organisation should be placed under the operational and administrative control of Coastal Command, and to meet this demand an additional 13 high speed launches would be necessary. This total included the requirements for overseas, whose demands were similar to those in the British Isles.

3. Pending the provision of a chain of High Speed Launches to be available for rescue work at places ranging from Wick eastwards round the coast to the Isle of Man, interim measures were taken to locate existing launches at Tayport, Blyth, Grimsby, Yarmouth, Felixstowe, Ramsgate, Calshot (2) and Pembroke Dock.

4. This was the position in September, 1939.

THE OUTBREAK OF HOSTILITIES.

5. The peace time arrangements for Air/Sea Rescue were in force on the outbreak of hostilities and continued during the early stages of the war. Operational aircraft searched for aircraft of their own unit which were known or suspected of having landed in the sea. If they were located, naval craft or R.A.F. craft were relied upon to carry out their rescue. As certain of the peace time facilities disappeared, for security reasons, the current instructions fast became obsolete. To assist in overcoming the difficulties which had arisen through congestion on the public telephone system, the G.P.O. divided Great Britain into Group Distress Areas, according to the Group Headquarters with which telephone communication was the quickest. The G.P.O. W/T stations were no longer allowed to broadcast to shipping, but it was soon realised that there was an unnecessary loss of life as a consequence of this ban, so in June, 1940, they were brought back into use again for rescue work.

FORMATION OF A SKELETON RESCUE ORGANISATION.

6. Our losses of aircrew over the sea during the intensive air operations of June and July, 1940, caused grave concern, and a local rescue service was organised by Fighter Command and Vice-Admiral Dover, utilising the services of a few R.A.F. high-speed launches, some light naval craft, and Lysander aircraft on loan from Army Co-operation Command. The value of such a combined service was soon apparent, and on 22nd August, 1940, the Deputy Chief of Air Staff called a meeting at Air Ministry, at which I was represented, to discuss a draft organisation for rescue craft.

7. It was decided to combine the rescue organisation run by the H.S.Ls., of Coastal Command with the rescue functions of the Naval Auxiliary Patrol, and to place the R.A.F. rescue craft under the operational control of the local Naval authorities. It was also agreed that the R.A.F. should be responsible for organising the necessary air search and for informing the Naval authorities of the area being searched.

/Approval

Approval was also given for the use of the twelve Lysander aircraft already borrowed unofficially from Army Co-operation Command.

8. Thus, nearly twelve months after the outbreak of war, the first real steps were taken towards the formation of an organisation specifically allotted the task of Air/Sea Rescue.

#### SUPPLY DROPPING EQUIPMENT.

9. Early in the war, it was realised that aircrews in distress needed immediate aid to enable them to survive long enough to be rescued.

10. Among the many devices which were tried out from time to time, two types of supply dropping equipment, the Thornaby Bag and the Birchan Barrel, were first thought of in 1940, at two of the stations within my Command, namely, R.A.F. Stations, Thornaby and Birchan Newton.

11. The first of these consisted of a fabric parachute bag, strengthened by tapes and buoyed by floats made from Mac West kapok pads, and contained watertight tins of food, drink, cigarettes and first aid equipment. All the components of the element were readily obtainable on the station. At first, the bag was not a success owing to the fact that it was hard to detect in even a moderate sea, and was liable to burst open upon contact with the water. Later however, after further experiments, it proved such a practical success that instructions were received from Air Ministry to the effect that units were to be instructed in making up the Thornaby Bag, and thereafter all stations whose aircraft might be employed on air/sea rescue searches were to hold a supply in readiness.

12. The second piece of equipment was based on an idea which originated and was developed by R.A.F. Station Birchan Newton. In the first instance, experiments were carried out with a type of supply dropping container which could be carried on the bomb racks of a searching aircraft and dropped therefrom to distressed crews. Known as the Birchan Barrel, it consisted of a cylindrical container (the cardboard tail container of a 250 lb. bomb was used), with a reinforced inner frame and an inner canvas bag, the whole rendered completely watertight. Again, the components were readily available on the station, and the contents were similar to that of the Thornaby Bag.

13. Towards the end of my tenure of office, Birchan Newton had perfected this method of dropping supplies from Blenheim aircraft by means of the Birchan Barrel.

14. The next problem requiring solution was one of providing distressed aircrews with a more stable type of dinghy than that carried in the aircraft, in order that their chances of survival for many days, even in adverse weather, could be reasonably assured. This particularly applied to those aircrews called upon to make long sea passages. The idea was invented and perfected by the Station Commander at R.A.F. Station, Lindholme (Bomber Command), and the apparatus, originally designed to be carried by Hampden aircraft, consisted of five containers, of which one held an inflatable dinghy, and the remainder contained food, warm clothing, and first aid outfits.

15. The successful rescue in April 1941 of a Whitley crew, who had been in their dinghy for 72 hours, was achieved with the aid of a Thornaby bag and Lindholme dinghy dropping gear. This test proved the practicability of the apparatus, and it was agreed to commence commercial production of the Lindholme gear. A number of sets were provided for use of Bomber and Coastal aircraft when employed on sea searches.

16. At best, all these rescue appliances were only a temporary means of maintaining life. Without co-ordinated search and rescue, plus an adequate supply of rescue craft, little could be done to reduce the losses of aircrew force-landed in the sea.

#### THE NEED FOR CO-ORDINATION.

17. The rescue organisation brought into force in August, 1940, valuable though it had proved to be, was in many respects unable to meet the increased demands being made upon it. With the divided control imposed upon the service, the required speed of action necessary for its success was difficult to attain. There was no central body to co-relate the requirements for rescue. The administration of High Speed Launches was the responsibility of my Command, but the local Naval Flag Officers were responsible for their operation. Fighter Command was responsible for providing search aircraft and escorts for the marine craft, but Coastal and Bomber Commands were frequently called upon to provide operational aircraft for search purposes. It was therefore becoming increasingly apparent that co-ordination of the work of the Rescue Service under a central organisation was the sole solution for securing the state of efficiency required.

#### FORMATION OF THE AIR/SEA RESCUE SERVICE.

18. Improvements and expansion of the Rescue Service was the subject of a meeting held in the Air Ministry on 14th January, 1941, under the chairmanship of the Deputy Chief of Air Staff. The Royal Navy and the various R.A.F. Operational Commands were fully represented, and amongst those present was Group Captain L.G. Croke, my Station Commander at R.A.F. Station, St. Eval, Cornwall, who had shown a keen interest in Sea Rescue at his Station.

19. It was agreed that the rescue of R.A.F. personnel from the sea had become of such paramount importance that it should receive the whole time attention of an Air Commodore as Director of Sea Rescue Services, assisted by a Naval Deputy Director, the closest possible liaison being maintained between the two services. The R.A.F. was made responsible for all matters appertaining to the air side of the problem, and the Naval Staff were to be responsible for the provision and organisation of surface craft.

20. This Directorate was to be located at Headquarters, Coastal Command, and took up its duties on 6th February, 1941, with Group Captain (later Air Commodore) L.G. Le. B. Croke as the first Director of Sea Rescue, and Captain C.L. Howe, R.N., as the Deputy Director.

21. Officers of the Directorate were attached to the Area Combined Headquarters of Nos. 15, 16, 18 and 19 Groups, whose functions were to control sea rescue activities and co-ordinate air and sea searches in their respective areas.

22. For the purpose of sea search, the British Isles was divided into four areas coinciding with the geographical boundaries of Coastal Command Groups, and all R.A.F. Stations within each area contributed as far as their resources permitted to search within that area. Fighter Command was responsible for close-in search of a coastal area 20 miles in depth; Coastal Command for deep search beyond this zone, and the Naval Commanders-in-Chief for the operation of all surface craft.

23. Besides dealing with the actual rescue activities, the Directorate of Air/Sea Rescue was also responsible for the development, improvement and introduction of all life saving equipment and safety devices necessary for the rescue of distressed aircrews forced down in the sea.

MARINE CRAFT.

24. At the outbreak of hostilities the strength of Marine Craft under my command was nine; by April, 1940, it had increased to fourteen and a further eight were received during the remainder of the year, this bringing the total to twenty-two by February, 1941. The building programme had suffered from a variety of causes, such as the switch over from peace to war conditions, labour troubles and lack of materials; and even at this time the estimated rate of production was only two vessels per month.

25. The original 64' model had been superseded by a 63' type, which possessed many improvements, among which was a properly constructed sick bay, better manoeuvrability and more seaworthy qualities than its predecessor. Both types were difficult to maintain and suffered from a high degree of unserviceability.

26. In December, 1940, the total number of H.S.Ls. in use or under construction was 66 boats, but it was not anticipated that any of the additional craft would be available until later in 1941.

27. There were various types of R.A.F. and Naval marine craft which could be called upon to assist in rescue work, but their practical value was small due to the limitations imposed by their structure and speed.

28. In February, 1941, therefore, the position regarding the supply of marine craft for rescue work could not be regarded as satisfactory, and one of the first tasks of the new Directorate was to represent again to the Air Ministry and the Admiralty the marine craft requirements to meet the ever increasing needs of the sea rescue service.

CONCLUSION.

29. That part of the Air/Sea Rescue Service which was under my Command did most valuable work, and though the account of its many rescues cannot be quoted in this Despatch they will be found in other records.

30. I would like, however, without detracting in any way from the work carried out in other spheres, to quote what happened during the evacuation from Dunkirk.

31. My Command's contribution to the fleet of small marine craft was one High-Speed Launch, five Seaplane Tenders and one Pinnace. This flotilla was organised by the Officer Commanding, R.A.F. Station, Calshot, and the special alacrity shown by all ranks of the Marine Craft Section to volunteer for these duties was noteworthy. In the course of their duties, two Seaplane Tenders were lost, and during a special operation carried out on 2nd June, 1940, by two Seaplane Tenders manned by volunteer crews, the Officer-in-Charge and three of the crew lost their lives, and Seaplane Tender No. 243 was sunk. The crew of the other Tender, No. 276, showed great bravery and resource throughout this operation.

32. When I handed over to my successor in June, 1941, a world-wide expansion of the Air/Sea Rescue Service was under consideration.

COASTAL COMMAND

ORDER OF BATTLE.

3rd September, 1939.

NO. 15 GROUP

Mount Batten	No. 204 Sqn.	Sunderland
Pembroke Dock	No. 210 "	Sunderland
"	No. 228 "	London
Warmwell	No. 217 " (part)	Anson
Aldergrove	No. 502 " (AAF)	Anson
Carew Cheriton	No. 217 " (part)	Anson

NO. 16 GROUP

Birchan Newton	No. 42 Sqn.	Vildebeeste
"	No. 206 "	Anson
Thorney Island	No. 22 "	Vildebeeste
"	No. 48 " (part)	Anson
Detling	No. 500 " (AAF)	Anson
"	No. 48 " (part)	Anson
Guernsey Airport	No. 48 " (part)	Anson

NO. 18 GROUP

Sullon Voe (S.S. Mancla)	No. 201 Sqn.	London
Invergordon	No. 209 "	Stranraer
"	No. 240 "	London
Thornaby	No. 220 "	Anson
"	No. 608 " (AAF)	Anson
Leuchars	No. 224 "	Hudson
"	No. 233 "	Anson
Montrose	No. 269 "	Anson
Dyce	No. 612 " (AAF)	Anson

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AMENDMENTS TO AIR COUNCIL INSTRUCTIONS  
GOVERNING NAVAL AND AIR BOMBARDMENTS.

June 4th, 1940.

Following instructions are to be substituted for those previously governing bombardment policy contained in Instructions Governing Naval and Air Bombardment forwarded under Air Council letter S.46239/S.6 dated 22nd August 1939 which are hereby cancelled.

2. The action of armies is well established by practice. Commanders of land forces will use every reasonable precaution to avoid undue loss of civilian life by artillery bombardment.

3. Bombardment by naval and air forces is to be confined to military objectives and must be subject to the following general principles:-

- (a) The intentional bombardment of civil populations as such is illegal.
- (b) It must be possible to identify the objective.
- (c) The attack must be made with reasonable care to avoid undue loss of civil life in the vicinity of the target.
- (d) The provisions of Red Cross conventions are to be observed.

4. The following military objectives may be attacked:- (In the following categories the term 'military' is used in its widest sense to include all armed forces. These do not include merchant ships whether defensively armed or not).

- (a) Military forces including naval auxiliaries of whatever description and whether or not attendant on the fleet; troop transports and military supply ships whether at sea or in port.  
(NOTE: Areas in which all shipping can be treated as enemy transports or military supply ships will be specially notified).
- (b) Military works and fortifications.
- (c) Military establishments and depots including barracks, camps, billets and naval dockyards; aerodromes whether designated military or civil; stores and dumps of military supplies.
- (d) Shipyards, factories and other establishments engaged in the manufacture, assembly or repair of military material, equipment or supplies, power stations ancillary thereto; fuel and oil producing plants, refineries and storage installations.
- (e) Lines of communication and transportation and means of inter-communication, serving military purposes.
- (f) Provided that the principles set out in paragraph 3 above are observed, other objectives, the destruction of which is an immediate military necessity may be attacked for particular reasons.

5. In the case of naval bombardment of objectives in a town, warning should be given if the safety of the attacking force or the success of the operations is not jeopardised by so doing.

COASTAL COMMAND

ORDER OF BATTLE.

1st June, 1941.

NO. 15 GROUP.

Aldergrove	No. 254	Sqdn.	Blenheim.
"	No. 233	"	Hudson.
"	No. 252	" (part)	Beaufighter.
Linavady	No. 502	"	Whitley.
"	No. 224	"	Hudson.
"	No. 221	"	Wellington.
Lough Erne	No. 209	"	Catalina.
"	No. 240	"	Catalina.
Hooton Park	No. 48	" (part)	Anson.
Oban	No. 210	"	Catalina.
Islay	No. 48	" (part)	Anson.
Iceland	No. 98	"	Battle/Hurricane.
"	No. 204	"	Sunderland.
"	No. 269	" (part)	Hudson.
Chivenor	No. 272	" (part)	Beaufighter.

NO. 16 GROUP.

North Coates	No. 22	Sqdn.	Beaufort.
"	No. 86	"	Beaufort.
Birchan Newton	No. 206	" (part)	Hudson.
"	No. 235	"	Blenheim.
"	No. 500	"	Anson/Blenheim.
Thorney Island	No. 59	" (part)	Blenheim.
"	No. 816	" (FAA) (part)	Swordfish.
Detling	No. 59	" (part)	Blenheim.
"	No. 816	" (FAA) (part)	Swordfish.

NO. 18 GROUP.

Sullon Voe	No. 201	Sqdn. (part)	Sunderland.
Wick	No. 269	" (part)	Hudson.
"	No. 220	"	Hudson.
"	No. 612	"	Whitley.
"	No. 248	" (part)	Blenheim.
Invergordon	No. 201	" (part)	Sunderland.
Dyce	No. 248	" (part)	Blenheim.
Leuchars	No. 42	"	Beaufort.
"	No. 320	" (Dutch)	Hudson/Anson.
"	No. 114	" (B.C.) (part)	Blenheim.
Thornaby	No. 608	"	Blenheim.
"	No. 114	" (B.C.) (part)	Blenheim.
Stornoway	No. 48	" (part)	Anson.
Hatston (R.N.A.S.)	No. 828	" (FAA)	Albacore.

NO. 19 GROUP.

NO. 19 GROUP.

St. Eval	No. 217	Sqdn.		Beaufort.
"	No. 53	"		Blenheim.
"	No. 236	"	(part)	Blenheim.
"	No. 206	"	(part)	Hudson.
"	No. 827	"	(FAA)	Albacore.
Penbroke Dock	No. 10	"	(RAAF)	Sunderland.
Carew Cheriton	No. 236	"	(part)	Blenheim.

NO. 200 GROUP (Gibraltar).

No. 202 Sqdn.

London/Catalina/Swordfish.

ANALYSIS OF ANTI-U/BOAT OPERATIONS.

3rd September, 1939 - 1st June, 1941.

MONTHLY RESULTS.

Date	Sorties	Hours	U/B.		U/B. assessed	
			Sighted	Attacked	Sunk	Damaged
1939.						
Sept. )	3178*	12834*	35	27	-	4
Oct. )			13	9	-	2
Nov. )			6	6	-	1
Dec. )			9	6	-	1
1940.						
Jan. )	19457*	78002*	6	3	-(1)	-
Feb. )			19	12	-	1+(1)
Mar. )			8	6	-	-
Apr. )			19	12	-	1
May )			13	5	-	-
June )			19	13	-	1
July )			9	8	-(1)	-
Aug. )			15	14	-	2+(1)
Sept. )			9	8	-	-
Oct. )			9	7	-	2
Nov. )			5	3	-	-
Dec. )			4	4	-	-
1941.						
Jan.	1145	5812	4	2	1	-(1)
Feb.	1249	6357	4	3	-	1
Mar.	2170	10980	7	4	-	1
Apr.	2654	13287	8	4	-	3
May	2301	11717	12	8	-	3

SUMMARY.

Date	Sorties	Hours	U/B.		U/B.	
			Sighted	Attacked	Sunk	Damaged
1939. (Sept./ Dec.)	3178	12834	63	48	-	8
1940.	19457	78002	135	95	(2)	7+(2)
1941. (Jan./ May)	9519	48153	35	21	1	8+(1)

- NOTES:
- (1) Assessments shared with Naval and other forces are shown separately in brackets.
  - (2) An asterisk indicates that monthly totals are not available.