An F2a flying-boat with 'dazzle' camouflage on patrol. This machine combined the hull of a Porte flying-boat married to the wings and tail assembly of a Curtiss H12 'Large America.' With its v-shaped, curved hull, the F2a could land or take off in much heavier seas than the H12. (AH 572)

F2b flying-boats waiting to be launched for patrols over the North Sea. Canada was particularly well represented among the crews of these big flying-boats, and many served at the RNAS station at Felixstowe, where this picture was taken. (AH 453)
A Porte Baby flying boat. This machine was distinguished by its three engines, the centre one driving a pusher propeller and the other ones driving tractor airscrews. Only eleven were built before the hull was married to the wings and tail assembly of the Curtiss H12 'Large America' to produce the Felixstowe F2a series. (AH 564)

This rare scene on board an RNAS 'C'-type, non-rigid coastal airship, patrolling the North Sea, gives some idea of how exposed the crew were. (Q 20860)
A Short Type 184 seaplane, flown by many Canadians in the RNAS. The square, box-like object on top of the fuselage, behind the airscrew and in front of the upper wing, is the engine radiator; the vertical pipe in front of that is an exhaust stack. Note the tail float. (AH 574)

An SS 'Z'-type airship landing on the after deck of HMS Furious. A Sopwith 1½ Strutter can be seen on the forward flight deck. (q 20640)
A 'C'-type ss airship about to leave its RNAS base on an anti-submarine patrol (AH 452)
Introduction

Far fewer Canadians served in the Royal Naval Air Service than in the Royal Flying Corps. The naval air arm, however, was itself much smaller than its military counterpart and therefore the Canadians in it formed an important part of its total flying strength. For the first year of the war only a handful flew with the RNAS. One of them, R.H. Mulock of Winnipeg, became the highest ranking Canadian airman of the war. By late 1915 the young men who had received their first taste of flying at the Toronto Curtiss School were reaching England, and from that time on Canadian pilots and observers were entering upon flying operations in increasing numbers. Whether through accident of posting, timing of arrival, or design (though there is no evidence for the latter), certain RNAS units eventually became heavily or even predominantly Canadian. Yet wherever the RNAS flew and whatever it was doing, Canadians were to be found. They flew not only over the Western Front, and deep into Germany, but in many other war theatres as well. They served at Gallipoli, Malta, and Gibraltar, flew over Mesopotamia, the Arabian desert, East Africa, and the Red Sea, or patrolled the Aegean, the Mediterranean, and the Adriatic. Most of them, however, were stationed in the British Isles and at Dunkirk; the waters they knew were the North Sea, the English Channel, and the Atlantic approaches to Britain.

Canadian naval airmen fought a war that, on the whole, was far less intense than the air war over the land battlefronts. The enemy was less frequently encountered, casualties were lower, the chances of survival were better, although even routine patrolling was punctuated with moments of violent action: the sighting of a U-boat, the chase of a zeppelin, sudden and fierce encounters with German seaplanes. Moreover, the RNAS had fighter and bomber formations in Flanders in which many Canadians were concentrated and their war experience was much closer to that of the RFC.

In spirit and structure the RNAS differed in a number of ways from the RFC. As befitted the air arm of the navy, with its diverse and far-flung responsibilities, the RNAS was a loosely constructed and flexible organization not overly preoccupied with establishment tables. No single individual could possibly have made the impression upon it that General Hugh Trenchard made upon the RFC, for its many units and formations were not tied together by a staff system. Overall control was exercised by a designated authority within the Admiralty; operational control
lay with the various naval commands, but for most of the war it rested in practice with the senior air officers on the spot. In the RFC standard procedures were laid down for every form of air operations, duly set out in official pamphlets and revised when necessary. In the RNAS each unit worked out its own procedures; the service never made a shibboleth of uniformity. The informal and decentralized character of the RNAS extended to its airmen, who tended to be more individualistic and less specialized than their brethren in the RFC.

Just as the RNAS was more tolerant of organizational diversity, so it was more enterprising and experimental in its approach to the vital matters of aircraft design and supply. The RFC was initially wedded to the designs of the Royal Aircraft Factory, Farnborough, which produced worthy but unremarkable machines. The Admiralty, in contrast, relied primarily upon the resources and ingenuity of private industry and liberally commissioned aircraft and engines from among Britain's best designers and manufacturers. From T.O.M. Sopwith came the Sopwith 1 1/2 Strutter, the Pup, and the Triplane; from Handley Page an outstanding series of heavy bombers culminating in the V1500; from Short Brothers a variety of seaplanes; from Rolls-Royce its splendid engines. So successful was the Admiralty in accumulating stocks of good aircraft and engines that the RFC, hard-pressed for such commodities and locked in a ceaseless struggle with the German air force on the Western Front, protested vigorously. Only a political settlement could finally solve the supply quarrel between the two services.

Both the RNAS and the RFC had to keep constantly abreast of changing aviation technology. A slight improvement in rate of climb, endurance, or handling characteristics spelled the difference between success and failure, between life and death. At the unit level the RNAS was always open to experimental approaches, new designs, and technical innovations. For the naval flyer, technical improvement was not simply a question of aircraft performance but of linking two technologies: that of the aeroplane and the air to that of the ship and the sea. Yet the progress of the RNAS in such matters as torpedo-carrying aircraft or aircraft carriers was disappointingly slow. The Admiralty's conservatism has often been blamed for this state of affairs, but it should also be recognized that, with the exception of the U-boat menace, the RNAS was not exposed to the kind of heavy and constant enemy pressure that speeds technological advance by giving it a vital priority. It was just such an active and innovative enemy that imposed the need for change upon the RFC.

The crucial campaign in which the RNAS was involved was the struggle with German submarines. The mounting danger from enemy underseas forces reached a level in 1917 which threatened the entire war effort, since by this time the maintenance of allied military and industrial strength depended heavily upon shipments from North America. To this point the Admiralty had put its faith in such countermeasures as hunting down submarines with destroyers, mining waters that gave them access to the open sea, and bombing their bases. Finally, in the face of staggering losses of merchantmen, it was compelled to resort to convoy. The part played by the RNAS in the success of the convoy system, though almost completely overlooked by the Admiralty at the time and by historians since, was extremely important. It is ironic that the greatest contribution of naval aviation to the winning of the war came in 1918, when the RNAS itself had ceased to exist.
The RNAs was never content to be a mere auxiliary to the navy. Seeking an offensive role, it pioneered the development of long-range bombing, a form of warfare in which its Canadians played an especially prominent part. It also formed a number of fighter squadrons at its large Dunkirk base which it was forced to lend, from time to time, to the RFC. By late 1917 the friction between the two services over questions of supply, the obvious duplication of operational functions such as bombing and air fighting, and powerful political pressure for retaliatory air attacks upon German cities led to the decision to unify the two air services. On 1 April 1918 the RNAs buried its individuality in the Royal Air Force, a fate brought about in part by its failure to confine itself to a purely naval role. But the Canadians who had served in it, taken part in its extraordinarily diverse activities, flown its many types of aircraft, and become imbued with its prodigious talent for improvisation were to have much to contribute to aviation in postwar Canada.
With the exception of a few individuals, Canadians took no part in the air war until the later months of 1915. Even then, their names are scattered infrequently through the war diaries of units on active service. In the Royal Naval Air Service, some divisions of which became virtually Canadian preserves later in the war, significant numbers did not fly operationally before early 1916. Not until the vanguard of recruits from the Curtiss School and other North American flying schools had passed through further training in England did the Canadians begin to make their presence felt.

As latecomers, the Canadians moved into a service which had already been shaped by the exigencies of a year of war. Their duties, and how and where they were to perform them, had for the most part already been determined. By the end of 1915 the chief characteristics of the wartime evolution of the RNAS had already emerged, even though in many respects the service was still in a formative stage and a number of contentious questions had not yet been resolved. For an understanding of the manner in which Canadians were employed in the RNAS, therefore, it is necessary to review its operations during the first year of the war.

The nature and even the spirit of the RNAS differed markedly from its sister service, the Royal Flying Corps. This was not solely because of the contrast between the two forces to which the air arms were attached, but also because the problems confronting the land and sea elements were so different. Three factors governed the development of the RFC during the war: the nature of the land battle, the structure of the British Army, and the principle, virtually unquestioned until late in the war, that the air arm existed solely to serve the ground forces. These factors meant that specialization of function—and hence of airmen and equipment—developed in response to the military situation and to the requirements of the army, and that specialized units were enclosed within a rational hierarchical structure that corresponded to the organization of the army itself and expanded in consonance with it. The RFC was characterized by symmetrical order and subordination of role.

The tasks confronting the British navy during the First World War were far more diverse than those facing the army. The navy’s prime duty was, at the minimum, the containment of the German High Seas Fleet by every possible means. But naval responsibilities extended beyond this to the control, not only of home waters but of the oceans, seas, and coasts important to the land campaign and to the protection of the shipping and shipping lanes vital to the prosecution of the
war. The ordering of these responsibilities and the allocation of resources among them was the job of the Board of Admiralty and its political head, and their priorities fluctuated with their assessment of the endlessly changing contingencies of the war at sea. Flexibility of response and reliance upon mobility were the hallmarks of the exercise of British sea power. The organization and outlook of the RNAS, so loose and individualistic when compared with the RFC, reflected these principles. The RNAS was never so tightly structured as the RFC and was repeatedly altered to correspond with shifts in Admiralty priorities. Though the RNAS developed specialized functions in conformity with naval requirements, it remained much more elastic in organization and experimental in outlook than the RFC.

Moreover, while both air arms were conceived originally as auxiliaries to the operations of their main forces, the RNAS, to a much greater extent than the RFC, came to be seen as a weapon in its own right both by some policy-makers and by some of its leading members. Almost from the beginning of the war tension arose between those who wished to confine the RNAS to functions closely related to fleet and coastal operations and those who wished, in addition, to exploit its potentialities for offensive action, whether in concert with other naval elements or by itself. This tension was never fully resolved within the RNAS partly because it was so flexible and partly because its manpower and its supply of aircraft and engines made a degree of diversity tolerable: for most of the war it had more men and equipment than it could fully employ on purely naval duties.

Direct co-operation with naval units was never the prime function of the RNAS during the war. When the Grand Fleet steamed to its war station at Scapa Flow on 29 July 1914, not a single aircraft accompanied it. A month later a number of seaplanes, and the men to fly and maintain them, were sent to Scapa to work with the fleet. There was no means of taking them to sea, however, and the Commander-in-Chief, Admiral Sir John Jellicoe, requested a fast seaplane carrier. HMS Hermes completed a refit to carry three seaplanes early in October, but she was far too slow (14 knots) to keep station with fleet units, and in any event sank after a torpedo attack at the end of the month. In November the hangars at Scapa blew down in a gale and the Grand Fleet was once more without aircraft until HMS Campania, purchased and converted as a result of Jellicoe's representations to the Admiralty, came on the scene in April 1915. Her seaplanes were intended to act as scouts for the fleet.

When the war began Winston Churchill, the First Lord of the Admiralty, had much more aggressive plans for seaplanes. On 11 August 1914 the Admiralty had taken up three fast Channel steamers, the Empress, Engadine, and Riviera, for conversion to seaplane carriers, apparently with the intention of employing torpedo-carrying aircraft in offensive operations. Churchill later stated that he 'ordered immediate preparations for a bombing attack by torpedo seaplanes upon the German Fleet in the Roads at Wilhelmshaven ...' Three Short Folders, fitted

* Squadron Commander Arthur M. Longmore had made the first successful torpedo drop in Great Britain on 28 July 1914 when he released a 14-inch Whitehead torpedo of 810 lbs from a 160-hp Short Folder, one of the earliest aircraft to have folding wings. But this experimental flight was little more than a 'stunt' and a far more highly-powered seaplane was required before an airborne torpedo attack could be attempted under operational conditions. Sir Arthur Longmore, From Sea to Sky, 1910–1945 (London 1946), 36–7
for carrying torpedoes, went to **HMS Engadine**. But it was to be many months before an aircraft with the endurance and the safety margin needed for the torpedo-carrying role was developed. Nothing more was heard of a carrier-launched torpedo attack after September.²

The idea of using seaplanes in a strike role was not abandoned, however, for they could carry bombs if not torpedoes. A major responsibility assigned to the **RNAS** at the beginning of the war was the defence of Britain against air attack, which in 1914 meant attack by German airships. Rather than await their coming, many at the Admiralty, from the First Lord down, believed that the best defence was attack. On 25 December **Engadine**, **Empress**, and **Riviera**, in company with other naval forces, were directed against the zeppelin sheds at Cuxhaven. Seven of the nine seaplanes launched reached the Cuxhaven area, but none of them could find the sheds, partly because of patches of mist and partly because the sheds were in fact several miles from their assumed positions.³ While this raid was in progress, the carriers and their escorts were bombed by German seaplanes and zeppelins, without effect.

Much more important than service with the fleet was the patrolling of home waters, a routine but vital duty which the **RNAS** took up from the beginning of the war. The northern extremity, from Kinnaird's Head to the Firth of Forth, and the southern extremity, from Dungeness to the North Foreland of Kent, were patrolled at first by **RFC** aeroplanes, but after mid-August, when four squadrons had departed for the continent, **RFC** participation was minimal. As a result, **RNAS** east-coast stations were greatly over-extended in the first months of the war. When Lord Fisher of Kilverstone became First Sea Lord on 30 October 1914, returning to the office he had left in 1910, he made the strengthening of **RNAS** patrolling one of his first priorities. Horrified by British shipping losses to mines and submarines, not only did he inaugurate a massive shipbuilding programme but on his second day in office held a meeting of those concerned with air matters that was eventually to result in a non-rigid airship building programme.⁴

The naval air stations in Britain were controlled from the Central Air Office at Sheerness, but control did not mean regimentation. Patrol and other procedures varied greatly from station to station. Many station commanders and pilots in 1914 were naval officers qualified to command small ships and they were given free rein to do their job as they saw fit. Their independent spirit rubbed off on the Royal Marine and direct entry officers serving with them. It was a spirit highly congenial to the Canadians who were to join them. Isolated both from Sheerness and from fleet units, the naval air stations retained their independent character throughout the war. When, in 1915, their rapid increase outgrew the capacity of the Central Air Office to control them, authority over them was assumed by the Air Department itself. This change made no discernible impact on the individualistic tendencies of the naval air stations.⁵

In the first year of the war the capacity of the **RNAS** to carry out effective patrols in home waters was inhibited not only by shortages of aircraft but by the responsibility it had been assigned for the defence of Britain against air attack. When the war began, Captain Murray Sueter, Director of the Admiralty Air Department, had been ordered to use naval aircraft primarily for this purpose. It was a task for
Origins of Naval Airpower

THE THAMES ESTUARY

AUGUST 1914 - DECEMBER 1915

Areas covered by insert

ENGLAND

THE NORTH SEA

NORTH SEA

NETHERLANDS

GERMANY

FRANCE

BELGIUM

THE FLANDERS COAST
which the RNAS was unprepared, and certainly not one it had sought. In theory, the War Office was responsible for ‘aerial supremacy in the British Isles,’ and before the war the General Staff had claimed responsibility for home defence, including the defence of ports and other installations of naval concern. Faced with the realities of war, however, the army authorities ‘admitted sorrowfully that they had not got the machines and could not get the money’ for home defence. On 3 September 1914, therefore, Lord Kitchener, Secretary of State for War, handed over responsibility for home defence to the Admiralty.6

The RNAS was in no better condition than the RFC to discharge this function. In August 1914 it possessed, for all purposes, thirty-one seaplanes and forty aeroplanes, all of very limited range and endurance. Patrols intended to detect the presence of enemy vessels could not be combined with anti-zeppelin patrols. As the RNAS was to discover, the zeppelins waited for nightfall before venturing over land, a circumstance forcing naval pilots to acquire experience in the unfamiliar techniques of night flying. Moreover, German airships normally attacked at heights above the operational ceilings of RNAS aircraft, so that there was little opportunity to build up tactical experience in anti-zeppelin operations. For all these reasons the RNAS was unhappy with its role, but an additional factor caused acute concern to the Admiralty: anti-zeppelin operations took place over the homeland itself, where their inadequacy was spectacularly obvious to the civil population and their conduct was therefore subject to an unwanted amount of public discussion and political comment.

It was not until early 1915 that the RNAS was called upon to come to grips with the zeppelin menace. German army airships were fully occupied over the Western Front in 1914 and the German Naval Airship Division began the war with only one zeppelin, L 3. By the end of the year it had four zeppelins at its new base at Nordholz. On the night of 19–20 January it made its first attack upon England, two airships bombing scattered points in East Anglia. The next visit of naval airships was on the night of 14–15 April when L 9, commanded by Kapitänleutnant Heinrich Mathy, bombed an area north of the Tyne. The following night three more zeppelins raided the east coast. No significant damage was done on any of these occasions, nor had the airships encountered any opposition from the RNAS.7

Beginning on 29 April 1915 it was the turn of the German army’s airship service to carry out a series of raids on southern England from its bases in Belgium. During one of these raids the first interception of an airship over England took place, and a Canadian airman was responsible. Flight Sub-Lieutenant R.H. Mulock, from Winnipeg, had been the first Canadian to join an operational squadron of the RNAS. He had gone overseas with the First Contingent of the Canadian Expeditionary Force, but on 19 January he had been permitted to transfer to the RNAS and had been trained as a pilot at Eastchurch. Flying an Avro, Mulock encountered LZ 38 at the unusually low altitude of 2000 feet on the night of 16–17 May, but after firing one round at her, his Lewis gun jammed.8

Two weeks later LZ 38, commanded by Hauptmann Erich Lennarz, carried out the first attack upon London. The popular repercussions were disproportionate to the seven fatalities caused. Panic and indiscriminate rioting broke out; for example, on the morning after the raid, the London police reported that a crowd ‘raided and
attacked a Scotch baker’s shop (thinking they were Germans). 19 When further and more damaging raids followed in June, with no duplication of Mulock’s interception, the Admiralty sought to relieve itself of its unwanted burden. On 18 June the War Office was formally requested to take over home defence, but the army authorities, pleading shortage of aircraft and the pre-eminent demands of the Western Front, held out no hope of such a transfer until January 1916. The RNAS had thus to carry on in the face of continued, if sporadic, raiding for the balance of the year. In July new air stations were opened at Redcar, Hornsea, and Scarborough; in August several night-landing grounds were established between The Wash and the Thames estuary. Despite these efforts, the RNAS record of failure in home defence remained unbroken, and was the source of much frustration within the Admiralty and much unfavourable comment outside it.10

The Admiralty was particularly aggrieved by this criticism because of its view that offensive action against enemy bases, and not defensive patrolling, was the right policy. It was this thinking that lay behind the pre-emptive strike against Cuxhaven, and had launched much more successful operations from RNAS airfields on the Flanders coast.

The Flanders lodgment, which was to affect greatly RNAS operations during the war as well as the flying careers of many Canadians, had begun fortuitously at an early stage of the war. Shortly after hostilities commenced the aeroplanes at Eastchurch, under Wing Commander C.R. Samson, had been designated a ‘mobile squadron’ by Sueter. On 24 August 1914 the Admiralty, concerned for the security of the Channel ports, decided to respond to an appeal for help against German cavalry marauders by the Burgomaster of Ostend. Originally conceived as a landing of several hundred men, the project expanded to the commitment of a brigade of Royal Marines, three thousand strong. Churchill aimed at an ostentatious diversion to relieve pressure on Belgian forces near Antwerp and on the British Expeditionary Force retreating from Mons. Samson’s mobile squadron was sent to provide the Marines with air reconnaissance. Nine Eastchurch aeroplanes, mostly ‘old veteran servants of the Crown,’ went to Belgium on 27 August 1914. The Admiralty recalled the squadron together with the marine brigade on 30 August, but by a number of subterfuges Samson, who represented the independent spirit of the RNAS to a quintessential degree, was able to turn a blind eye to repeated orders to return home. On 1 September Admiralty orders arrived for the Eastchurch aeroplanes to operate from Dunkirk.11

It was in this manner that the RNAS obtained its toehold on the Continent. From 27 August until the Western Front stabilized at the end of October, Samson’s aircraft and the armoured cars he had improvised performed a remarkably varied set of roles in Flanders, operating from Ostend, Antwerp, Lille, Dunkirk, and intermediate points. The chief justification, in the eyes of the Admiralty, for the continued presence of the Eastchurch aeroplanes in Flanders was to find and attack zeppelin bases before the enemy could launch an attack on England. Samson’s main effort was therefore directed against the sheds known to exist at Düsseldorf and Cologne. To reach these targets, the attacking aeroplanes had to fly from Antwerp. On 22 September the first raids were launched. Out of four aircraft, one managed to locate the sheds at Düsseldorf, in spite of ground fog,
and achieved complete surprise. Unfortunately the pilot glided in so low that the
20-lb bombs did not explode on hitting the shed.* On 9 October, when Antwerp
was about to fall to the enemy, the airship bases were again attacked. This time
one of the sheds at Düsseldorf and the zeppelin that it housed were destroyed.¹²

After all RNAS aircraft in Flanders were concentrated at Dunkirk in early
November, Düsseldorf and Cologne were no longer within range. But on 21
November four newly-acquired Avro 504s were flown to Belfort, behind the
French lines, to mount an attack against the sheds at Friedrichshafen, on Lake
Constance. Three of the Avros bombed the sheds, but had to be content with near
misses. British aircraft made no further attempts on this target until 1916.¹³ This
was not the end of the RNAS offensive against zeppelins, however. After the
German army established airship bases in Belgium and commenced the raiding of
England, Dunkirk airmen achieved some notable victories. On the same night that
Mulock made his brief interception of LZ 38 over England, pilots from Dunkirk
damaged LZ 39 on its return flight. On 6 June 1915 four pilots from Dunkirk took
off to raid the Belgian sheds, their attack coinciding with an airship raid on
England. Flight Sub-Lieutenant R.A.J. Warneford, flying a Morane Parasol mono-
plane, intercepted LZ 37, scored hits with his incendiary bombs, and became the
first pilot to destroy a zeppelin in the air. Warneford, who won the Victoria Cross
for this feat, died eleven days later in a flying accident at Paris. Two other pilots in
Henri Farman biplanes bombed the sheds at St Evêre and destroyed LZ 38,
which had returned early with engine trouble. The commander at Dunkirk used
these successes to gain Admiralty approval for an immediate expansion of the
forces at Dunkirk, but at the same time the German army closed down its Belgian
bases. Most of its future attacks were made from sheds in the Rhineland. Only one
more airship was destroyed by RNAS Dunkirk in 1915, at Zeebrugge in August.¹⁴

Long before this the RNAS had secured acceptance from the Admiralty for the
continuance of its presence in Belgium, because of Churchill’s belief that ‘We
would have to concentrate our energies on the Belgian coast, and make every
effort to attack Zeppelin bases in case they opened some in Belgium.’ After 7
November the RNAS at Dunkirk was placed ‘under the general command of the
Commander-in-Chief in France, who will authorize them to proceed with their
special mission’—that is, surveillance of the Channel coast and action against
zeppelin bases.¹⁵

Dunkirk was to become the largest single RNAS operational base, and to remain
so for much of the war. Just why it should have become the favoured child of the
Admiralty is not easy to explain, although its strategic position on the left flank of
the allied armies and upon the vital artery of the Channel was probably a telling
factor. Its very location, however, encouraged a diffuseness of aim and function, a
tendency furthered by the relatively loose rein held by the Admiralty on its succes-
sive commanders. As a result, virtually every aspect of military aviation was, at
one time or another, pursued at Dunkirk, from sea patrolling and work with fleet
units to aerial fighting, bombing, and co-operation with ground forces. Partly

* For a bomb to be,primed for detonation it was necessary to release it at a sufficient height to
allow the nosecap to be unwound by the action of airdriven vanes.
because of its versatility, Dunkirk became an experimental arena for the naval air service and its activities often reflected the most advanced and innovative thinking in the Admiralty Air Department.

There was always a fundamental reason for a base at Dunkirk: the need to patrol the Channel. Regular patrolling by 3 Squadron, as the Dunkirk aircraft were designated, began in November 1914. The pilots christened their beat the 'Iron Coast,' in reference to the ever increasing number of coastal and anti-aircraft batteries the Germans constructed. Changeable weather conditions meant a difficult flying environment, particularly with the heterogeneous and obsolescent collection of aeroplanes and seaplanes the Dunkirk establishment flew in 1914 and early 1915.16

Dunkirk also became the focus for the strong naval interest in aerial bombing. In December 1914 Sueter laid down the requirement for 'a bloody paralyser' of an aircraft – the origin of the Handley Page bomber. Samson did what he could to implement the clear direction from the Air Department for an aggressive bombing policy, not only against zeppelin bases but also against a reported submarine depot south of Bruges. He also planned night attacks on the coast, primarily for their effect upon morale, for only incidental damage could be hoped for.17 In March 1915 Samson and 3 Squadron departed for the Dardanelles; their replacements, Squadron Commander A.M. Longmore and 1 Squadron, continued the pattern already established. Indeed, in suggesting the path for future aircraft development, Longmore gave first place to the production of heavy bombing machines, followed by high performance fighters and torpedo-carrying seaplanes, priorities which left no doubt of his offensive-mindedness.

When, on 21 June 1915, consequent upon Dunkirk’s solid achievements against German airships, the Admiralty authorized an increase in its establishment to six squadrons of aeroplanes and seaplanes, the tasks allotted reflected the diverse activities of the base. Aeroplanes provided cover for ships bombarding German installations along the coast, escorted seaplanes spotting for the ships, and carried out coastal reconnaissance flights to observe the results of bombardments, to report on activity in Ostend and Zeebrugge, and to watch for German mines and submarines at sea. Offensive roles were given particular prominence. On 26 August near Ostend a British pilot made the first recorded attack by a heavier-than-air machine against a submarine. Eleven days later Mulock, who had joined 1 Wing, as the Dunkirk establishment was now known, in July, made the second recorded attack. On 28 September Mulock was allowed to make a lone bombing raid on the zeppelin sheds at Berchem Ste Agathe: ‘a remarkable incident of cross country flying,’ wrote Longmore, ‘as he had to depend almost entirely on Compass and Time.’18

By this time, as the result of a further reorganization in August, Dunkirk had been amalgamated with the RNAS units at Dover under the command of the Vice-Admiral Dover Patrol. Wing Captain C.L. Lambe was in direct command of the eight squadrons. He used the two at Dover for reconnaissance work and for fighter patrols and the six at Dunkirk, which were still in process of formation, he allocated in pairs to the functions of spotting and reconnaissance, fighter patrols and bombing. Like Longmore, Lambe recognized that effective bombing would require aircraft with longer ranges and heavier payloads. Looking forward to the
acquisition of the Short bomber and the Sopwith 1½ Strutter, he wrote in November to his commander, Vice-Admiral Bacon, that it would soon be possible to attack ‘strategical points such as the lock-gates of canals, railway bridges, cuttings or stations.’ He had no doubt about where Dunkirk’s priorities should lie, recommending to Bacon the formation of two more wings of four squadrons each to concentrate ‘especially on offensive operations.’ Admiralty approval of this project came on 13 December, at a time when the Dardanelles campaign was coming to an end and negotiations with the War Office were under way to relieve the RNAS of the home defence burden. The terms of reference given the new wings show the Admiralty’s ambivalence over the bombing role, as well as the ambiguities of the Dover-Dunkirk establishment: ‘... the inland work of the Royal Naval Air Service is to be for the training of personnel in contact with the enemy. The units stationed at these two Aerodromes may be regarded as available in connection with military operations at times when Naval Air work proper is not required to be carried out. They will also, if necessary, be drawn upon for completing any Naval Air Service units serving in, or ordered to be dispatched to other spheres of operations, and together with the Naval Air Force at Dunkirk must always be held available for large coast operations when required.’

The evolution of Dunkirk encapsulates Churchill’s search for an offensive role for the navy, including the RNAS. Both he and Fisher were concerned that most of the enormous strength of the Royal Navy lay in ‘cold storage.’ In April 1915 he had enthusiastically endorsed Longmore’s priorities for aircraft development. Churchill’s main object was not ‘reconnaissance and patrolling’ but...

... the attacking with bombs on the largest possible scale of military points on enemy territory. For this, weight of explosives and numbers of machines are more necessary than skill of pilots or special fighting qualities in the machines. We shall then have passed the stage of daring exploits, and must acquire the power to strike heavy blows which will produce decisive effects on the enemy’s fighting strength. The carrying of two to three tons of explosives to a particular point of attack in a single night or day is the least we should aim at as an operation in the future. All possible objectives should be studied and special reports made upon them. The capacities of machines should be considered in relation to these definite tasks.

Churchill’s concentration upon offensive roles for the RNAS, and especially upon land-based bombing operations, persuaded many professional naval officers that he had neglected the purely naval side of aviation. It should not be overlooked, however, that he had much professional opinion on his side. A case in point was the response to the rise of the submarine menace. Churchill and many professional officers believed that bombing raids upon submarine installations was the best answer, but others, led by Fisher, held the view that submarines should be attacked at sea, where they were most dangerous and most likely to be found.

Had the two men continued in office, their differing views might merely have produced a healthy tension. When both resigned in May 1915 over the Dardanelles controversy, the RNAS lost its foremost patrons. The comparative lethargy of the new administration is a matter of record. A.J. Balfour as First Lord took a
less personal part in making decisions than had Churchill. Admiral Sir Henry Jackson as First Sea Lord was a man of impressive scientific attainments, but he had little of Fisher’s drive. The position of Jellicoe as Commander-in-Chief, Grand Fleet, was thus enhanced, and it was his view on air policy that now prevailed.

With Churchill gone the professional sea officers seemed resolved to impose their interpretations upon naval aviation. Jellicoe’s memorandum on the functions of the service contrasts sharply with Churchill’s pugnacious utterances:

- Observation duties from the coast generally, and from naval bases in particular.
- The attack of enemy aircraft wherever met.
- The aerial defence of all naval centres, such as dockyards, magazines, since the Army who, properly speaking, should carry out this work have apparently turned it over to the navy.
- Scouting for enemy submarines and enemy minelayers, which properly comes under the heading of reconnaissance work.24

The further reorganization of the RNAS reflected these aims. In August 1915 RNAS units were absorbed into naval commands. Commanding officers now reported not to the Air Department, but to senior naval officers in their locality. Rear-Admiral C.L. Vaughan-Lee, who had no air experience, was placed in charge of the Air Department in September, over the head of Murray Sueter, whose responsibilities were reduced to aircraft construction. And, in respect to equipment, the rigid airship programme was reinstated. C.R. Samson spoke for many naval airmen when he observed upon his return from the Dardanelles that ‘The R.N.A.S. was in the hands of those that knew it not, and the prevalent idea seemed to be that the active pilots were a wild sort of people who should be kept well under.’25 The fact was, however, that the RNAS itself remained ineradicably stamped with the offensive-mindedness Churchill and Fisher had exemplified and, despite Jellicoe’s principles, the new administration, as we have seen, was prepared greatly to expand the land-based bombing role at Dunkirk.

The Churchill-Fisher administration left not only a legacy of offensive-mindedness to the RNAS, but also the Dardanelles campaign, in which the RNAS had been committed almost from the start. After failing to muster War Office support for an amphibious attack upon Zeebrugge, a project that had had Fisher’s full support, Churchill persuaded his Cabinet colleagues to undertake an eastern strategy, using the fleet to force access to Constantinople. In what became the largest combined operation of the war, the RNAS provided the air support. Ark Royal went to the Eastern Mediterranean with her seaplanes in February. When Samson arrived with 3 Squadron on 24 March, Vice-Admiral J.M. de Robeck had already abandoned his attempt to force the Dardanelles. On 9 April a kite balloon ship arrived and on 19 April it was put to use observing the fall of shot for the bombardment of targets invisible to the guns.

By this time the RNAS had formed another curious organization at the Dardanelles. Based at Mudros Bay, responsible to the Commander-in-Chief, Eastern Mediterranean, was the Ark Royal. At Tenedos, on land leased from a local landowner, was 3 Squadron; in July, redesignated 3 Wing, it moved to Imbros. Wing
GALLIPOLI
ROYAL NAVAL AIR SERVICE UNITS
AT THE DARDANELLES AUGUST 1915

2 Aeroplane wings No. 2 and No. 3
1 Seaplane Squadron consisting of ARKROYAL and
BEN-MY-CHREE Aircraft
2 Kite Balloon Sections- HMS MANICA and HECTOR
1 SS Airship Section
H.Q. R.N.A.S. at Imbros

LEGEND: BRITISH TURKISH
Aerodrome ▲ ▲
Seaplane Station □ □
Airship Station ● ●
Kite Balloon Station ♦ ♦
Emergency Aerodrome 🌼 🌼
Commander Samson was responsible to the C-in-C Eastern Mediterranean for operations, but when giving aerial support to the army reported to General Sir Ian Hamilton. There was also a French squadron at Tenedos, working with the French army. The kite balloon ship, Manica, was absorbed into the naval chain of command. The nearest RNAS headquarters was the Air Department of the Admiralty. Thus a triad of air units, occasionally reinforced, was to provide all the aerial support for both land and sea operations in the ensuing attempt to take the Gallipoli peninsula. 26

In a sense, Gallipoli was similar to 3 Wing’s earlier experience in Flanders, except that Turkish air opposition did not compare to German strength in Belgium. On the other hand, there was no RFC support, and the RNAS simply did not have enough aircraft to meet its many duties. Of Samson’s eighteen aeroplanes, only five were of real use.* Seaplanes could be employed to observe the fall of shot during bombardments, as could kite balloons, but the only way seaplane pilots could gain sufficient altitude was to find one of the notorious thermals or ‘up-currents’ of the region to give them the needed lift. Kite balloons were excellent for stationary targets, but enemy troops could easily evade them by taking shelter in dead ground. Only aeroplanes could be used for the whole range of flying duties and even they were handicapped by having to fly from an island base to the lines, ‘the equivalent oversea flight of crossing the English Channel.’ 27 In face of their flying difficulties, it was dispiriting for the RNAS airmen to find that their efforts, particularly in spotting for naval bombardments, were not always appreciated. Ships’ gunnery officers were reluctant to believe large spotting corrections. Only when ships began to hold post-mortems on shots did the seamen come to accept the value of air observation. 28

Admiral de Robeck managed to persuade the Admiralty to send out additional aircraft in order to ease the strain on Samson’s meagre resources.† In June three new pilots arrived; one of them was Flight Sub-Lieutenant H.S. Kerby of Calgary, with fifteen hours of flying experience behind him. These reinforcements were much needed, for the preparations for the Suvla landings created new demands on the air service for information. As at Helles in April, air reports and photographs provided the only reliable intelligence. There were only six pilots available in 3 Wing, and in the days preceding the new landing they ‘practically lived in the air.’ Bombardment and artillery spotting had almost to be abandoned while reconnaissance was carried out in co-operation with the seaplanes of Ark Royal (now anchored in Kephalo Bay because she was too slow to proceed to sea in the face of

* Samson says 3 Squadron had twenty-two aircraft, but he only specifically names the same eighteen given in Great Britain, Admiralty Gunnery Division, Report of the Committee Appointed to Investigate the Attacks Delivered on and the Enemy Defences of the Dardanelles Straits, 1919 ([London] 1921).
† The first batch sent out, obsolete Henri Farmans, were returned. In June five Voisin two-seaters with 140-hp Canton Unné engines were accepted – slow aircraft, and no longer satisfactory in France, but in the absence of enemy air opposition useful for reconnaissance. Eventually they wore out, from having to fly continuously at full revolutions in order to maintain adequate altitude. It was in July that the first really effective reinforcements arrived: six 80-hp Nieuports, excellent aircraft for bombing, single-seater reconnaissance, and aerial combat, and six Maurice Farmans. Report of the Committee ... on ... the Dardanelles, 519.
the submarine threat) and *Ben-my-Chree*. The latter, the most recently converted merchantman, had arrived on 12 June with 225-hp Short 184 seaplanes and Sop-with Schneider seaplanes, great improvements on the old Wights and Shorts. In torpedo attacks the Shorts scored notable successes in sinking two ships and scoring a direct hit on another that was already aground. There were less successful attempts as well, however, primarily because it required a perfectly running machine and ideal conditions to lift the torpedo.²⁹

The Admiralty had realized the need for an assessment of the air situation in June and Colonel F.H. Sykes of the *RFC* was sent out to report. On 24 July Sykes took command of a central air headquarters at Imbros, with the *RNAS* rank of wing captain, thus placing Gallipoli and Dunkirk on a similar footing. The reinforcements so badly needed did not appear until late in August. By the time 2 Wing arrived the situation had reverted to static warfare once again, but there was more need for fighter patrols and for bombing, especially on the Turkish line of communications. In addition, in November the Admiralty issued orders for long-distance bombing raids.³⁰ By then there were about fifty aeroplanes, twenty-three seaplanes, three *SS* airships (only one was inflated) for anti-submarine patrols, and three kite balloons. But the Admiralty never allocated aircraft to Gallipoli on the scale required by land forces. As Sykes repeatedly stated, his command was hopelessly undermanned by *RFC* standards. There were two armies on the peninsula, consisting of two corps each plus an independent division. In France such an establishment would have been served by nine squadrons and a flight, or at least 168 aircraft. The Admiralty, however, had not yet adopted any precise table of organization for the *RNAS*. A squadron of aeroplanes was variously considered at this time to consist of six to ten machines. Seaplanes were sometimes organized into flights, and sometimes into squadrons, presumably according to the capacity of seaplane carriers and to the number of aircraft that could be spared. Not until May 1916 did the Admiralty attempt to lay down exact definitions for units.³¹

On 7 December 1915 it was decided to evacuate Gallipoli, and by 9 January the last troops had gone. No 3 Wing disbanded, Samson’s recognition being a censure for a fire in one of his workshops. With a maximum of eleven pilots and an average of seven, and sometimes with as few as four aeroplanes, the wing had logged 2600 hours in the air in exactly nine months.³²

The navy and the *RNAS* maintained a presence in the Eastern Mediterranean. No 2 Wing remained at Imbros with three squadrons of ten machines each, eighteen pilots, eight observers, and a photographic section. To the west lay Salonika and the *Ark Royal*, sent in November to provide some air support for a new Anglo-French Mediterranean adventure. At Mudros Bay on the island of Lemnos there were six *SS* airships. Thus, as 1915 came to an end, the Aegean Sea became a general theatre of operations for the *RNAS*. To the south, off Palestine, in the Red Sea, and in East Africa there were other units of the *RNAS*.³³

A detachment of the *RNAS* had been drawn into the East African campaign when the German surface raider *Königsberg* went to earth in one of the myriad branches of the Rufiji River delta. In the humid tropical heat, with its lack of lift, and maintenance problems of warping wood, melting glue, and stretching fabric, bombing the *Königsberg* proved impossible. In early June 1915 two shallow draft
monitors, Severn and Mersey, sailed into the Rufiji delta hoping to sink the Königsberg with gunfire. Sea and air officers worked out a clock code together, testing it in exercises during which two of the RNAS' four machines were wrecked. On 11 July Flight Commander J.T. Cull and his observer, Flight Sub-Lieutenant H.J. Arnold from the Queen Charlotte Islands, BC, had begun to record hits on the Königsberg when shell splinters took away two cylinders from their Henri Farman. As the aircraft planed down, Arnold radioed the final correction that led to the destruction of the German ship. The Farman came down near the Mersey, turned over, and trapped Cull. Arnold, who had been thrown clear, swam back and helped his pilot to escape the wreckage.* Cull then took the remaining aeroplanes up-country to participate in the land campaign, while the seaplanes went to Mesopotamia.34

The traditional mobility of sea power had played an important part in shaping the roles of the RNAS by the end of 1915. The urgent need to develop and acquire aeroplanes capable of the speed and range for effective bombing had been another consideration, one that had led to the neglect of rigid airships and to some extent of seaplanes and flying boats. Lighter-than-air and seaplane operations became more important with the rise of the submarine threat. These functions, and the varying importance given them, dictated personnel policy which in turn determined the manner in which Canadians were to participate in RNAS operations.

There were three avenues to naval air units for Canadians: by transfer from other forces overseas, by travelling to England to join the RNAS ‘from shore,’ and by joining through the Naval Service of Canada. In the first category was J.A. Barron of Stratford, Ont. He had joined the Canadian Marine Service as a cadet in 1908 and was one of the Naval Service of Canada’s first group of cadets in 1910. In 1912 he received a medical discharge, but managed to get himself accepted as a midshipman in the Royal Navy in 1914. He was the only Canadian among the midshipmen selected for airship service in 1915.† Officers were only chosen for airships and kite balloons if they had naval background or experience. Consequently all the other Canadians in the RNAS in 1915 went to heavier-than-air squadrons. Three transferred from the CEF: R.H. Mulock, T.D. Hallam of Toronto, and W.B. Lawson of Barrie, Ont., a graduate of the Royal Military College of Canada who by the end of the year was taking up an appointment with the seaplane force in Mesopotamia.

At least three Canadians paid their own way to England. H.S. Kerby, already mentioned, who went on to a distinguished career in the Royal Air Force, made his way overseas from Calgary with J.T. Bone, who lost his life in a drowning accident while flying at Dover in November 1915. J.E.D. Boyd, a Torontonian, failed to return from a raid over Zeebrugge on 3 October 1915. He was interned after a forced landing in Holland.

Those who joined in Canada did not become available for operational flying until later in the year. The first two graduates of the Curtiss School in Toronto,

* Arnold was awarded the DSO for his part in the proceedings. He was killed in 1918.
† In 1918 he would help J.T. Cull to organize the Royal Canadian Naval Air Service. See chapter 19.
W.H. Peberdy and A. Strachan Ince of Toronto, went to Dunkirk in October, where Ince took part in one of the only two decisive combats recorded by the Dunkirk Wing in 1915. On 14 December, as observer in a Nieuport two-seater, he shot down a large German seaplane. The Nieuport was damaged and had to ditch, but the crew escaped to a nearby minesweeper. Two more of the early Curtiss students went to home stations: C.G. Gooderham of Toronto to Whitley Bay and R.E. Bush, an English immigrant who had enlisted in Canada, to Westgate.

When Squadron Commander Bell Davies returned from Gallipoli to command the naval air station at Killingholme early in 1916, he found that with home defence no longer a prime responsibility of the RNAS there was little for experienced aeroplane pilots to do at coastal stations. He recommended a number of them, including Gooderham (who was now at Scarborough), for service abroad because of their competence in night flying. Gooderham had an active career at Dunkirk. C. MacLaurin of East Templeton, Que., A.J. Nightingale of Toronto, A.T.N. Cowley of Victoria, and F.S. McGill of Montreal, who had qualified in the United States and then joined the RNAS in Canada, became seaplane pilots at Calshot, Dover, and Westgate and in the new seaplane carrier, HMS Vindex. The seven Canadians who sailed for England in September and October and qualified as aeroplane pilots were to form a squadron under Squadron Commander R.L.G. Marix at Detling, the nucleus of the future 3 Wing. R.D. Delamere of Toronto, selected in 1916 to join Cull’s aeroplane party in East Africa, was the only one of those who joined in Canada in 1915 to be sent away from the vicinity of home waters.

At the end of 1915 the RNAS had been committed to many theatres and to a large number of functions and was on the threshold of a period of rapid expansion and of considerable improvement in aircraft quality and supply. Though the service had not clearly been directed either towards an offensive policy or towards the pursuit of more conventional naval duties, the Admiralty seemed content to permit it to follow both. It was coincidental that Canadians should begin to arrive in significant numbers at this stage, but the timing of their arrival was crucial in deciding the form their contribution would take. They were soon to be found wherever the RNAS was operating, but the bulk went either to Dunkirk or to coastal air stations in Britain. As a result, in 1916 many Canadians were to be directly involved in the next stage of RNAS experimentation, whether in long-range bombing over the Continent or in the development of the war against the U-boat and in the struggle for air mastery over the North Sea.

* Cowley and McGill both later rose to the rank of air vice-marshal in the Royal Canadian Air Force.
By January 1916 there were some 120 Canadians in the Royal Naval Air Service, either actively engaged or en route from Canada to flying stations.* What they and those who were to join them in the course of the year were to do rested with the Admiralty. The naval officers who struggled to find an air policy 'for all seasons' ran into severe criticisms from many quarters: they were accused of having no imagination (especially about aircraft carriers and torpedo aircraft), of lagging behind the Germans in home waters, and of misusing their forces. The Admiralty, indeed, became embroiled with the War Office and Air Board over undue RNAS concentration on bombing and the inefficient use of forces at Dunkirk—a charge that rendered that command vulnerable to Royal Flying Corps raids upon its strength. Especially damaging was the claim that the navy refused to co-operate in aircraft supply and operational planning. But such great matters, and the shakeup in high command which resulted, were remote from naval airmen on daily flying operations, where the Canadians without exception were to be found.

German naval air policy, meanwhile, was determined by the strategy of Admiral Reinhard Scheer, who received his appointment as Commander-in-Chief of the High Seas Fleet on 24 January 1916. Scheer had no wish to bring the enemy's numerically stronger Grand Fleet to battle, but he proposed to keep up 'constant pressure' by provocative sweeps using all or part of the High Seas Fleet, by the harassment of British merchantmen trading with Scandinavia, and by an increased emphasis upon submarine, mine, and aerial warfare. The Royal Navy would be compelled to send out ships to meet these challenges. Sooner or later, Scheer believed, he would find 'favourable possibilities of attack.'1

Jutland was the most important result of this strategy. The buildup to it began with the mass airship raid of 31 January. England's home defence system, termed not altogether unfairly 'a screaming farce' by the editor of Flight, was swiftly reorganized in the aftermath of this action, and the RNAS as a result was left with only secondary responsibilities.² Since its role was now restricted to offshore defence, the naval air arm was presumably in a position to redeploy its strength elsewhere. But where, and in what form?

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* Total officer strength of the RNAS in December 1915 was 1634. Director, Air Division, 'Appreciation of British Naval Effort RNAS Aircraft Operations,' Nov. 1918, Air 1/308/15/226/91
The Admiralty unfortunately had narrowed the options by according low priority to a plan submitted by Squadron Commander de G. Ireland, commanding officer of Great Yarmouth Air Station, which called for ‘between fifty and one hundred’ torpedo-carrying aircraft to be ready by summer for a raid on the High Seas Fleet at its bases. The Board of Admiralty, influenced by the poor showing of seaplanes in 1915 and by still unsolved technical problems, placed no urgency upon its order to Short Brothers to design the required aircraft. Not until January 1917 was a production contract let out for twenty-five Short 320s, armed with an 18-inch Mark IX torpedo.

Instead, the Admiralty was much more interested in a long-range bombing programme, which would employ the high-powered engines the navy virtually monopolized as the result of its agreement with the RFC at the beginning of the war. The Admiralty’s preoccupation with strategic bombing heavily biased RNAS operations during 1916; moreover, it brought a confrontation with the RFC on several levels: at the level of high policy, over which service ought properly to carry out this role; at the operational level, over the question of control of air activities on the Western Front; and at the level of production and supply, over how, and according to which priorities, aircraft and engine production ought to be shared between the two services.

It was the strategic bombing argument, combined with strong public dissatisfaction with the apparent failure of the two air services to collaborate effectively against zeppelin attacks, that led the British government to establish the Joint War Air Committee ‘for the interchange of ideas and the co-ordination of procedures.’ The committee, which consisted of Admiralty and War Office representatives, was established on 24 February 1916. It was short-lived. Its chairman, Lord Derby, proved unable to resolve the main differences between the two services. Over the matter of supply, the Admiralty was intransigent, though it made minor concessions. On the matter of strategic bombing, it was adamant. The paper submitted by the Admiralty in early March for committee discussion laid out the following list of RNAS duties:

1 To attack the enemy’s fleets, dockyards, arsenals, factories, air sheds, etc....
2 To patrol our own coasts to look out for enemy’s ships and submarines, and to meet and repel enemy aircraft. Possibly also to discover minefields.
3 Observation of fire during ships’ bombardment of enemy’s coasts. Destruction of enemy’s coast batteries, means of communication thereto, and material in connection therewith.
4 Scouting for the fleet and reconnaissance work from ships (vide Egypt).
5 To assist the Army whenever and wherever required. (vide East Africa and Mesopotamia).

In early April Derby and Lord Montagu of Beaulieu, who had now joined the committee, decided that it was futile to continue. Derby wrote the Prime Minister

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* The original version of the Short had the less powerful 310-hp Sunbeam Cossack Engine. By March 1918 the navy had taken delivery of 110 Short 320s. Owen Thetford, British Naval Aircraft since 1912 (London 1962), 262
that it had been ‘quite impossible to bring the two wings closer together,’ and that it would not be done ‘unless and until the whole system of the Air Service is changed and they are amalgamated into one service as personally I consider they ultimately must be.’

With great difficulty terms of reference for another committee were hammered out. The Air Board’s chief architect was Lord Curzon, the Lord Privy Seal; its chief critic was Lord Balfour, at the Admiralty, who feared complications if the proposed board were treated as a ‘third fighting department controlling all aerial operations (which is I believe what an unthinking public really want) ...’ What emerged was a relatively weak body, with Curzon as its president. Advisory in nature, the Air Board was charged with organizing supply for the two services and was ‘free to discuss’ matters of general policy. Should the services refuse to follow the recommendations of the president, the War Committee of the Cabinet was the only court of appeal. In May the new board turned warily to a discussion of the problems that had sunk the Derby Committee.

By that time, however, the Admiralty had unilaterally decided upon its own course of action. Nothing Curzon or the RFC representatives could say affected this. It had become clear in February that long-range bombing operations based on Dunkirk were only possible in co-ordination with and under the control of the Commander-in-Chief of the BEF. Nevertheless, the assumption by the RNAS of a strategic bombing role and the establishment of 3 Naval Bombing Wing at Luxeuil was a fait accompli. That decision had an important effect upon the capacity of the RNAS to carry out its other duties. Pilots for Luxeuil, and for long-range operations from Dunkirk, had to come from somewhere. By the end of 1916 Luxeuil alone was employing roughly 20 per cent of all RNAS aeroplane pilots.

Most of the pilots for the bombing role came from home stations in the British Isles. Some of the small airfields that had been used for home defence were dispensed with; strength was concentrated at the main coastal and training stations. Cuts in the home establishment were not uniform. The seaplane element, for example, was left untouched. Its chief task remained the hunt for submarines and mines in support of the ship patrol, and it was a task in which Canadians played their part. When the second U-boat campaign against merchant shipping off the British coast began in March-April 1916, Canadians were flying from most of the main seaplane stations. The small flying boats and seaplanes these men flew—the Short 18, Short 827/830, Sopwith Schneider, and Baby fighters—were slow, poorly armed, and frequently had no wireless equipment. Against submarines they were completely ineffective. However, because the Admiralty was preparing to expand the force with flying-boats when the new Curtiss ‘Large America’ H12s and more Curtiss ‘Small America’ H4s were delivered, it was unwilling to make cuts in the seaplane establishment.

Of necessity, then, bomber pilots had to be taken from the pool of aeroplane pilots on home stations. Even here, however, there were both political and military reasons not to go too far. The RNAS still had a secondary responsibility for...
home defence, and was vulnerable to public criticism for the manner in which that responsibility was carried out. The weakness of seaplanes against zeppelins, and against German aeroplanes now sporadically raiding coastal towns, meant that defence had to be stiffened by 'fast, rapid-climbing aeroplanes.' Moreover, in the RNAS scheme of things, the home defence establishment was really coterminous with its night-flying training. In April 36 per cent of the 304 aeroplanes on active RNAS duty were being used for this combination of home defence and night-flying duties. By the end of the year the number of aeroplanes on such duties had increased only slightly; more significant, all but ten had been downgraded to the category of second-class aircraft.* In other words, as the Admiralty reordered priorities for its air service, the home aeroplane element lost most of its experienced pilots and its aircraft were allowed to become largely obsolescent.†

With the exception of a few veteran pilots retained for night flying, the RNAS used the home aeroplane organization as a graduate course for inexperienced pilots. Flight Sub-Lieutenant L.S. Breadner of Carleton Place, Ont., was a typical example of the young Canadians now being sent for training to operational stations in England. With three other Canadians who had also been at the Wright School at Dayton, he arrived at Redcar in early February; 'a splendid station,' he wrote, 'well-equipped and we will be started flying at once.' The Canadians arrived at their various stations in batches and at first had a tendency to stick together. 'How clannish the Canucks are,' Breadner noted, but 'we are all willing to fly on any kind of a day and that's what pleases the c.o.... He is tickled with us and is trying to get all the Canadians he can here.'* After train-

* In calculating its strength, the RNAS had adopted the practice of distinguishing between first- and second-class aircraft. The former were the most effective combat machines available at the date of assessment; the latter were obsolescent or obsolete machines which were not for use against serious enemy opposition. Some of these second-class aircraft were probably no worse than the aging machines utilized by the RFC on the Western Front.

† Not all station commanders were as enthusiastic. Flight Sub-Lieutenants M.G. Dover of Winnipeg, C.E. Moore of Fort William, Ont., K.M. Smith and Bert Wemp of Toronto figured in a bizarre incident in May in which they clashed with their station commander at Yarmouth. In the words of the investigating officer: 'Squadron Commander Oliver (whom I gathered does not much care for these Canadian Officers) made some remark in the Officers' Mess after dinner about their want of knowledge in the English language and their method of expressing themselves, and said (in what he intended to be a joking manner) that they were to have half-an-hour's instruction in English every morning. This was taken literally (or possibly with a view of annoying these officers) by Sub-Lieutenant [S.K.] Reeves, who ordered them to parade in the lecture room the following morning at 9:30. They were all of them (and, in my opinion, quite justifiably so) furious at this reflection on their speech and manners, and agreed together to tender their resignations failing their being removed from the Yarmouth Air Station.' Oliver thereupon called them before him and read them an extract from the Articles of War on 'mutinous assembly.' Oliver was subsequently reprimanded for tactlessness, and the four Canadians were transferred elsewhere. Air 1/416/15/243/pt 111. There is some evidence that the arrival of Canadians was not without friction at other stations in 1916, but the period of mutual incomprehension does not seem to have lasted long. The May incident might be seen as the beginning of Bert Wemp's political career. He was later a member of the Board of Education of Toronto, an alderman, controller, and then, briefly in the early 1930s, mayor of Toronto. During the Second World War he travelled to Europe several times as a correspondent for The Telegram; one of his bosses described Wemp as 'an exception to the style of dramatic writing that gave The Telegram its flavor.' Globe and Mail (Toronto), 7 Feb. 1976
1916: Diffusion and Misdirection

ing at Redcar and other stations, Breadner was posted to 1 Wing at Dunkirk in July.\(^1\)

What is particularly notable about his experience is that at Redcar, green though he was, Breadner along with other inexperienced pilots was slated for duty on a roster system in case of air raids. A good many Canadians undergoing final pilot training in 1916 had similar experiences; some of them were actually introduced to the war in the air on anti-zeppelin patrols. Flight Sub-Lieutenant R. Collishaw of Nanaimo, B.C, one of the most famous of all Canadian pilots, first flew operationally in this way from Redcar, before joining the Luxeuil bombing wing. Similarly, Flight Sub-Lieutenant Grant Gooderham of Toronto gained his first operational experience against zeppelins before being sent to Dunkirk. Although such training was invaluable for the pilots concerned, it is hardly surprising that the RNAS continued to be criticized for its failings in the home defence role.

The chief beneficiary of the Admiralty's shift in policy was the Dover-Dunkirk Command. During 1916, under Wing Captain C.L. Lambe, it was expanded rapidly. The command operated under Vice-Admiral Reginald Bacon's Dover Patrol, which had three main objectives: to protect the cross-Channel supply routes of the British Expeditionary Force; to harass enemy submarines using Belgian ports; and to take offensive action, by whatever means, against the Channel end of the German lines, manned at their western extremity by three divisions of marine infantry. These objectives dictated the RNAS roles of coastal reconnaissance, wireless spotting for ship bombardment of the shore, anti-submarine and hostile aircraft patrols, and the interception of zeppelins and aircraft returning from raids upon England. To oppose them the German navy had seaplanes at Seeflugstation Flanders I on the Mole at Zeebrugge and a growing force of Marine Korps aeroplanes in Flanders.\(^2\)

At first Flight Sub-Lieutenants R.H. Mulock of Winnipeg, A.S. Ince of Toronto, and B.C. Tooke, address unknown, were the only Canadians in the command. All but the last had already seen service in the command in 1915.* During the early months of 1916 Mulock was rapidly consolidating his growing reputation as an all-round operational pilot. On 24 January, while carrying out a photo reconnaissance flight to Ostend and Ghistelles, an inland aerodrome to the southeast, he drove down a German biplane to a forced landing. Two days later, while taking part in an operation in which five monitors bombarded shore batteries near Westende, he intercepted a large two-seater biplane heading for the flotilla. Putting his Nieuport Scout under the enemy's tail, he followed his opponent through a cloud bank and then sent his quarry plunging to the ground. Within a week Mulock was taking a prominent part in another of the command's duties. Before dawn on 1 February ten Nieuports were patrolling a line between Nieuport and Zeebrugge at 10,000 feet, hoping to catch zeppelins returning from the first mass raid of the

THE STRAIT OF DOVER AND FLANDERS COAST, 1917
Extent of Dover barrage, Dec. 1917.
Mines laid, July 1917.
U-Boat bases Ostend
German aerodromes and seaplane bases.

THE DOVER/DUNKIRK AIR COMMAND: AFTER REORGANIZATION APRIL 1917

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<tr>
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<td>No. 2 (N) Squadron: St. Pol</td>
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<td>The seaplane units at Dunkirk and Dover came under the operational control of No. 1 (N) Wing</td>
<td>No. 11 Kite Balloon Station</td>
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year. It was they who were caught. With fuel running low after two-and-a-half hours on patrol, the naval pilots discovered, on turning for home, that fog had blotted out land and sea. Only Mulock and one other pilot reached the aerodrome. Mulock then went out with a mechanic in a two-seater Nieuport to help five of the patrol stranded on the sand dunes and guide them home.\textsuperscript{13}

The Admiralty’s new bombing programme began to affect Dunkirk from February onwards. New bombers were the first sign; most notable were the Caudron G4 and the Sopwith 1½ Strutter. A slow and cumbersome aircraft, the Caudron carried four 65-lb bombs. Dunkirk took delivery of fifty-five, most of them French-built, during the year. The first 1½ Strutters to reach Dunkirk were the two-seater fighter variant, the first British aircraft to enter service equipped with synchronizing gear to permit the pilot to fire his Vickers machine-gun through the propeller arc. This aircraft could carry two 65-lb bombs; later in the year the single-seater bombers arrived, capable of carrying four such bombs.\textsuperscript{14} Two-seater Breguets and the Henri Farman F27 were also to be found in the Dunkirk bomber force.

While the two wings that were to use the new bombers were still forming at Eastchurch, the Dover-Dunkirk Command launched its first raid on German bases in Belgium in retaliation for hit-and-run attacks on Kentish towns. Following a protest by General Haig about indiscriminate RN\textsuperscript{AS} target selection in February, Bacon took special pains to control bombing operations. Hence it was with army approval that he ordered an attack on Houttave aerodrome, between Ostend and Bruges on 20 March, in which eight aircraft of 1 Wing joined twenty-one French and Belgian machines in dropping 114 bombs on the target. Simultaneously, seaplanes from HMS Vindex and Riviera and Dunkirk itself struck at the Zeebrugge Mole. Among the Riviera pilots was Flight Sub-Lieutenant G.A. Maclean of Toronto, one of the first Canadians to fly ship-borne aircraft. Whatever the effectiveness of these strikes, the Germans discontinued their own attacks for a month, a period used by the RN\textsuperscript{AS} to adjust and consolidate its organization at Dunkirk.\textsuperscript{15}

With two new wings, No 4 at Petite Synthe and No 5 at Coudekerque, ready for operations in late April, flying duties in the command were reallocated. No 1 Wing was divided into two squadrons\textsuperscript{*} and assigned the naval support role. For photographic reconnaissance and fire direction it was given two-seater Nieuports, with BE2cs for night firing. Its single-seater Nieuport fighters patrolled (together with a Belgian squadron) a sector from Ypres to the sea along the Western Front and out over the fleet. The Canadians remaining with this wing were Mulock, Leslie, Hains, and Gooderham. No 5 Wing’s main duty was bombing, but it was also to carry out fighter and reconnaissance roles, though on a smaller scale than No 1. It was given a flight of two-seater 1½ Strutters, some Caudrons and Breguets, and a number of Canadians: Grange, Hervey, Hughes, Hewson, Shook, Thom, Todd, and Van Allen, all from 1 Wing. Supply problems spelled a slower rate of expansion for 4 Wing, but it too was to carry out both bombing and fighting duties, and for these purposes it was equipped with an assortment of Caudrons, BE2cs, Avro

\textsuperscript{*} From June 1916 a flight consisted of ten aircraft and six pilots; a squadron was made up of two flights and a wing of two or more squadrons. Confidential Admiralty Monthly Order, 268/16, 1 June 1916
504s, and single-seater Nieuports. Among its pilots were two Canadians, Flight Sub-Lieutenants H.R. Aird of Toronto and C.H. Darley of Montreal.

The organization, equipment, and duties of the three wings clustered so closely about Dunkirk fell somewhat short of functional coherence, which is merely to say that the structure of the command reflected the conflicting and competing pulls of its naval responsibilities, its land situation, and the bombing role assigned it by the Admiralty. The same observation can be made about its operations during the spring of 1916. The Dover Patrol had a specific objective in this period—the strengthening of its mine operation to meet the German submarine campaign. Bacon hoped to stop the use of Zeebrugge as a U-boat base by closing the passage between Thornton Ridge shoal and the Flanders coast with a double line of deep mines and mine net barrages. The enlarged Dunkirk air command sought to support this objective by a bombing offensive which was not always clearly related to the aim.

On 23 April, twenty-four hours before the minelayers moved in on the coast, six Caudrons of 5 Wing, including two flown by Thom and Van Allen, battled through heavy ground fire to bomb Mariakerke, a new coastal aerodrome west of Ostend. The next morning Shook in a Caudron was one of twelve pilots from the bombing wings in action over the same target. Meanwhile, fighters and seaplanes flew protective and anti-submarine patrols to seaward. German seaplanes from the Mole reacted by attacking the coal-burning drifters left to watch the nets; one of the Germans was shot down by a Nieuport of 4 Wing, an event prompting the commander of Seejlugstation Flanders I to urge the need for fast seaplanes with better combat qualities.

Seaplane pilots from Dunkirk and Dover were very much a part of these operations, making frequent patrols from the Outer Ratel Bank off Nieuport to the Thornton Ridge in order to cover the British ships along the mine barrage line. Of the eighteen seaplane pilots, five were Canadians: Flight Sub-Lieutenants Tooke, Stephens, Cowley, P.S. Fisher, and A.H. Sandwell of Montreal. On 2 May Tooke’s bombs forced a surfaced submarine to dive; on 4 May a Short flown by Stephens was damaged by U-boat fire and he was forced to crawl back to base. Cowley was less fortunate. Engine failure forced him down at sea; he and his observer were made prisoners by a German torpedo boat. Bomb attacks were not resumed until 4 May, when Mariakerke was again hit by thirteen Caudrons and Breguet’s escorted by Nieuports, all from 5 Wing. Van Allen was shot down over enemy territory during this raid and died of wounds the same day. Not for two weeks was another raid attempted. This time Ghislennes was the target, but it is doubtful that the mixed force of aircraft (Caudrons predominating) caused much damage. For Thom, the lone Canadian taking part, the experience chiefly served to introduce him to the hazards of landing a bomber at night. ‘... Sometimes from 5000 feet one can see the flares beautifully,’ a naval pilot wrote, but ‘from 20 feet – the most critical time – the light becomes diffused, and one has not the least idea where one is, so one generally lands on a turn and crashes.’

Though these sporadic raids may have had only an indirect effect upon the work of the Dover Patrol, they appear to have aroused the Germans. Between 19 and 22
May German aircraft dropped 372 bombs on the city of Dunkirk, killing thirty-seven people, and Seefflugstation Flanders I sent seaplanes to hit Dover and other Kentish towns on 20 May. Dunkirk was immediately drawn into retaliatory action. The fighters of 1 Wing swept over German aerodromes on 21 May. Mulock destroyed one and perhaps two enemy aircraft off Mariakerke while Gooderham sighted five of the enemy near Ghistelles—and engaged a sixth off Westende. Dunkirk’s main response, however, was to join in a series of allied counter blows against aerodromes, ammunition depots, and other targets of military importance. While French and Belgian bombers struck at Ghistelles, Handzaeme, Keyem, and Vyfwegen, and RFC squadrons from Second Army raided Langemarck and the Forét d’Houthuist, the RNAS sent sixteen Caudrons and single-seater 1½ Strutters against Mariakerke on 21 May. All pilots encountered poor visibility and had trouble finding the target. Hervey and his observer, bedevilled as well by a jammed bomb rack, were reduced to heaving three 16-lb bombs over the side of their escorting Sopwith from 5200 feet. On Bacon’s orders, three pilots were subsequently brought before a court of inquiry to explain why they dropped their bombs on Ostend after failing to locate Mariakerke. He also laid down, in a delphic instruction, that in future bombs not dropped on the designated target were to be jettisoned ‘in places other than the main position of the enemy’.

Bacon’s order reflected his growing scepticism about the worth of bombing offensives. The obvious German response to them was to bomb French towns; the Allies, at least in the Flanders sector, were in no position to retaliate in kind and, as Lambe pointed out, there was no defence against German night bombing. He considered that a resumption of the bombing offensive against German aerodromes would be valuable only if carried on round-the-clock, and for that he needed more men and aircraft. At this point Bacon reached the same general conclusion about the usefulness of bombing that General Hugh Trenchard, commanding the RFC in the field, had arrived at somewhat earlier. He wrote to Lambe on 6 June:

The chief lesson learned by our airmen in Flanders during the past two months, I hope, is one which the Military have known for some time, namely, that indiscriminate bombing is useless. The point they will eventually appreciate is not only that it is useless, but absolutely harmful to well thought out military operations ... I intend to limit day bombing to such occasions of general attack or a general advance or to the attack of submarines and other vessels at sea. Night bombing may be useful against vessels in a harbour when present in sufficient numbers to make success probable, but otherwise bomb-dropping leads merely to the strengthening of anti-aircraft defences without adequate compensation.

Though bombing, for a time, was halted, the command’s resources were still being spread over a wide variety of tasks. When the French withdrew their sole squadron from Dunkirk to help with the Verdun battle, the RNAS found itself left with complete responsibility for the aerial defence of the city. On 10 June the two flights of ‘A’ Squadron, composed solely of Nieuport fighters and therefore the first homogeneous unit in the history of the service, moved to Furnes. Since that aerodrome brought the unit closer to the front, it was agreed that it would furnish
escorts for French reconnaissance and artillery aircraft. All three wings, as a matter of routine, sent out fighter patrols to prevent enemy spotting over the lines. The command, then, was charged with the maintenance of aerial superiority over the French and Belgian lines, and over the fleet as well. The latter task became even more important with the arrival at Zeebrugge of the 2nd Destroyer Flotilla of the High Seas Fleet.\(^{21}\)

To carry out these duties the command had a distinct margin of superiority over its opponent. The German Marine Korps could muster only about eighteen seaplanes at Zeebrugge and twenty-three aeroplanes at land bases, compared to thirty-seven British seaplanes (of which thirty-two were defined as ‘first-class’) and 153 aeroplanes (of which 115 were ‘first-class’). Even so, with only twenty-seven seaplane pilots and seventy-two aeroplane pilots, Lambe complained that for fleet support his wings were ‘barely over 50% of the approved complement’; and so high was the priority accorded the command that the Admiralty ordered a speed-up in supply at the expense of other commands ‘whose needs are not so pressing.’ Seven pilots, including Canadians H.H. Arundel of Winnipeg, L.S. Breadner of Carleton Place, Ont., C.J. Wyatt of Mount Brydges, Ont., and C.B. Sproatt of Toronto, along with 150 ratings, were drafted immediately to Dover for Dunkirk, and the Air Department promised quick despatch of twenty-one aeroplanes and fifteen seaplanes of the latest types.\(^{22}\) Within three weeks ‘A’ Squadron had taken delivery of the first examples of two fine new fighters, the Sopwith Pup and the Sopwith Triplane.

The high priority given Dover-Dunkirk, particularly when much of the command’s work was of no naval value whatever, stood in sharp contrast to the Admiralty’s attitude towards the use of aircraft at sea. Here development proceeded at a more leisurely pace. At the beginning of 1916 the Board of Admiralty placed some emphasis upon their long-range flying-boat programme, but their main priority was rigid and non-rigid airships.\(^{23}\) Carriers came a long way after: only one, Manxman, a former cross-channel packet on the Isle of Man run, came into service during the year. Few Canadians, therefore, found their way into this branch of the service. Of the ten who did, three—Flight Sub-Lieutenants W.M.C. Matheson, H.G. Nares, and L.E. Nicholson, all of Winnipeg—joined Manxman in December, when she was finally commissioned after having spent nearly twelve months undergoing alterations.

Despite the indifference and conservatism of the navy’s senior officers, constructive ideas for maritime aviation were not wanting. In 1915 Flight Commander H.A. Williamson produced a wood model of a vessel bearing a marked resemblance to the ‘island type’ of aircraft carrier of the postwar era and design drawings were being considered for a 27-knot light cruiser able to carry five 225-hp Short and four Sopwith Schneider seaplanes. While these were circulating, the Air Department organized aeroplane dummy deck-landing trials at Grain Island experimental station to test Williamson’s grid scheme\(^*\) of fore and aft arrestor wires.

* In January 1912 Williamson had written a paper for the benefit of an Admiralty committee outlining offensive and defensive measures against submarines which included the suggestion that aircraft could utilize a system of wires for operating from the deck of a parent ship.
These trials, though successful, had to be stopped because there was no suitable ship for sea tests. Commodore Murray Sueter, the Superintendent of Aircraft Construction, thought that the ‘most satisfactory arrangement would be to so devise the whole scheme that machines could not only fly off the ship, but could also fly back onto it without its having to come to rest, or even slow down.’ Backed by his chief, Sueter argued that three such carriers should be approved as urgently needed by the Grand Fleet, and that of those in service only Campania was suitable for adaptation. 24

Nothing came of these plans, so the advocates of specially designed carriers resolved to approach the Commander-in-Chief. Admiral Sir John Jellicoe was much impressed by the idea of aircraft operating from the deck. ‘It has ... long been evident to me that the only satisfactory type of seaplane carrier is one from which the machines can rise off the deck,’ he wrote to the Admiralty. ‘The advantage of being able to land on the deck is, of course, very great and the proposals in this design seem to promise well.’ 25 If the new carrier could not be built, he, and some others, thought that some of its features might be embodied in the three large cruisers, Glorious, Courageous, and Furious. Four months, however, elapsed before the Admiralty replied to his letter.

What contribution did seaplane carriers make towards the achievement of naval tactical objectives in 1916? In the Mediterranean and East Africa their work was useful if not spectacular: spotting and scouting for fleet units and, from time to time, providing support for military operations. After the evacuation of the Dardanelles the four available carriers, Ben-my-Chree, Anne, Raven II, and Empress, were formed into a composite squadron at Port Said, under the orders of the Commander-in-Chief East Indies Station, whose command extended from Port Said to Singapore. The squadron’s pilots, including the Canadians M.G. Dover of Winnipeg, F.C. Henderson, A.J. Nightingale, and T.G.M. Stephens, all of Toronto, flew 225-hp Shorts and 100-hp Schneiders. In April Empress was lent to Eastern Mediterranean Command for operations off the Bulgarian coast, and then spent the rest of the year patrolling the Turkish coast south of Smyrna. During this period Sub-Lieutenant D.P. Rowland, RNVR, of Winnipeg served with her as an observer. 26

If carriers were of some limited but consistent use in secondary theatres, their work in the North Sea was decidedly uneven. There carriers, airships, and seaplanes faced difficult conditions; moreover, they were mere pawns in the great game contested by the two fleets, in which the major pieces were capital ships. From the beginning of 1916 each side engaged in a series of forays intended to isolate, entrap, and destroy unsupported elements of the other. Twice in January Vice-Admiral R. Tyrwhitt’s Harwich Force was out, but the launching of seaplanes from Vindex against the airship sheds at Hage was thwarted, once by fog and a second time by U-boats. 27

On 25 March Harwich Force mounted a bombing raid on supposed airship facilities at Hoyer on the Schleswig coast. The force was bait for a trap. It had battle-cruiser support, since it would be working deep in the German Bight. Vindex sent out five seaplanes, only two of which returned. After flying some forty miles through a snowstorm, the pilots discovered that Admiralty intelligence was defec-
There were no zeppelin sheds at Hoyer, though some were sighted at Tondern. The raid did precipitate some naval action. Two German armed trawlers were sunk near the island of Sylt, a German destroyer was rammed and sunk by Tyrwhitt's flagship, and another was lost after hitting a mine. The British lost the destroyer Medusa, also rammed during the confused operations. More important was the fact that the rival main forces both came out. Scheer recalled his battlecruisers, supported by battleships, during the early hours of 26 March. Sir David Beatty and his battlecruisers spent twenty-seven hours in very bad weather off Horn Reefs before giving up hope of enticing the Germans towards the distant Grand Fleet.

To the Admiralty, this operation seemed to promise great things. Why not embark upon an aggressive policy of air and mine-laying sorties in German waters, and thus prod the High Seas Fleet into action? Jellicoe and Beatty were unconvinced, partly because destroyers could not be maintained off a hostile coast for long periods without refuelling, but mainly because they believed that Scheer would risk a major battle only at a time and place of his choosing. Though they were willing enough to support further operations of the kind, they regarded them as minor and the possibilities arising from them as limited.

The initiative then passed to the enemy. To support the Easter rising in Ireland, Scheer despatched eight zeppelins to raid England and bombarded Lowestoft with units of the fleet. The High Seas Fleet had put to sea at noon on 24 April, with L 6, L 7, and L 9 overhead as scouts. At 0410 hrs on the 25th the people of Lowestoft were rudely awakened by the crash of heavy projectiles, delivered by four German battlecruisers hulking down on the horizon. After ten minutes the German ships moved north, dropped a few rounds on Great Yarmouth, and then turned away to help the 2nd Scouting Group, by then engaged with the Harwich Force. RNAS pilots at Yarmouth, who had already been up pursuing zeppelins, now became involved in the action. Two of them caught L 9 at 2600 feet, but after fruitlessly expending all their ammunition in a sixty-five-mile chase, had to turn for home. Five other Yarmouth aircraft, one of them piloted by Flight Sub-Lieutenant B.H. Wemp from Toronto, who had only recently qualified as a pilot, flew through the fire of every German gun that would bear to bomb the retiring battlecruisers. Wemp aimed his puny 16-lb bombs at the rear ships of the line. These gallant pin-pricks had nothing to do with Konteradmiral F. Boddicker's decision, at 0500 hrs, to pass up the chance to smash the light units of Harwich Force, nor with Scheer's, twenty minutes later, to order the High Seas Fleet back to its bases from its position west of Terschelling. At that moment, far to the north, the Grand Fleet was still bucking heavy seas in an attempt to reach the scene of action.

In assessing the air aspect of the Lowestoft Raid, the Admiralty concluded that the Yarmouth aircraft had been a liability. They had hit nothing. Worse, two Yarmouth submarines had been bombed, apparently by their own aircraft, and forced to dive 'at a particularly unfortunate moment' when they were manoeuvring to attack the enemy. Wing Commander D. Hyde-Thomson, the torpedo expert in the Admiralty's Air Department, was highly critical of the station commanders at both Yarmouth and Felixstowe for not sending up their torpedo-equipped Shorts. Though Hyde-Thomson had ascertained that 'there were many pilots who were
willing to run risks to obtain great results’ at both stations, their orders had kept them on the ground and ‘rendered ineffective the results of two years preparations.’ Vaughan-Lee differed; he agreed with the Yarmouth Commanding Officer’s assertion that the Shorts would have been ‘blown to pieces’ before getting into range. In Hyde-Thomson’s view, war was about such hazards. If the pilots had ‘what is vulgarly known as “guts,”’ they should have been employed as intended: ‘They would undoubtedly realize that, in company with a large proportion of the British Army, they would be incurring a certain risk.’

The Royal Navy’s response was the unsuccessful Tondern Raid. Given the thinking of the two naval staffs, however, a fleet engagement was only a matter of time. Jellicoe had planned an operation similar to the Tondern Raid for 2 June, but with light cruisers as the bait. Scheer anticipated the British and sent two scouting groups of cruisers and destroyers into the Skagerrak, ostensibly to attack shipping but actually intended to bring out the Grand Fleet. On 31 May he ordered all available units to get under way. Jellicoe had already sensed that a major operation was beginning from the mass movement of U-boats to sea and then from the German fleet’s signal traffic on 30 May. That evening, at 1910 hrs, the ships in Scapa Flow were ordered to raise steam for full speed. Included in that order was the Grand Fleet’s own carrier, *Campania*. She had just been refitted with a longer flight deck and facilities to carry a kite balloon aft. These new capabilities were largely untried, though during her workup programme Sopwith Babys with detachable wheels had been flown off her deck. The Commander-in-Chief, however, had allocated action duties to her in a revised version of the Grand Fleet Battle Orders: ‘In suitable visibility, the *Campania* may be stationed in rear of the advanced light-cruiser or cruiser line to enable her to fly the kite balloon for reconnaissance ... The *Campania* if not stationed as above and if the enemy is reported by our advanced cruisers, is to proceed to the front at full speed and prepare to hoist out or to fly seaplanes and fly the kite balloon.’ The orders also prescribed that once in the air, *Campania*’s 225-hp two-seater Shorts were to hunt for submarines and minelayers in the vicinity of the fleet, while the Sopwith fighters were to attack zeppelins, ‘if these are seen or reported.’

Because she had been allotted a night cruising station in the rear of the whole fleet, *Campania* was to leave harbour last, after the light cruiser *Blanche*. Patiently waiting his turn, Captain Oliver Schwann discovered from the shore authorities, shortly before midnight, that the entire fleet had long since passed out through the boom-gate in accordance with orders signalled throughout the anchorage at 2010 hrs. Had there been a breakdown in the searchlight signal system? The carrier’s berth was five miles away from the battleships, over against the north shore of the Flow. Or had she been purposely forgotten? Whatever the reason, *Campania* set off in pursuit of the fleet at 0115 hrs on 31 May. There was every chance that she would make up the forty mile leeway by early afternoon. But at 0437 hrs Jellicoe, who had learned two hours earlier that his unescorted carrier was struggling along behind, ordered her to return to base because she was too easy a target for U-boats and also, he thought, because she would be too late to join in the action.

The first point was valid, for U-boat activity had been reported ahead of *Campania* at 0355 hrs. It seems incomprehensible, however, in view of her length
of service with the fleet, that Jellicoe should think *Campania* too slow to catch up, despite his subsequent statement that he found out only in 1926 that she could make 20½ knots. His battle orders supply a hint of the explanation. While he fully accepted the premise that ‘the German fleet will not undertake any considerable offensive operations unless the weather is suitable for airships,’ he gave his own seaplanes no reconnaissance responsibility for reporting enemy fleet movements and the duties they were assigned could just as easily be carried out by the cruiser screen. To say the least, Jellicoe had little confidence in *Campania*, and it is possible that he regarded her as an encumbrance. 35

While *Campania* made her disconsolate way back to Scapa Flow, the two fleets approached one another blindly. Commander Peter Strasser, chief of the German Naval Air Division, had ordered five zeppelins ‘to be flung boldly out into the distant reaches of the North Sea for the strategic reconnaissance for which they were so pre-eminently suited by virtue of their great range, endurance, mobility and powerful radio equipment.’ but they remained grounded by bad weather until afternoon, when it was too late. By dawn the next morning they were back in the sheds at Nordholz and Hage without contributing to the action. Similarly, Beatty made no attempt to use *Engadine*’s four seaplanes on early warning patrols in advance of his battlecruisers. That he did not is scarcely surprising. During the months that *Engadine* had been moored off Rosyth with the Battle Cruiser Fleet, she had been virtually ignored. She had carried out no exercises with the fleet, nor was the training of her observers up to the demands now likely to be made upon them. 36

At 1415 hrs Beatty’s force changed course in accordance with prearranged orders to rendezvous with the Grand Fleet. Five minutes later *Galatea* hoisted battle ensigns and made the electrifying signal ‘Enemy in Sight,’ having spotted two enemy destroyers fanned out ahead of Admiral F. von Hipper’s northward-moving battlecruisers. Beatty, quite unaware of what he was up against, altered course to cut the enemy off from their base. Then at 1440 hrs he ordered *Engadine* to put up a seaplane. Twenty-eight vital minutes ticked by while a Short 184 was assembled and hoisted out. Airborne at 1508 hrs, Flight Sub-Lieutenant F.J. Rutland and his observer found that in the misty conditions the British and German ships could not be kept simultaneously in view. They therefore saw nothing of Hipper’s battlecruisers, but they did pass three messages to *Engadine* about the composition and direction of the screen. The second of these, ‘Enemy’s course is south,’ timed at 1533 hrs, would have been useful to Beatty as an early warning of Hipper’s movements, but neither it nor the others apparently got further than the carrier, which failed to raise the flagship *Lion* by searchlight. Three minutes after his last signal of 1545 hrs, Rutland had to come down because of a broken fuel line. Although he quickly repaired it himself, the Short was ordered alongside for hoisting in at 1600 hrs. 37

By this time *Engadine* could no longer keep up with the battlecruisers, rushing towards the German force at 25 knots, and she followed along on the disengaged side. After the first hour of the engagement, destroyer wakes had so disturbed the sea that further flights were impossible, even had they been requested. 38 *Engadine*
therefore took no part in the afternoon’s battlecruiser action in which *Indefatigable* and *Queen Mary* were blown up, nor in the evening’s clash between the battle fleets. Afterwards she took the disabled cruiser *Warrior* in tow until she had to be abandoned and then returned with the survivors to Rosyth. Meanwhile Scheer had managed to break through the destroyer flotillas astern of the British battle line and regain the safety of the swept channel leading home.

In the battle’s aftermath searching inquiries were undertaken into the Grand Fleet’s command, equipment, training, and tactics. No inquiry was needed to show that the part taken by the RNAS was lamentable, despite the lionizing of ‘Rutland of Jutland,’ the first aviator to make a sighting report with a fleet in action. The air service, at the moment of crisis, had only ‘a comic craft jury-rigged to carry seaplanes’; the performance of the one that flew was little better than Samson’s demonstration at the first air-sea manoeuvres in 1913. Jutland, nevertheless, was a turning-point for the air service. The gap between potential and performance bred a new air-mindedness among many officers in the fleet, the fruits of which were to emerge under Beatty’s leadership in 1917. The change began with Jellicoe, however; as part of his general shake-up of the Grand Fleet, he held several exercises at sea in the weeks following the battle in which *Campania* was used actively for air reconnaissance. On 3 June 225-hp Shorts were flown off her, initiating deck-flying tests that were to last for five months. Two of the pilots taking part in this work were Flight Sub-Lieutenants Matheson and G.M. Breadner of Winnipeg. Breadner served on *Campania* for the remainder of the war.39

If Jellicoe appears to have become somewhat more enthusiastic about the air after Jutland, the same cannot be said for the Admiralty. Thus the Commander-in-Chief’s urgent request for eleven kite balloons for his capital ships was refused because it was thought advisable ‘to go cautiously experimenting to the full’ before laying out money on such expensive devices. Lack of vision was also displayed with respect to carriers. Admiral Vaughan-Lee, for the Air Department, agreed with the estimate that a new carrier would take fifteen to eighteen months to build, and supported a recommendation for the conversion of two large merchantmen then on the stocks.40 Given his understanding of the current state of the art, he thought a new carrier unwarranted:

Landing on the deck ... has not yet been accomplished but will probably be possible for aeroplanes.

The problem of landing seaplanes is more difficult but may be evolved and hence it is desirable to consider this possibility in any ship specially designed, as for obvious reasons seaplanes are more suitable than aeroplanes for Fleet scouting.41

Vaughan-Lee’s judgment, at best, was merely safe. In fact, given the record of seaplanes, it was no longer ‘obvious’ that they were more suitable than aeroplanes, especially after the success of the Grain Island experiments with aeroplanes using arrestor wires. Tudor went along with this ultra-cautious appraisal, mainly because he still considered that rigid airships were the answer, but he also opposed the
conversion of merchant ships. All that he was prepared to recommend was the adapting of Courageous, Glorious, and Furious to aircraft, and so it was in this vein that on 14 July the Admiralty finally replied to Jellicoe’s letter of 8 May. 42

On 19 August the Admiralty got a clear warning that the air element of its sea forces needed bolstering. The High Seas Fleet came out again, with the Naval Airship Division this time taking a prominent part. After Jutland, Scheer had no intention of bringing on another major fleet action, and was convinced that thorough air reconnaissance was the way to prevent one. Provided that it was reliable, he could resume his forays in search of unsupported British naval elements. To this end he attempted a raid on Sunderland beneath a zeppelin screen. Neither side was satisfied with the results of this operation. The zeppelins, Scheer thought, had been too rigid in their patrol patterns and he had also received conflicting and erroneous reports from them. To the British, however, the airships overhead had seemed to give a kind of omniscience to German operations. Jellicoe wrote that they ‘hampered us terribly last week and greatly helped theirs. M [submarines]. One Zeppelin is worth a good many light cruisers on a suitable day.’ In contrast, the Royal Navy had had negligible air support. Campania was once again left behind, this time with machinery defects. Engadine had tried and failed to launch a seaplane to attack a shadowing zeppelin. Naval air stations along the east coast had drawn blanks with patrolling aircraft. By chance, Campania’s kite balloon was with the fleet undergoing endurance trials in the battleship Hercules. For some twenty-eight hours it soared over the main body without an observer in the basket. As Beatty said in his report, a manned balloon could well have spotted the High Seas Fleet had it been flown from the advanced cruiser line. 43

Jellicoe, convinced that the Germans now had air superiority for fleet reconnaissance in the North Sea, asked the Admiralty to base ten non-rigid ‘coastal’ airships along the east coast. Characteristically, the Admiralty agreed only to a test exercise with the fleet to check the navigational accuracy of airships when making sighting reports. The whole matter was too important to be thus shelved. Aware that the aging Campania needed another long refit, Jellicoe pressed for a replacement. The Admiralty, reversing itself, had first agreed to convert two merchant vessels and then, with renewed pressure on the shipyards in September, decided instead to convert a 15,750-ton Italian liner, the Conte Rosso, renaming it the Argus. As well, it authorized the resumption of landing experiments at Grain Island. 44

For these experiments the trials team used a wooden platform built to simulate a carrier deck and emulated the technique used by Eugene Ely when he landed aboard USS Pennsylvania in 1911. A special hook was fitted to the aeroplane to engage transverse wires stretched across the ‘deck.’ In 1917 Flight Sub-Lieutenant A.H. Allardyce of Vancouver served with this unit.
In the North Sea the Admiralty’s air policy lacked enterprise, but the formidable German presence had forced it, however cautiously, to authorize some innovation. In the Mediterranean, a secondary theatre of operations, there was little pressure for change. The allied naval forces were charged with the protection of communications with the troops in Egypt and Salonika, with immobilizing the Austrian fleet in the Adriatic and the German warships Goeben and Breslau lying at Constantinople, and with the provision of sea support for military operations. At the Paris naval conference in December 1915 the Mediterranean had been divided into eighteen patrol zones; of these ten went to the French, four to the Italians, and the remainder (the Strait of Gibraltar, Malta and the south coast of Sicily, the Dardanelles-Aegean and Egyptian coast) to the British. These latter responsibilities were extended by the decision of an admirals’ meeting in Malta in March to include the Aegean and the routes from Malta and Salonika to Egypt.

RNAS deployment was determined by these arrangements. From Kalafrana Air Station in Malta seven pilots, including J. Gorman of Ottawa, patrolled the transport routes in Short 184s and Small Americas. At Gibraltar Short 184s patrolled the strait; at one point three of the five pilots were Canadians, Flight Sub-Lieutenants J.R. Bibby of Niagara Falls, Ont., M.B. Walker of Hamilton, Ont., and A.G. Woodward of Victoria. But the main RNAS concentration was with the Eastern Mediterranean Squadron, ‘a wondrous command – a sort of confederacy of semi-independent nabobs, each of whom had some special duty to perform, and each designated by a grand and resounding title.’ The squadron supported allied forces at Salonika, kept a watch on the Dardanelles, patrolled the Aegean, blockaded the coast of Bulgaria, and conducted operations against the Anatolian coast of Turkey.

No 2 Wing, RNAS, served the fleet. In February, when Wing Commander F.R. Scarlett took over, it had three flights of ten aeroplanes each at Imbros; Ark Royal lay at Salonika, with five of her seven seaplanes allocated to a shore base at Stavros. Scarlett immediately proposed a second wing and a continuous air offensive. The Admiralty unsympathetically replied that under existing circumstances it was not practicable to expand the air service in the Mediterranean, which was already drawing off too many ships from home waters. The Admiralty did agree, however, to add another flight at once and two more as available. With these resources Scarlett’s plans had to be modified.

Scarlett’s original proposal had been based on the premise that Salonika could be left ‘entirely to the French aviators.’ Yet despite the Admiralty’s grudging response, 2 Wing increasingly involved itself in military operations, as well as endeavouring to carry out its fleet support duties. The seventeen Canadians with the wing, more than 25 per cent of its pilot strength, found themselves shifted about from place to place in the Greek islands as Scarlett pursued a vigorous and overly ambitious policy with increasingly obsolete aircraft. In March some flew

from Mitylene to spot for an allied fleet bombardment of Smyrna. After bombing Constantinople and Adrianople with three aircraft on 15 April, Scarlett conceived the idea of a mobile bomber force to hit at points all the way from the Mesta River in Bulgaria around to Cape Alupu. Hence in June elements of the Wing were based on Thasos and at a new aerodrome near Mudros. In August, when the Bulgars advanced towards the Struma River, the RNAS was once more redeployed to assist warships protecting the seaward right flank of the British Army, but also to carry out bombing and reconnaissance missions over the front. All these and other activities were carried out in addition to normal reconnaissance and anti-submarine work for the navy. 47

By comparison with Dunkirk, 2 Wing at first glance seems to have been handicapped in both aircraft and personnel, as the following table shows:

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<th>AEROPLANES</th>
<th>SEAPLANES</th>
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<tr>
<td></td>
<td>CLASS I</td>
<td>CLASS II</td>
</tr>
<tr>
<td>Dunk.</td>
<td>77(109)</td>
<td>9(47)</td>
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<tr>
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<td>59(34)</td>
<td>15(42)</td>
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<td>CLASS I</td>
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<td>Dunk.</td>
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<td>E.Med.</td>
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In terms of the relative importance of the two theatres, it was proper to favour Dunkirk. The Eastern Mediterranean, in contrast, was becoming a ‘forgotten’ theatre. While Dunkirk’s first-class aircraft strength grew substantially during the year, 2 Wing was making do with aircraft that were rapidly becoming obsolete. As at Dunkirk, the RNAS was permitted to take on too many roles, a commentary both upon the Royal Navy’s system of command and control, and upon its flexible, adventurous, and often rash air arm.

An analysis of the work of the Dunkirk Command for the last half of 1916 indicates that the two-way pull of its situation continued to affect its operations. When plans for the Somme battle were first made, the Royal Navy, and hence its air service, were to have an important role. Ten thousand men of the First Division were to have been landed from monitors and lighters to seize the harbour at F.S. Mills of Toronto, C.E. Moore of Fort William, Ont., and J.L.A. Sinclair and K.M. Smith, both of Toronto. A Canadian warrant officer, J.P. Haworth, address unknown, was on the staff of the airship base at Mudros. H.V. Reid of St John’s, Nfld. was also in the Eastern Mediterranean at this time.

* Estimated
1916: Diffusion and Misdirection

Ostend, in conjunction with French and British attacks from Nieuport and Ypres. Until 7 July Haig kept the organizing staff for this venture at his headquarters; lack of progress on the Somme then led him to cancel the operation. From the navy’s viewpoint, the feasibility of the landing had already been questioned because the Germans had erected the Knocke Battery of 12-inch guns some thirty thousand yards behind Ostend, commanding its jetties. The role of the Dunkirk Command during the Somme battle was reduced to the task of diverting as much enemy strength as possible through naval and air activity. For this reason Dunkirk’s operations were necessarily episodic in character.

Thus in July and early August the command’s aircraft worked with naval forces against the Tirpitz Battery, which prevented short-range monitors from bombarding the Ostend dockyard. The destruction of its four 11-inch guns, among the most powerful on the Flemish coast, became the almost exclusive preoccupation of all Dunkirk’s available fighters and reconnaissance aircraft, of its seaplanes, and of the Dover Defence Flight. The effectiveness of the enemy battery was to be reduced by the Dominion Battery, a 12-inch naval gun, and a pair of French 9.2s. Monitors and balloon ships were stationed offshore to confuse the Germans about the direction of fire. During the first two days of the operation, which began on 8 July, RNAS units logged 442 hours of photo reconnaissance and ranging for the Dominion Battery, fighter protection for spotting aircraft, and fighter patrols to interdict German reconnaissance aircraft seeking the source of bombardment.

Most of the twenty-five Canadians in the command took part, including some newcomers, Flight Sub-Lieutenants D.M.B. Galbraith of Carleton Place, Ont., and H.R. Wambolt of Dartmouth, NS, in 1 Wing and F.A. Rivers-Malet and A.M. Tidey of Vancouver in seaplanes.

C.B. Sproatt, a 5 Wing pilot from Toronto, became lost and was forced to ditch at sea on 8 July. His experience, insignificant in itself, illustrates the normal hazards of flying at Dunkirk, and also the kind of misadventure that frequently overtook First World War airmen. Returning from an evening patrol off Westende, he let down to 2000 feet before breaking cloud cover. No land was visible, the surface of the sea could barely be seen because of mist, and his compass was ‘stuck at North.’ Sighting a ship, he let down further in order to get directions. As he reported to his commanding officer: ‘... we had now come down to 400 feet, and not wishing to run the risk of being found with tracer bullets in our possession,† I instructed my Observer to throw our trays overboard ... unfortunately, the Observer hit the propeller with a tray of ammunition, breaking it, and leaving me no choice but to land in the sea. Believing the machine would float for a few minutes, I tried to pancake gently into the water, but the light being very deceptive

* Bacon chose the name because Canadian railway engineers helped in mounting the gun, which weighed fifty tons. Sir Reginald Bacon, *The Dover Patrol, 1915–1917* (London nd), 1, 183
† The Declaration of St Petersburg, in 1868, had established that ‘the contracting parties engage mutually to renounce, in case of war among themselves, the employment by their military or naval troops of any projectile of a weight below 400 grammes which is either explosive or charged with fulminating or inflammable substance.’ The Declaration of The Hague of 1899 ruled that ‘the contracting parties agree to abstain from the use of bullets which expand or flatten easily in the human body.’
I misjudged my distance, and the machine struck a wave, throwing me clear, and my Observer was able to get out quickly. The vessel, a British monitor, picked them up; the Caudron sank.

In their various tasks the RNAS aircraft seem to have acquitted themselves well. Wireless work with the Dominion Battery went smoothly; before the end of July excellent photographs of the Tirpitz Battery were being obtained from a height of 14,000 feet; and the fighters had destroyed three Fokker monoplanes without loss before weather conditions prevented effective spotting for ten days. During that time Galbraith scored his first victory. Returning in his Nieuport from a seaward patrol, he encountered a German seaplane flying out of Ostend, some five hundred feet below him. Remaining below, the German manoeuvred behind the British machine, both aircraft meanwhile executing a steep glide. Galbraith then looped his aircraft (a manoeuvre he would not have got away with on the Western Front) and from a position a hundred yards astern opened fire. The German seaplane burst into flames and was 'last seen falling headlong downwards.' Bacon commented favourably on Galbraith's tactics to the Admiralty.

When the bombardment was resumed, it met with no more success. By early August German smoke screens made ranging difficult and in any case the barrel of the British gun was beginning to wear. Bacon chose not to use the bombing weapon at his disposal against the Tirpitz Battery. It is likely that he had little faith in the capacity of bombs to inflict any real damage. Instead, it was General Trenchard who was instrumental in unleashing the long inactive bombers of the Dunkirk Command. At his behest the RNAS took part in an RFC bombing offensive in the northern sector designed to draw off enemy aircraft from the Somme. On 2 August the RNAS attacked St Denis Westrem aerodrome and a large ammunition dump at Meirelbeke, both targets being southwest of Ghent. At St Denis Westrem, ten Caudron g4s, including aircraft flown by Sproatt, Nelles, and Darley, approached the target in wedge formation, led by a single Henri Farman. At a Very light signal from a Sopwith above them they deployed into line ahead and dropped their bombs on parked aircraft and sheds. At Meirelbeke, Sopwith 1½ Strutters dropped thirty-one bombs with no apparent result.

The main efforts of the command were now turned to bombing for the rest of the month. Lambe and Trenchard agreed upon targets for eight more RNAS raids in conjunction with attacks by II Brigade RFC. Targets selected included ammunition dumps, the Hoboken shipyards at Antwerp where submarines were being assembled, aerodromes, the naval airship sheds at Namur, and military airship bases. The airship installations were selected upon the false assumption that they were to participate in the zeppelin assault on London being mounted by the Naval Airship Division from its North German strongholds. Thus in August attacks were made upon such targets as the German army hangars at Evere and Berchem Ste Agathe (both of which were, in fact, empty), the airship sheds at Namur, and ammunition stores at Lichterverde. The offensive continued into September with a raid on the Hoboken shipyards and the Ghistelles aerodrome. Both 4 and 5 Wings were involved in these raids, as they were in separate attacks on St Denis Westrem, Ghistelles, and Handzaeme aerodromes later in the month. On 24 September Sproatt, in company with three other Sopwiths, dropped his twelve Le Pecq bombs along the length of the Evere shed, which, as it happens, was empty.
In mid-September Haig requested, prior to the resumption of the Somme battle, that a diversionary show of naval strength be made off the Belgian coast. Bacon responded with enthusiasm and, as a feint, visible preparations for an amphibious landing were made in Dunkirk harbour. An armada of destroyers, monitors, and a hundred trawlers was assembled off the beaches, and a week-long bombardment was inaugurated upon targets between Middlekerke and Westende. During the whole affair the RNAS was active, culminating its efforts with the bombing of Tirpitz and neighbouring Hindenburg Batteries on the morning that Haig’s troops once more moved to the attack.

Did the bombing offensive, including the mid-September demonstration, appreciably alter German air dispositions? It appears that it did not. There was no significant increase in the air arm of the German 4th Army in the northern sector. No reinforcement was provided for the 1st Marine Jagdstaffel at Handzaeme or the 1st and 2nd Marine Feldflieger at Mariakerke and other fields. Indeed, German army air units continued to be sent to the sector for rest and refit, though occasionally they gave assistance to the Marine Korps on the coast if the situation warranted. The Germans gave little overt sign that they considered the RNAS offensive important; their reaction was two weak night raids on naval airfields on 8 and 9 September, and another small-scale attack on Dunkirk two weeks later. It is true that German offensive seaplane patrols off the Flanders coast were stiffened in late August by the arrival of the Friedrichshafen FF 33h and Rumpler 6B I types, but these new fighters had been requested by the Zeebrugge commander long before. Lambe may well have been somewhat mystified by the enemy failure to respond to what, for the RNAS, had been an all out offensive. He surmised that the enemy ‘are concentrating a large force of seaplanes ... since that type of machine could be better spared, and during the next spell of fine weather bomb attacks may be expected on the s.e. coast of England, on the monitors on patrol, and possibly also on Dunkirk.’ Admiral Bacon thereupon grounded the bomber force once more, in order to release pilots for anticipated fighter duties.

Now the Dunkirk Command was called upon to assist the RFC in its struggle over the Somme in a more direct fashion by giving up aircraft and men. A naval squadron went to the RFC in October, in the course of which the Admiralty’s strong opposition to such a move had to be overcome. Wing Captain Lambe’s willingness to co-operate in this, it is clear, was crucial. It reflected not only his good relations with Trenchard, but also the fact that Dunkirk had once more stopped bombing. The reality was that Lambe’s fine pilots and first-rate aircraft were under-employed.

Each of the three Dunkirk wings contributed a flight: Sopwith Pups from No 1, Nieuport Scouts from No 4, and Sopwith 1½ Strutters from No 5. All the pilots were volunteers; they included a high proportion of Dunkirk’s most experienced and successful airmen. The new squadron, named 8 (N) Squadron, had six Canadian flight sub-lieutenants among its number. Before leaving Dunkirk three

* The RNAS had begun to redesignate its units in a fashion similar to that in the RFC. Previously known by letters – ‘A,’ ‘B,’ ‘C’ in 1 Wing, ‘A’ and ‘B’ in 4 Wing, and ‘A’ and ‘B’ in 5 Wing – squadrons were now given numbers from 1 to 8. Canadians were founding members of all these squadrons: E. Anthony of Maitland, NS, and G.A. Gooderham of Toronto in 1(N) Squadron; C.J. Wyatt of Mount Brydges, Ont. (KIA 21 Aug. 1917) in 2(N); R.H. Mulock of Winnipeg, H.R.
of them scored victories in aerial combats. In the month from 23 September to 23 October Dunkirk pilots shot down nine enemy aircraft; Thom, Grange, and Galbraith accounted for four of them, all seaplanes. Thom gained his success on 23 September. The next day Grange forced a Sablatnig SF 2 to spin into the sea. The Germans later found it 'completely demolished.' On 27 September Galbraith scored his second victory since arriving at Dunkirk and then on 22 October shot down another seaplane off Blankenberghe, just prior to his departure for the Somme. 58

Though the command had temporarily lost some of its best pilots, there was no appreciable change in the scale of its operations as the year drew to a close. Admiral Scheer was instrumental in bringing the command back to its naval support role when he moved III and 1X Destroyer Flotillas of the High Seas Fleet into Zeebrugge on 24 October. These units fought a night action on 26-27 October with guardships of the Dover Patrol, and sank a British destroyer and six drifters. 59

The Admiralty reinforced the patrol with destroyers from Harwich Force, and when aerial reconnaissance revealed that the Germans remained concentrated at Ostend, Bacon ordered, upon Lambe's urging, the resumption of bombing.

For the last three weeks of November the command attacked Zeebrugge and Ostend, and especially the Slyken Electric Power Station and the Ateliers de la Marine shipyard. Some of the raids were heavy. For example, the Ostend raid of 15 November was delivered by twenty-two bombers, among them four Shorts, a new landplane version of the Short 184 with more than three times the bomb carrying capacity of the Caudron G4. The Shorts had teething problems, however, and while returning from this raid C.H. Darley of Montreal had to make an emergency landing on the beach at Dunkirk. Associated with these raids were bombing attacks by seaplanes on ships, docks, and lock-gates of the Zeebrugge-Bruges Canal. P.S. Fisher and A.H. Sandwell, both of Montreal, were among six pilots in such a raid on 10 November; all experienced heavy anti-aircraft fire. 60

These November raids were the heaviest of the year, over twelve tons of bombs being dropped. Moreover, they disrupted Scheer's plans for hitting the Dover Patrol. Because of the raids on Zeebrugge he found it necessary to move his torpedoes boats up to Bruges, and this meant that there was 'very considerable delay' in getting them back through the locks in order to launch a surprise attack. As he later wrote: 'As soon as they left Bruges harbour it was not possible, as a rule, to conceal the movements of the boats from the enemy.' 61 He decided to withdraw III Flotilla to Wilhelmshaven to await a more favourable opportunity. Here RNAS Dunkirk had made one of its most useful contributions of 1916.

At year's end Dunkirk still enjoyed a favoured status among all RNAS commands. As its older aircraft passed into obsolescence, they were progressively replaced by 1½ Strutters, Pups, and Triplanes. Because of its extremely variable weather, flying at Dunkirk was demanding enough at the best of times, and the

Wambolt of Dartmouth, NS (KIA 4 March 1917), and J.B. White of Vancouver in 3(N); W.E. Orchard of St Lambert, Que. (KIA 3 June 1917), and A.M. Shook of Red Deer, Alta (WIA 21 Oct. 1917) in 4(N); C.B. Sproatt of Toronto in 5(N); C.L. Bailey and G.C.W. Dingwall, both of Toronto, in 6(N); and C.H. Darley of Montreal in 7(N) and J.A. Shaw of Edmonton in 8(N).
station’s pilots became highly skilled in meeting the challenge of strong winds, fog, and rapidly changing cloud and ceiling conditions. The reception of more advanced fighter aircraft in late 1916 added another dimension, that of higher altitude flying under extreme conditions. Lloyd Breadner wrote his mother on 21 December: ‘It is frightfully cold up high this weather & we are having a hard time of it, from frost bite it is getting to be a serious proposition. You know, we are the first to fly at the height we do, in winter-time. Yesterday one of the boys took a thermometer up with him, the maximum reading was 60° of frost or 28° below as we Canadians speak of it. You can’t imagine what it is like up there. When you are shifting through that atmosphere at 100 miles per hour it is certainly cold. We would all be very thankful to anyone that would send a Balaclava or scarf along.’

Despite such rigours, combat pilots at Dunkirk, like their counterparts elsewhere, welcomed improved aircraft that would give them, if only temporarily, an edge over their opponents.

What had Dover-Dunkirk Command done to merit special treatment both in personnel and material? Undoubtedly the command had given useful support to the Dover Patrol. More and more, however, it had been drawn into military roles. Thus it had taken up virtually all the fighter work over the northern flank of the Western Front, permitting the French to withdraw aircraft to Verdun. Its bombing record, except for its activities in November against naval forces, had been of questionable effectiveness, lacked a coherent objective, and was at best ancillary to the operations of the RFC. The mission of the command had never been sufficiently defined. Whatever doubts he may have expressed from time to time, Bacon had permitted his airmen considerable leeway and as a result they had fallen increasingly into the military orbit.

Nevertheless, thanks to Admiralty favour and the navy’s foresight in aircraft and engine procurement, Dunkirk grew fat; nothing demonstrated this more convincingly than the loan of 8(N) Squadron to the RFC. It is a remarkable fact that the command claimed fifty-two enemy aircraft destroyed during the whole of 1916, yet twenty-five of these were shot down by 8(N) Squadron on the Somme in November and December. No 8’s record was testimony to the excellence of RNAS training and aircraft, but it sheds a rather different light upon the activities of the Dunkirk Command.

The size and activities of the command formed part of the indictment marshalled against the RNAS and the Admiralty by the President of the Air Board. Increasingly exasperated by the recalcitrance of the Admiralty on questions of supply and its future air plans, and outraged by his discovery in August that the navy had obtained Treasury approval for an expenditure of £2,875,000 on aircraft and engines without passing the matter through the Air Board, Lord Curzon finally exploded. ‘It is our profound conviction,’ he wrote in a report of 23 October to the Cabinet War Committee, ‘... that the addition to the Navy of responsibilities for the air – not in itself necessarily impracticable – has, in the manner in which it has been carried out, been attended with results that have been equally unfortunate for the Navy and the Air Service, and, if persisted in, will be incompatible not merely with the existence of an Air Board, but with the immense and almost incalculable development that ought to lie before a properly co-ordinated and con-
ducted Air Service in the future. Curzon flayed the Admiralty for its 'indifference or hostility' towards innovative proposals from naval airmen, dwelt upon the 'melancholy illustration of their lack of foresight' about rigid airships, as well as aircraft carriers and kite balloons, and accused the navy of dissipating its air effort upon areas of secondary importance. He was particularly critical of the inflated strength of RNAS Dunkirk. In summing up the indictment, he stated:

... we can draw no other conclusion from the existing situation than that portion of the Air Service which has been subordinated to the Admiralty, and handled on naval lines, has not been the gainer by the connection, but has, on the contrary, failed to make a proportionate contribution to the successful conduct of the war.

A single, instead of a divided, policy, a co-ordination, instead of a dispersion of force, above all, the management of the Naval Air Service by airmen rather than by seamen, would, we believe, have produced very different results.

Curzon's highly charged language betrayed his considerable pique after a long series of heated exchanges with Balfour. Some of his evidence and the construction he placed upon it was erroneous and unfair. But two of his main points were clearly correct: that aircraft supply should be removed from the control of the two services and placed under a single authority, and that the naval air arm should be represented on the Board of Admiralty and on the Air Board by an officer with powers and standing commensurate with those of Henderson for the RFC.

Personal, political, and inter-service rivalries were further intensified by the revival of the acrimonious dispute over long-range bombing, prompted by the Admiralty's unilateral talks with the French and by an RNAS proposal to the Air Board that 'it should be definitely laid down that the Navy should keep an effective force of at least two hundred bombers in France, to include Dunkirk.' On 27 and 28 November the War Committee took its first step in resolving these conflicts by agreeing in principle that all responsibility for the design and production of aeroplanes (but not seaplanes or airships) should be placed with the Ministry of Munitions, and that a Sea Lord should be appointed with responsibility for all aspects of naval aviation and a seat on the Air Board.

These important decisions by no means halted this bitter clash. Meanwhile, however, the Admiralty had been encountering equally harsh criticism over a far

* Balfour refused to concede either of these points, yet in August he had already agreed with Jellicoe that a change in control of the air service was needed. Jellicoe had then written: 'I have no hesitation in giving my opinion that your proposal to place a naval officer of high standing at the head of the Naval Air Service is the correct solution ... I am also of the opinion he should be a member of the Board ...' John Rushworth Jellicoe, Earl Jellicoe of Scapa, The Jellicoe Papers: Selections from the Private and Official Correspondence of Admiral of the Fleet Earl Jellicoe of Scapa, 11: 1916-1935, A. Temple Patterson, ed. (London 1966), 67-9

† The dispute over bombing is dealt with in chapter 10. The main lines of this debate were available to any German intelligence agent who cared to buy a British newspaper. The Admiralty was attacked in the press and publicly urged by the Parliamentary Air Committee to be more cooperative. Much public support was given a resolution of that committee, that 'the Air Board should be given more extensive and immediate executive powers for the development of both air services.' Flight, 9 Nov. 1916, 971-2
more vital question - its handling of the new German submarine campaign against merchant shipping. That campaign had been foreshadowed, in September, by an increase in tempo of operations by the small U-boats from Zeebrugge and the movement of large mine-laying submarines to the south of Ireland and the western approaches to the British Isles. This offensive began in earnest on 6 October and, under the restrictions laid down by prize rules,* was to last until the end of January 1917.† Against it the Royal Navy employed the methods it had already developed: Q-ships,‡ a resumption of mine-laying in the Heligoland Bight, and an increase in the numbers of armed merchantmen and small craft on patrol duty. Local commanders were also instructed to make greater use of their air resources.

The state of the Home Commands once again demonstrated that the Admiralty's air priorities were questionable. The overall pilot strength was adequate at 191 (the largest single group in the air service), though some of them were undergoing operational training. Slightly over 25 per cent of them were Canadians. Reflecting the drafts made upon Home Stations by Dunkirk and 3 Wing, the complement of aeroplane pilots had dropped since the end of May. In the same period the number of seaplane pilots had grown to 115, Canadians again forming about a quarter of the total. It was not airmen that were needed, but good patrol aircraft in sufficient numbers. Between May and the end of December seaplanes rated 'first-class' by the RNAS — a more powerful version of the 'soggy' Short 184 and Sopwith Baby fighters — declined from 141 to seventy-four.¶

Stations operating seaplanes were still all located on the east and south coasts of the United Kingdom.¶ For the western approaches the RNAS relied upon its lighter-than-air organization, one far more effective than it had been in the previous submarine campaign. By December there were thirty-two SS type and twenty-five Coastal airships based not only at the stations opened in 1915 but also

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* Under prize rules, submarines could not destroy ships before examining their papers and ensuring the safety of their crews, unless the ships attempted to escape or offer resistance.

† Q-ships were merchant vessels, small enough that an enemy submarine would surface to shell them rather than waste a torpedo. They were equipped with concealed guns, usually 6- and 12-pounders. Q-ship tactics usually included fake attempts to escape, including abandoning ship — except for the gun crews. When the submarine closed, the White Ensign was raised and the concealed guns opened fire.

‡ At the most northerly station, Dundee, there were three Canadians: J.G. Ireland of Montreal, W.R. Kenny of Ottawa, and C. McNicholl of Montreal. At South Shields were G.G. Avery of Toronto (KIA 14 May 1917) and T.C. Wilkinson of Quebec City. Farther down the coast H.H. Arundel of Toronto, M.C. Dubuc of Montreal, F.E. Fraser of Winnipeg, and A.Y. Wilks of Montreal worked out of Killingholme. G.R. Halliday of Victoria, R. Leckie of Toronto, N.W. Leslie of Winnipeg, G.H. Simpson of Toronto, and F.P.L. Washington of Hamilton, Ont., flew from Great Yarmouth. At Felixstowe there were J.L. Gordon of Montreal, B.D. Hobbs of Sault Ste Marie, Ont., G.R. Hodgson and F.S. McGill, both of Montreal, W.H. Mackenzie of Victoria (KIA 25 April 1918), N.A. Magor of Montreal (KIA 25 April 1918), and W.E. Robinson of Winnipeg (POW 8 July 1917). As well, V.H. Ramsden of Toronto and H.A. Wilson of Montreal were under training on Small America H4s. In the Thames estuary and its approaches C.V. Bessette, address unknown, and L.M. Lewis of Montreal were at Grain Island and C.G. Bronson of Ottawa (POW 28 Jan. 1918), F.G. Hellmuth of Allandale, Ont., and R.E. Spear of Winnipeg were at Westgate. At Calshot were the veterans Peck and McLaurin, and the newcomers A.S. Ince of Toronto, W. Lodge of Arnplor, Ont., J.S. Maitland of Montreal, and J.K. Waugh of Whitby, Ont.
at Pembroke, Howden, Longside, and Mullion for coastal patrols, at East Fortune to support Beatty’s battlecruisers, and at Caldale adjacent to Scapa Flow.*

Recognition that air dispositions were faulty came when the important coal trade between Britain and France was seriously disrupted in September. Seaplane units began to shift westward. The Commander-in-Chief Portsmouth ordered four Short 184s to join McLaurin’s party at the Bembridge sub-station, and a new sub-station was established at Portland to patrol the mid-Channel over a 60-mile radius. Even so, the air weapon was not yet a very effective instrument against submarines. The experiences of two Canadian pilots early in the campaign revealed its possibilities and limitations. A seaplane in which Flight Sub-Lieutenant Spear was a crew member discovered a submarine preparing to sink a Norwegian steamer between Portland and the Channel Islands. The air attack with 16-lb bombs, which did not take place until the submarine had submerged, was quite ineffectual, and yet the presence of the aircraft forced the submarine to break off its own attack. On 9 September Flight Sub-Lieutenant J.A. Barron was on a patrol from Mullion in a Coastal airship. He sighted two sailing ships hove to and on fire, with a submarine lurking near them. Descending to 700 feet, he released his bombs and the u-boat crash-dived out of sight. He then sought help for the blazing vessels, attracting a Norwegian steamship into the area, but Barron was soon too low on fuel to take any further part in the action. As he laid course northeast, he encountered the destroyer he had summoned and at her request signalled the position of the burning vessels. In both these cases aircraft had certainly had their uses, but their shortcomings were also evident. Moreover, the fragmentation of the RNAS under local commands meant that its efforts were largely unco-ordinated, much being left to the initiative of each station commander.*

In late 1916 a major shakeup in the Admiralty occurred, closely connected with the events in which Lloyd George replaced Asquith as the head of a reconstituted coalition government. Before this took place Jellicoe had already been brought in as First Sea Lord, with a mandate to organize effective anti-submarine measures. Now Balfour was gone, and Sir Edward Carson was the new Prime Minister’s choice as political head of the Admiralty. Carson’s naval education proceeded apace. With some chagrin Lloyd George noted that ‘the Admiralty had succeeded in kneading its new First Lord into full acceptance of its attitude’ in the matter of air supply. Before relinquishing his post at the Air Board to become Lord President of the council and a member of the War Cabinet, Curzon again raised the question of the former War Committee’s decision of 27-28 November. The Cabinet, however, having decided that the principles had been agreed upon by its predecessor, approved the draft conclusions without alteration. The unco-operative stance of the Admiralty towards the Air Board during 1916 had in great measure set the Cabinet on a course which would end, in a year’s time, with the demise of the RNAS itself.

* The Canadians in this branch were J.A. Barron of Stratford, Ont., at Mullion; A.R. Layard of Saanich, B.C., at Pembroke; R.F.E. Wickham of Vancouver, at Polegate; and I. Macdonald of Calgary at the navy’s main airship base at Kingsnorth.
During this period of naval disarray the Admiralty suffered yet another blow. Haig had given notice that he wanted twenty fighter squadrons for operations in the spring, over and above previously projected requirements. In a forceful appearance before the Air Board Trenchard pressed Haig’s request, stating that only eleven squadrons of aircraft (including No 8(N)) ‘of a performance equal to that of the new German’ would probably be available. As a stop-gap he asked that the navy supply four more squadrons and enough engines to equip six others. The Admiralty, appealed to ‘at this moment of great emergency,’ was in no state to resist pressure. A new Fifth Sea Lord for Air had not yet been appointed, and all other members of the board, with the exception of Tudor, were new men. It therefore agreed to furnish four complete squadrons, fifty-five Rolls-Royce engines, and, to make up the shortfall, sixty Spad fighters from the 120 on naval order. It was not the sacrifice of material but the loss to the RFC of a large number of its most resourceful and experienced pilots that the RNAS found severe.\(^72\)

It could count, nonetheless, upon mounting numbers of young Canadians. By December the Chief of the Naval Staff in Ottawa was enrolling pilot candidates at the rate of twenty-four a month. There were by this time some 300 Canadians in the RNAS, 230 of them among its total officer strength of 2764.\(^73\) Most Canadian aeroplane pilots were with 3 Wing at Luxeuil, while most seaplane pilots were now on home stations. Some experienced Canadians, notably Mulock, who had become a Flight Commander at Dunkirk, were beginning to attain more responsible positions.

When Balfour and Jackson had taken over in 1915, they had wished the eradication of past heresies in the RNAS and the conversion of its air arm to a more truly ‘naval’ kind of administration. In the course of this transformation some serious miscalculations were made. The development of ship-borne aircraft had been sacrificed to a reliance upon rigid airships and large flying boats, with disappointing results. The jealousy with which the Admiralty guarded both its material and its authority to deploy that material as it saw fit made it politically vulnerable. Yet undoubtedly much substantial operational work had been done by the RNAS during the year. Some fresh technical approaches, the appointment of a new group, fresh from command at sea, to the Board of Admiralty, the provision for a Fifth Sea Lord for Air, and the creation of an anti-submarine department promised a new purpose and direction for naval aviation, a purpose and direction in which more and more Canadians would join.
There were 839 fully-trained pilots serving in the RNAS in January 1917; 110 of them were either at Luxeuil or on loan to the RFC in France. Of the 160 Canadians, more than one-third were among those whom the Admiralty reckoned were ‘not employed directly in duties in connection with the Navy,’ a disapproving phrase which reveals the Admiralty’s lack of direction in air matters. But on 11 January Commodore Godfrey Paine had taken up the new position of Fifth Sea Lord responsible for air policy, operations, and training. At last the RNAS would have a spokesman on the Board of Admiralty. Furthermore, Paine had the active support of Beatty who, as soon as he took over from Jellicoe as Commander-in-Chief, Grand Fleet, began to demand from the Admiralty an offensive air capability in the North Sea. Consequently, a new emphasis on training and selection led to 25 per cent of new pilots being directed to fleet work. These were chosen from among those showing the best aptitude in aeroplane handling and on take-off and touch-down. This resulted in three-quarters of the Canadian graduates in 1917 finding their way to anti-submarine and fleet operations, a great change from 1916. There would still be a steady flow of pilots into fighter and bomber units on the Western Front, but naval aviation would acquire increasing importance.

Technical developments were partly responsible. Early in the year squadrons employed in air defence, offshore fleet support, and anti-submarine patrols used for the most part Short and Sopwith seaplanes. In addition, the FBA, Porte Baby, and Curtiss H4 Small America flying-boats appeared on the station strength of some establishments. In January 1917 Flight Lieutenant J.K. Waugh of Whitby, Ont., took command of the RNAS station at Portland, a patrol base for six thousand square miles in the western reaches of the channel. To patrol this area he found there were only ‘... three other pilots, three armourers who acted as observers, some thirty odd men and four machines all of different types and in the final stages of dissolution ... morale ... was, to say the least, not at all good.’

* Paradoxically, 1917 would also be the year in which the navy lost exclusive control of its own air arm. On 24 August the British Cabinet approved in principle the amalgamation of the two air forces. Parliament passed the Air Force Act, later called the Air Force (Constitution) Act, in November and the Air Council came into being on 3 January 1918. H.A. Jones, The War in the Air: being the Story of the Part played in the Great War by the Royal Air Force, v1 (London 1937), 22
The news that the long-awaited Curtiss H12 Large Americas were at last coming into service was thus particularly welcome. Manned by two pilots and two mechanics, H12s had the useful armament for the day of four 100-lb or two 230-lb bombs, a maximum speed of eighty-five miles an hour, and an operational ceiling of nearly 11,000 feet. On the debit side they had only two or four Lewis guns for defence against fighters, and had a tendency to suffer damage on take-off because of structural weakness in the bottom of the hull. Nevertheless, their six-hour endurance in the air with a substantial bomb load gave them great advantages in the anti-submarine war. Flight Sub-Lieutenant Claude C. Purdy of Winnipeg was among the first RNAS pilots to fly them in May 1917. ‘Am here [at Felixstowe] taking some special work on large sea-planes [sic] which will be able to stay out at sea on patrol much longer than ordinary ones,’ he wrote:

We have not been having a great deal of flying the last few days, as it has been windy and wet. We have some very fine machines, some of which I should say are the largest in the world. It seems wonderful that such a large structure can possibly get into the air at all. Patrols, of course, go on in all kinds of weather and we have to be pretty good at navigation, as there is very little to go by in the air when it is foggy ... The whole thing has to be done by instruments by which one can tell the speed through the air, climbing and gliding angles, and the position laterally. There are also a dozen other things which require attention, and which help to keep the course and to keep the station at home posted on one’s movements. It is very interesting indeed to go sailing through the air with anything from five hundred to nine hundred horsepower behind one in the shape of engines."

Meanwhile, the ‘F’ (Felixstowe) series were being developed. The prototype, F1, used the hull of a Porte flying boat married to the wings and tail assembly of the Curtiss H4, while the F2 combined the same parts of the Porte and H12. From these evolved the famous F2A. With a ‘V’ shaped, curved hull this machine had the advantage of being able to alight and take off in much rougher seas than the H12. It was also better armed, the high position of the tail enabling two extra Lewis guns to be fitted at the rear, making a total of up to seven. Both types were powered by two Rolls Royce Eagle engines and were comparable in performance, the F2A being slightly faster at 95 mph, but having a lower service ceiling of 9600 feet."

Purdy’s machine was shot down and all four of the crew lost in a running fight between two Large Americas and three two-seater German seaplanes (Friedrichshafen FF 33Ls) off the North Hinder Light on 15 February 1918. ‘Upon sighting our aircraft the Curtiss boats immediately turned away to the northwest. The more southerly flying boat was engaged about 1100 [hrs] at 200 meters and after a brief combat fell in flames. The co’s aircraft then pursued the remaining enemy, the other two aircraft being low on gas. The chase was abandoned off Lowestoft. At about 1700 the wreckage of the Curtiss boat which was shot down was located, with three survivors clinging to it. Because of heavy seas, however, aircraft were unable to land.’ "The Hornets of Zeebrugge: Annotated Excerpts from the War Diary of Seeflugstation Flanders I, 1914–1918," Cross & Cockade Journal, CXXI, spring 1970, 23

The F2A was also superior to the later F3, which had a service ceiling of only 8000 feet and though fitted with two 345-hp Rolls Royce Eagle engines could obtain a maximum speed of only 91 mph.
The Admiralty paid less attention to the development of torpedo-carrying aircraft. Inter-related problems of range and payload suggested that they would usually need to be flown from carriers, but carriers themselves were still at an early stage of development. HMS Manxman, the latest addition to the Grand Fleet, had a sixty-foot flight deck forward, a hangar that could take four single-seat fighters in assembled state, and a centre-line cantilever gantry aft for hoisting her four Short 184s over the stern. With a top speed of only sixteen knots she lagged behind the fleet. In March, therefore, Beatty forced through the conversion of the 31-knot battlecruiser Furious over the opposition of Admiralty gunnery experts. Instead of the firepower of her forward 18-inch gun, Furious was given a hangar on the forecastle; its roof made a flight deck 228 feet long and fifty feet wide. Squadron Commander H.E. Dunning made the first landing on the flight deck while the ship was underway on 2 August; five days later he drowned when his Sopwith Pup stalled and blew over the side. No further deck landings were made until Furious received an after flight deck in 1918. Some cruisers were given a flight deck rigged over the forward gun turret from which aeroplanes could fly off at sea when the turret was rotated into the ‘relative’ or ‘felt’ wind over the deck. This brought offensive use of aeroplanes at sea closer to realization. Full utilization would only be possible, however, when Hermes, laid down in July as the first large carrier to be designed as such, was ready. As a stop-gap Pegasus and Nairana, converted merchantmen, joined the Battle Cruiser Fleet as seaplane carriers.\(^*\)

Not surprisingly, therefore, few of the increasing numbers of Canadians selected for fleet operations in 1917 found their way to the carriers or cruisers. The redoubtable ‘Rutland of Jutland’ in Manxman had under his supervision eleven pilots and observers, of whom four were Canadians. One of the five pilots in Engadine and two in Campania, as well as one kite-balloon officer in the Grand Fleet, were also from Canada.\(^\dagger\) This amounted to no more than 10 per cent of RNAS personnel in the fleet, but the little contingent played its part in advancing the techniques of heavier-than-air operations at sea. It was hazardous experimental takeoffs from Manxman, for example, that paved the way for the equipping of individual ships with Sopwith fighters. Subsequently, the presence of carrier aircraft in the Heligoland Bight helped to force a change in German tactics. Zeppelins had to fly at greater altitudes, and could no longer undertake detailed observation of British minefields. By late 1917 German minesweepers, steaming further out into the North Sea in response to British minelaying activity, had to be accompanied by vessels carrying seaplanes.\(^7\)

The Admiralty’s Anti-Submarine Division, which Jellicoe had set up under Rear-Admiral A.C. Duff in December 1916, began immediately to explore strategic and tactical methods to defeat the U-boat. The resulting strategy was at first disjointed, often based upon false assumptions and wishful thinking, and resulted in inappropriate use of naval forces, including the RNAS. The mistaken belief that

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* The only Canadians among Pegasus’ complement of pilots were C. McNicoll of Montreal and G.M. Simpson of Toronto.

\(^\dagger\) These were, in Manxman, W. Lodge of Armrior, Ont., W.M.C. Matheson, H.G. Nares, and L.E. Nicholson, RNVR, all of Winnipeg; in Engadine, M.C. Dubuc of Montreal; in Campania, George Breadner of Winnipeg and C.V. Bessette, an American citizen of Canadian parentage and recruited in Canada.
convoy was defensive and therefore could not bring about the destruction of enemy submarines lay at the root of the trouble. Several ambitious schemes were put forward, mainly designed to destroy submarines or deprive them of their bases. A military campaign launched to capture Ostend and Zeebrugge was foremost in the planners' minds. It meant laborious preparations for the 'Great Landing' on the Flanders Coast anticipated by Vice-Admiral Bacon and the Dover Patrol.

Offensive operations against destroyers and submarines based on the Belgian ports necessarily involved RNAS squadrons based at Dunkirk. Their aircraft also provided spotting for naval bombardment of the ports and patrols over the vessels which maintained the net and mine barrage across the Straits of Dover. These patrols were designed to give some protection against attack by German surface vessels, as well as to sight and attack submarines. After August the RNAS at Dunkirk was principally concerned, however, with supporting the military offensive which, Jellicoe told the Cabinet, had to succeed, because if the Flanders Coast was not cleared Britain would be out of the war in 1918.

At the end of 1916 the Admiralty had approved Wing Captain Lambe's plan to expand the force at Dunkirk to five fighter, one reconnaissance, and two bomber squadrons. Lambe began this ambitious programme by creating nucleus flights, because initially he was short of fighter aircraft and pilots. The number of Canadians at Dover-Dunkirk in January 1917 had dropped to twenty, since many were with 3 Wing at Luxeuil or with 8(N) Squadron, which had been seconded to the RFC in October. Moreover, as the Luxeuil pilots returned, most were used to staff the additional fighter squadrons promised to the RFC.

These shortages and bad weather kept operations at Dunkirk at a low ebb at the beginning of the year. On 22 January, however, Flight Sub-Lieutenant C.J. Wyatt of Mount Brydges, Ont., flew one of two reconnaissance missions which disclosed that the German Sixth and Ninth Destroyer Flotillas were lying behind the Zeebrugge Mole. Further photographs on 1 February showed that there were eight destroyers, ten to twelve large torpedo boats, and three submarines crammed into Bruges harbour, and that the canals running from the harbour to the coast were frozen. Over the next two weeks bombers struck repeatedly at these targets. Results were disappointing, partly because the aircraft were frequently hampered by low temperatures. In one raid six of twelve bombers made emergency landings because of frozen water or oil, among them the Sopwith 1½ Strutters flown by Flight Sub-Lieutenants Chadwick and Sproatt. Aircraft from the 1st and 2nd Marine Feldflieger retaliated with night raids on Dunkirk and RNAS airfields. The chief consequence of this exchange of hostilities was that both sides strengthened their air defences against raids.

The heavy commitment of fighters to the RFC seriously affected the Dunkirk command's capacity to carry out its many tasks. In March and April 1917 Lambe gave his three wings specific roles. No 1 Wing took care of naval co-operation and photographic reconnaissance, with fighter protection from 9(N) Squadron. No 4, the fighter wing, had as its main task offensive patrols 'well over the enemy's lines and from the region of Ypres Sector to ten miles out at sea.' The bomber wing, No 5, had two squadrons to attack German naval bases and 'Military objectives far behind the lines with the object of forcing the enemy to withdraw both Bombing
Machines ... and Fighting Machines ...' Trenchard welcomed the latter objective as being 'in entire agreement with the policy laid down for the Royal Flying Corps by the Commander-in-Chief.'

Only the chief operational duties have been noted; the command was in fact spread too thin to carry out all its duties effectively. The quality of its aircraft was uneven. In the spring a number of DH4s were acquired for reconnaissance and bombing and the Handley Page 0/100s also being delivered were much superior to the Short bombers. Sopwith Triplanes went to the RNAS squadrons committed to the Western Front, however, while Dunkirk had to make do with Sopwith Pups and Nieuport 17s. Moreover, the Dunkirk seaplanes were 'hopelessly outclassed' by their opposition, as developments in the spring and early summer were to prove.

Nevertheless, in early April the seaplanes were of some use as decoys. After a number of raids on the German seaplane station at Zeebrugge Mole, Seeflugstation Flanders I, Bacon learned that German destroyers were steaming out to anchor a mile offshore during each raid. On 7 April he sent his seaplanes in once more to bomb; the German destroyer G-88 fell into the trap and was torpedoed by motorboats. It was their last success. At Zeebrugge the Germans had thirty-seven good aircraft which were now being reinforced by two superior types, the Friedrichshafen FF 49 and the Brandenburg W 12. In May the French station at Dunkirk lost six flying boats to the Germans, and on 19 June the RNAS lost two seaplanes and a rescue boat. One of the Sopwith Baby pilots killed was Flight Sub-Lieutenant J.E. Potvin of Midland, Ont. Just before this incident Lambe had told Bacon that the 'Seaplane pilots ... are amongst the best in my command and have constantly applied to transfer to land machines with a view to more active participation in the war.' The first step in this direction occurred in midsummer when the Admiralty scrapped seaplane operations at Dunkirk. Instead, the seaplane pilots, including P.S. Fisher of Montreal, flew Pups as escorts for a Large America flying boat transferred from Felixstowe to carry out anti-submarine patrols. The H12 arrived on 11 July, flown by Flight Sub-Lieutenants C.E.S. Lusk of Toronto and N.A. Magor of Montreal. They were joined by another Canadian, H.H. Gonyon of Chatham, Ont.

Lambe used the bombers of 5 Wing with circumspection in this period. He hoped to attack enemy warships in Flemish ports, but on 21 April the initial attempt was turned back by gale force winds. D.A.H. Nelles of Toronto was forced down during this abortive raid and was interned in Holland. The newly-arrived Handley Pages were committed to the same targets, but when one was lost in a daylight raid on 26 April, Lambe restricted them to night bombing. The first night raid was not until 10 May, when Flight Sub-Lieutenants J.R. Allen and F.R. Johnson, both of Westmount, Que., flew two of the Handley Pages. It is indicative of the shortage of experienced RNAS pilots that both returned to make their first night landing.

Pilot shortages were even more acutely felt in the fighter wing. The casualties in the naval squadrons on the Western Front, though by no means abnormal for that

* On 19 May he was awarded the DSC 'for conspicuous good work as pilot of a bombing machine.'
THE ROYAL NAVAL AIR SERVICE

CHART SHOWING AIR STATIONS AND THE ANTI-SUBMARINE MEASURES EMPLOYED IN HOME WATERS DURING 1917

THE HOME ORGANIZATION OF RNAS SHIPS AND AIR STATIONS, APRIL 1917

BOARD OF ADMLIRTY

C.H.C. COAST OF SCOTLAND

C.H.C. GRAND FLEET

R.A. EAST COAST

COMMODORE LOWESTOFF

COMMODORE HARBOUR

COMMODORE (I)

C.S.M. PORTSMOUTH

C.H.C. PLYMOUTH

S.N.O. MILFORD HAVEN

S.N.O. HOLYHEAD

NOTES: The aircraft carrier Campania came under the direct orders of the C-in-C Grand Fleet for operational purposes. The anti-submarine station at Lame, came under R.A. Lame for operational purposes, with Lame being subject to the general control of the Commanders-in-Chief, Coast Aircraft who were also over the R.A. in Grand Fleet.
theatre, were much heavier than the RNAS ordinarily experienced. As a result, men fresh from flying school were now being sent as replacements to RNAS fighter units, and the naval air service was confronted with the same deadly problem of attrition with which the RFC had coped for so long. Lambe had to take the drastic expedient of reducing fighter squadron establishments to eighteen pilots and then, when 10(N) Squadron was sent to the Western Front in May, of further decreasing establishments to fifteen. At Dunkirk there were never more than twenty fighter pilots (of whom about fourteen might be Canadians at any one time) to maintain the desired offensive posture as well as to provide protection for the fleet. When the Germans began their bombing raids upon England in June, Dunkirk was given the additional task of patrolling the enemy bases at Ghistelles and St Denis Westrem to intercept the bombers on their return from England. In order to carry out Dunkirk’s varied fighter duties, Lambe had to press 11(N) Squadron into service, although it was supposed to be a training and manning unit only. Some of the command’s wounds were self-inflicted, however. For example, in May 4 Wing was ordered to resume the discredited system of line patrols, which meant that single-fighter patrols had to be maintained for six hours a day to prevent enemy reconnaissance and artillery co-operation aircraft from penetrating British air space.

Just at this point, when Lambe considered the Dunkirk organization stretched to the limit, his command was virtually annexed to the major operation impending on the Western Front. As part of his Flanders offensive Haig planned landings on the Channel coast to collapse the German right wing and free the Allies from the submarine menace. The landing operation, to be directed by Admiral Bacon, was to take place when the Fifth Army’s advance had reached Roulers and coincide with an attack by Fourth Army from the Yser bridgehead. To this end General Rawlinson and elements of the Fourth Army, accompanied by IV Brigade RFC, took over the extreme left of the allied line from St Georges to the sea in late June. Air operations orders for the whole sector were issued by Trenchard on 7 July. The RNAS was given a night-bombing area of Dixmude-Thourout-Retranchement-Nieuport Bains and offensive patrol duties extending from Nieuport to three miles west of Dunkirk. Bacon made Lambe’s prime responsibility clear to him on 15 July: ‘you are to do what you can to attack hostile machines returning from raids over England; but nothing is to interfere with the efficient protection of the left flank of our army.’

Unfortunately interference had already taken place, as Bacon was fully aware. On the evening of 10 July German infantry assaulted that part of the Yser bridgehead from Lombartzyde to the sea, wiped out two battalions of the 1st Division, and threw the British back across the Yser.* No word of German preparations for

* The German assault force included, for the first time, a complete squadron of aircraft in close support. ‘The effects of this action on the enemy, both in the form of actual losses inflicted and in the form of its impact on the enemy [ie, British] morale, was so outstanding that the Commanding General of the Air Forces ... immediately proceeded to apply the experience gained and to re-form the existing air units accordingly. From then on ground-attack air squadrons (Schlachtstaffeln) supported the army operations ...’ Paul Deichmann, German Air Force Operations in Support of the Army (USAF Historical Studies No 163; New York 1962), 121-2
this most successful pre-emptive strike had been brought in by RFC or RNAS reconnaissance aircraft. The weather had been poor in the period immediately preceding the attack, though there had been occasional opportunities for observation. In addition, the sector was new to IV Brigade’s corps squadrons, and although it was on Dunkirk’s front doorstep naval airmen had had little previous experience in detecting those minute but cumulative changes in the enemy’s rear that would have spelled ‘attack’ to an experienced RFC observer. Even so, the episode reflected little credit upon either air service and damaged the prospects for the planned landings.

The main battle opened on 31 July when the Fifth and Second British Armies and the First French Army attacked in Flanders. It had been preceded by a furious RFC air offensive, beginning on 12 July. Before the ground attack commenced, Trenchard complimented his brigade commanders on the ‘energy and success’ with which the preparatory phase of the air offensive had been secured. He went on: ‘It is of the utmost importance that all units keep up the greatest amount of energy in this wearing down process. Bombing should be carried out with vigour, offensive patrols should be out continuously from dawn to dark, and artillery machines must work to the full amount required by the artillery, getting further out over the targets when the visibility is bad. If this is carried out I am confident the final result will prevent the German Flying Corps from taking any important part in the battle.’ In accordance with protocol, Lambe received a copy of this characteristic Trenchard exhortation ‘for information.’ In relaying its substance to his wing commanders, he repeated Trenchard’s request for vigorous bombing and dawn to dusk offensive patrols, but added ‘as far as possible.’ He concluded with a sentence that the RFC commander would certainly have found incomprehensible. ‘It is pointed out,’ Lambe wrote, ‘that the greatest value of the Aerial Offensive lies in the period of time immediately preceding the actual battle, and that once the battle has actually started, the Aerial Offensive can be eased up.’

No mention of this unusual order, nor of the considerations that prompted it, is to be found in the scanty literature on RNAS operations at Dunkirk. Lambe was attempting to deal with an extremely serious morale problem that stemmed from the losses suffered by the RNAS squadrons on loan to the RFC and the consequent strain upon the Dunkirk Command’s capacity to carry out its wide range of duties. In reviewing these difficulties for Bacon on 12 July, Lambe had specifically mentioned fighter shortages ‘owing to rather heavy casualties of late, and to the fact that many of the pilots – who have been serving for a considerable period – [have been] breaking down.’ When Bacon instructed him to make the protection of the army his prime concern, Lambe issued a secret memorandum to his wing commanders which discloses the dimensions of his problem:

Of late there have been rather a large proportion of pilots who state they are unable to fly over the enemy’s lines, for various causes. In view of the great shortage of pilots for the forthcoming operations it is essential, as far as possible, that every endeavour is made to eliminate these cases, and I think that the Squadron Commanders can assist very largely if they make every effort to do so. Many of these cases are genuine, and these I will recommend for Seaplanes, but, I am convinced that a large proportion of the officers prefer the comfortable surroundings of an Aerodrome situated near London to the glamour and glory
of the battle field. Wing Commanders and Squadron Commanders must make every endeavour to combat this idea.\textsuperscript{21}

Instead of following Trenchard’s example in holding out the prospect of victory over the German air force as the reward for strenuous effort, Lambe promised a reduction of RNAS strength at Dunkirk in October, with ‘promising officers’ to be sent for three months to England. ‘I hope,’ he added, ‘that every endeavour will be made by all the pilots to stick it out till then.’\textsuperscript{22}

The best explanation for this crisis in morale seems to be a difference in service practice and experience. The RNAS squadrons lent to the RFC performed valiantly, but under conditions for which they were wholly unprepared. Raymond Collishaw, the most successful of all naval fighter pilots and one who rose superlatively to the challenges of the Western Front, put the matter in a nutshell when he spoke of the ‘comparatively gentle’ operations at Dunkirk.\textsuperscript{23} Conducted with relatively few casualties, these operations had permitted the building up of a body of pilots who had developed very considerable skills in the air, but the relentless psychological pressures of the Western Front, with its incessant combats, proved a fearful shock to some of them. Trenchard’s driving insistence upon constant offensive was harsh, even cruel, in its effects upon airmen, as many of his critics have said. But it did have one result. Men who were physically or psychologically unable to measure up to the terrible demands of the air war were speedily winnowed out either by being returned to the depot within a few days of joining a squadron, or at the hands of German aviators. Neither RNAS leadership nor airmen had hitherto undergone this stern testing, and it is understandable that at both levels the resolution of some individuals wavered. It is in this context that an incident in September, dealt with later, in which the officer commanding 10(N) Squadron refused to carry out orders issued by his RFC superior, is to be viewed.*

In these circumstances, it was as well for the Dunkirk Command that the Flanders offensive never gained sufficient ground for the Channel coast landings to take place. Consequently, RNAS operations in support of the army never reached a high level of intensity. Nevertheless, during July and August the bombing wing made many night raids against railroad junctions and sidings at Ghent, Thourout, and Ostend and upon the electrical generating stations at Bruges and Zeebrugge, while during the day the DH4s attacked German airfields in Belgium. Many Canadians took part in these raids, the names of Flight Commander C.H. Darley, Flight Sub-Lieutenants H. Allan and F.R. Johnson, all of Montreal, C.B. Sproatt and E.B. Waller of Toronto, W.F. Cleghorn of Ottawa, and J.A. Shaw of Edmonton being among the most prominent.\textsuperscript{24}

Dunkirk’s fighter effectiveness was greatly enhanced by the return of 3(N) Squadron, with its extremely high proportion of Canadians,\textsuperscript{\dagger} after its service on

* See 432–4.
the Western Front, where it had been credited with eighty victories while losing only nine of its own Sopwith Pups. Now re-equipped with Camels, this veteran squadron lost little time in making its presence felt. On 7 July it was despatched to meet the Gothis returning from their spectacular daylight raid on London and became embroiled with German machines acting as a defensive screen for the bombers. Flight Lieutenant J.S.T. Fall of Hillbank, BC, attacked three seaplanes twenty-five miles northeast of Nieuport, sending one down. Later in the day while leading his flight he was credited with another, killing the observer and sending the aircraft crashing into the sea. Flight Lieutenant J.A. Glen of Enderby, BC, opened fire on a third and watched it plummet into the water. The two Canadians then joined in the destruction of yet another enemy seaplane. 25

In the late summer and autumn of 1917 the naval flyers were periodically involved in activities related to the ground war. For example, in preparation for the Channel landings, naval vessels relaid the 1916 barrage of net mines and deep minefields between Zeebrugge and Ostend. Many combats took place with German aircraft investigating the minelaying. Two Canadians, Flight Commander A.I. Chadwick and Flight Lieutenant R.M. Keirstead, both from Toronto, joined in claiming a seaplane shot down on 26 July. The next day three more, Fall, Glen, and L.D. Bawlf of Winnipeg, were part of a flight that drove off four German seaplanes from the new German torpedo-plane unit at Zeebrugge which were attempting to torpedo destroyers on the barrage line. RNAS patrols prevented German reconnaissance aircraft from slipping over the allied rear areas from the sea. Occasionally, too, RNAS pilots would initiate individual strafing attacks on enemy airfields. Flight Sub-Lieutenant R.F.P. Abbott of Carleton Place, Ont., sprayed five hundred rounds into the hangars at Uytkerke airfield from fifty feet in the course of one such strike on 16 August. 26

For the most part, however, operations at Dunkirk maintained their customary pattern and pace, fluctuating with Channel weather, the exigencies of naval warfare, and the changing priorities of Vice-Admiral Bacon and Wing Captain Lambe. In early September that meant the bombing of Bruges and vicinity. The Germans, 

* German aerial torpedo attacks on merchantmen in the southern North Sea and English Channel between Dover and Yarmouth added further to the responsibilities of British air stations in the summer. The German Naval Air Service had carried out numerous experiments attaching torpedoes to land and seaplanes at a Baltic base in 1916 before developing the twin-engined Brandenburg g w and Gotha w o 11 seaplanes. Following the setting up of the special flight (T-Stajfel) at Zeebrugge, several attacks by German seaplanes resulted in the sinking of a merchant ship in May 1917. The T-Stajfel was out in strength again in the afternoon of 9 July, firing torpedoes at three ships between the Sunk and Shipwash Light Vessels; as was usual on such occasions the British air stations were alerted too late. Another party of four seaplanes dropped two more torpedoes off Lowestoft in the evening, also failing to register any hits. One of the attackers was shot down and a second Brandenburg g w trying to rescue the crew had to surrender to a patrol boat. Two months later seven seaplanes made the last sortie, during which three torpedoes were used to destroy a small merchant vessel. Discouraged by the lack of any substantial achievement the Germans disbanded the T-Stajfel and abandoned the initiative they had taken in torpedo operations, a form of naval aviation of high promise. 'Report of Attacks by German Torpedo Carrying Seaplane,' Air 1/604/16/15/237; Great Britain, [Air Ministry], Aircraft Armament, Torpedo Section, History of the Development of Torpedo Aircraft (np, reprinted June 1919), 84; W. von Gronau, 'German Seaplane Stations, 1917,' app. III, Air 1/677/21/13/1901; G.P. Neumann, Die deutschen Luftstreitkräfte im Weltkriege (Berlin 1920), 133-4, DHist SGR 1 196, Set 65
sensitive to attacks upon this major submarine base, usually responded sharply. Thus after a night raid by Handley Pages on 2–3 September, nine Albatros fighters rose to challenge a Camel formation led by Flight Commander L.S. Breadner and composed of four fellow-Canadians, Flight Sub-Lieutenants W.H. Chisam of Edmonton, L.A. Sands of Moncton, NB, H.M. Ireland of Toronto, and N.D. Hall of Victoria. In the resulting combat Breadner reported shooting down an Albatros D-111 with its wings sheared off. Hall, who became a prisoner of war, was lost on the operation. Later the same day a formation of eight DH4s was broken up by German fighters. Attacked by six machines, Sproatt put the nose down to shake off his pursuers and then, he recalled, ‘suddenly I pulled up ... turned off my engine and practically came to a stall ... the plane above us was so close my observer could have hit him with a walking stick.’ Instead, Petty Officer A. Hinkler used his machine-gun; his bullets found the gas tank of the Albatros which fell away, ‘just a black ball of smoke.’

Canadians were involved in two notable successes of this period. On 15 September, during an attempt by British naval monitors to bombard Ostend, thirteen DH4s were over the Channel to catch German warships running to sea. From a group of trawlers and drifters, the team of Sproatt and Hinkler selected what was probably a torpedo boat destroyer and reported a direct hit upon it with a 65-lb bomb dropped from 9000 feet. The second success, a week later, marked the first (and only) time in the First World War that an aircraft succeeded in sinking a submarine. On 22 September, while the monitor Terror was shelling Ostend, Flight Sub-Lieutenants Magor and Lusk were flying a protective patrol in the Large America, some forty-five miles off-shore. They were near the western edge of the North Hinder Bank when ‘... a long Enemy Submarine, about 200 to 250 feet long, was observed fully blown [surfaced] and attacked, two 230-lb bombs being dropped at about 800 feet and striking just behind [the] Conning Tower as she was half submerged, causing her to keel over on her side and sink. Wreckage, large bubbles and oil were observed subsequently.’ The submarine was UB 32, a boat approximately 120 feet long and only about 14 feet wide. To score two direct hits on such a narrow target from a height of 800 feet with the primitive aiming device of the time was a matter of good luck rather than good judgment. (A week later Magor missed another submarine with two more bombs.) But if UB 32 looked twice as long as she actually was, perhaps she looked twice as wide too. In any case, although none of the twenty-three men on board survived there were at least four witnesses to the sinking - Magor, Lusk, and their two crewmen - and UB 32, which had sailed from Zeebrugge on 10 September and sank allied vessels on the 16th and 18th, was never heard from again.†

* Sproatt, who had completed twenty-six bombing raids by this time, and Hinkler, an Australian who became a noted pioneer aviator after the war, were awarded the DSC and DSM, respectively, during this period.
† Much confusion has arisen over Jones’ identification of the submarine as UC 72 in War in the Air, iv, (London 1934), 73, an error reflected in Vice-Admiral Sir Arthur Hezlet’s Aircraft and Seapower (New York 1970), 91. Hezlet also follows Jones in wrongly attributing the sinkings of several other submarines to air action. UC 72 was sunk by Q-ship gunfire in the Bay of Biscay on