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R.A.F. NARRATIVE

AIR DEFENCE OF GREAT BRITAIN

VOLUME I

GROWTH OF FIGHTER COMMAND

JULY 1936 - JUNE 1940

AIR HISTORICAL BRANCH (I)
AIR MINISTRY

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(FIRST DRAFT)

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THE GROWTH OF FIGHTER COMMAND JULY 1936 - JUNE 1940.

CHRONOLOGY OF PRINCIPAL EVENTS

PRE-WAR YEARS

1923	April	Report of the Steel-Bartholomew Committee on the air defence of Great Britain.
	June	H.M. Government decide to create a Home Defence force of fifty-two squadrons, including seventeen fighter squadrons, "with as little delay as possible."
1924	May	Report of the Romer Committee on the air defence of Great Britain.
1925	January	Appointment of Air Marshal Sir John Salmond as A.O.C.-in-C., Air Defence of Great Britain.
	December	H.M. Government decide to postpone the completion of the Home Defence force until 1935-6.
1926	June	Headquarters, Air Defence of Great Britain, opened at Hillingdon House, Uxbridge.
1929	January	Transfer of control of Observer Corps from War Office to Air Ministry.
	December	H.M. Government decide to postpone the completion of the Home Defence force until 1937-8.
1933	January	Hitler becomes German Chancellor.
	May	H.M. Government decide to postpone the completion of the Home Defence force until 1939-40.
1934	July	H.M. Government approve a scheme for the formation of a Metropolitan Air Force of seventy-five squadrons, including twenty-eight fighter squadrons, by April 1940.
		Beginning of the conversion of Auxiliary Air Force squadrons from bombers to fighters.
	December	Formation of the A.D.G.B. Sub-Committee to consider the reorientation of the air defences of the country.
1935	January	1st Report of the A.D.G.B. Sub-Committee.
	April	Report of the Boyd Committee on the expansion of the Observer Corps.
	June	H.M. Government approve a scheme for the formation of a Metropolitan Air Force of one hundred and twenty squadrons, including thirty-five fighter squadrons, by 1937.
		Air Staff begin the examination of the reorganisation of the Metropolitan Air Force.
	July	1st Report of the A.D.G.B. Sub-Committee approved 'in principle.'
1936	April	Proposed number of fighter squadrons reduced from thirty-five to thirty owing to increase in number of aircraft in each squadron.

	May	Reorganisation of the Metropolitan Air Force into three operational Commands officially notified.
		Headquarters, No. 11 Group, opened at Hillingdon House, Uxbridge, on the basis of Fighting Area.
	July	Headquarters, Fighter Command, opened at Bentley Priory, Stanmore.
	November	A.D.G.B. Sub-Committee instructed to report on "the ideal air defence of the country, irrespective of conditions of supply."
		Beginning of the formation of a chain of R.D.F. stations.
1937	February	Report of the A.D.G.B. Sub-Committee on the "ideal" air defence of Great Britain.
	May	Headquarters, No. 12 Group, opened at Hucknall, Nottinghamshire.
	July	Approval of the expansion of the Observer Corps to cover most of Great Britain.
	December	H.M. Government decide to increase the number of fighter squadrons to thirty-eight by April, 1940.
1938 1939	Sept-Oct.	The "Munich" crisis.
	November	H.M. Government decide to increase the number of fighter squadrons to fifty by April 1941.
1939	August	Headquarters, No. 13 Group, opened at Newcastle.
		H.M. Government decide to add seven squadrons to the approved strength of fifty fighter squadrons.

OUTBREAK OF WAR TO THE INVASION OF FRANCE AND THE LOW COUNTRIES

1939	3 September	Great Britain and France at war with Germany: thirty-eight operational squadrons in Fighter Command.
	8-9 September	Four fighter squadrons despatched to France.
	2-17 October	C.A.S. decides to form eighteen fighter squadrons immediately.
	15 November	Two fighter squadrons despatched to France.
1940	9 April	German Invasion of Denmark and Norway.
	8 May	C.A.S. decides to form three more fighter squadrons immediately.
	10 May	German Invasion of Holland, Belgium and Luxembourg: forty-seven operational squadrons in Fighter Command.

THE GROWTH OF FIGHTER COMMAND, JULY 1936 - JUNE 1940

CONTENTS.

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THE GROWTH OF THE A.D.G.B. SYSTEM PRIOR TO 1935

The Origin of the A.D.G.B. System

It will be convenient to start the story of the development of Fighter Command in 1922, for it was in that year that steps were taken to ensure that a Home Defence air force was always part of the peacetime defences of the United Kingdom. At that time there was little likelihood of a war in Europe in which Great Britain would be engaged and the air forces of the country had been allowed to come to such a pass that only three squadrons were permanently available for its defence against air attack. The one power capable of launching such an attack was France, and war with her was not likely. At the same time British diplomacy was not then marching in step with that of France and was likely to be hampered by the weakness of British arms; and so much concern was expressed at the position, notably by Lord Balfour, that a special committee was appointed, under the chairmanship of Lord Salisbury, to consider the whole question of national and imperial defence. The committee reported, amongst other things, that "in addition to meeting the essential air power requirements of the Navy, Army, Indian, and overseas commitments, British air power must include a Home Defence air force of sufficient strength adequately to protect us against air attack by the strongest air force within striking distance of this country." The basic principle was approved by the Cabinet, and its first application, in the words of Mr. Baldwin on 26 June 1923, was that "the Home Defence force should consist of fifty-two squadrons to be created with as little delay as possible."

C.I.D.106-A, 26 April 1922.

C.P.270 (23).

Hansard, Fifth Series, Volume 165.

Delays in its Completion.

This announcement was ill-matched by some other Cabinet decisions that were made about the same time and during the next few years, notably that which ruled that the estimates of service departments must be based on the assumption that no major war would occur for ten years. In consequence not only were the limited resources of the services stretched to the utmost to meet inescapable commitments, such as the

defence of India,[1] but it was difficult to make plans for the future. The effect on the Home Defence programme was profound. The original date for its completion was April, 1928. Later it was postponed to 1930; then, towards the end of 1925, a Cabinet committee, under the chairmanship of the Earl of Birkenhead, recommended that it should not be completed until 1935-6. The committee reported that it was sensible of the need for a Home Defence air force, and made no complaint about the size of the force that was planned, but considered that the programme could be safely retarded, especially since financial economy was so desirable. This report was approved by the Cabinet on 3 December 1925. A similar Cabinet decision of 11 December 1929, based on identical grounds, further postponed the completion of the fifty-two Home Defence squadrons until 1938, but long before that date the general deterioration of international politics had initiated the first of the many schemes for expanding and re-organising the Royal Air Force.

C.I.D.120-A, 3 November 1923.

C.P.498 (25) 27 November 1925.

But though the years 1923-1933 saw a much slower expansion of the Home Defence force than was originally intended[2] they were not barren of advance in the organisation of air defence, and a number of policies were adopted that affected the structure of the future Fighter Command.

The Organisation of the Aircraft Fighting Zone

When it was appreciated that the country needed a Home Defence air force it was first of all necessary to devise some plan governing the disposition of this force, as this would affect the form that the force would take. At that time the strongest air force in Europe was that of France. Accordingly, the air defence system was based on the assumption that the direction of attack would be across the Channel towards London and the south-east of England. The principles governing the structure of the system were as follows; firstly, the defending air

(1) The plans for the defence of India required the despatch of twenty-four of the Home Defence squadrons when that country was threatened. The Home Defence squadrons, in fact, formed a general reserve that could be used to re-inforce the Air Force throughout the world.

(2) The Home Defence air forces expanded as follows:-

October, 1925	25 squadrons
October, 1929	38 squadrons
October, 1933	42 squadrons.

These included both bombers and fighters.

forces should be able to receive the necessary warning of attack and reach their fighting height before the arrival of the enemy; secondly, ground defences are an essential part of any air defence scheme since they can be sited as direct protection for important vulnerable points and areas; thirdly, information and intelligence regarding the movement of friendly and hostile aircraft must be collected, and distributed to all parts of the defensive system, as quickly as possible.

The plan which attempted to apply these principles to the defence of the United Kingdom, and which remained the basis of the air defence system until 1935, was the work of an Air Ministry and War Office sub-committee, known as the Steel-Bartholomew Committee.(1) Its main feature was a prepared zone running parallel to the coast and some thirty-five miles inland, from Duxford, in Cambridgeshire, to Devizes, on the western edge of Salisbury plain. This zone, the Aircraft Fighting Zone, was to be about fifteen miles in depth and would be lighted with searchlights for night fighting. An Outer Artillery Zone would be established on its forward edge so that the guns could indicate the presence of the enemy to the defending fighters and also assist them by breaking up hostile formations by their fire. The zone formed a rampart round three sides of the London area, but, in addition, London was to be directly defended by an inner ring of guns and searchlights, which would form the Inner Artillery Zone. Numerous important areas were south and east of the Aircraft Fighting Zone, notably Portsmouth, Dover, the Thames estuary towns, and Harwich, and these were to be provided solely with ground defences.

C.I.D.118-A, 9 April 1923.

This plan was the basis of the defensive system that was slowly built up between 1923 and 1935, and its shape can be seen in the more comprehensive arrangements that were made between 1935 and 1940. Those who framed it intended to give some protection to the industrial Midlands as well as to London, and, later in 1923, it was decided to

C.I.D.120-A, 3 November 1923.

(1) After Air Commodore J.M Steel, the chairman of the sub-committee, and Colonel W.H. Bartholomew, the senior War Office representative.

extend the Aircraft Fighting Zone as far as the Bristol Channel, so reducing the chances of enemy raiders outflanking the defences in order to reach targets in the Midlands and the north of England. In addition the Thames and Medway area was brought into the air defence scheme in 1929 as part of the Outer Artillery Zone, instead of ranking, as it had done hitherto, as a separate defended area. Otherwise, the geographical limits of the Aircraft Fighting Zone remained the same until its re-orientation in 1935.

Its organisation chiefly depended on the size of the fighter force that would use it. When this question was being considered by the Air Staff one factor seemed particularly important, namely, that "the addition of bombers at the expense of fighters would inflict more damage on the enemy than the absence of fighters would permit the enemy to inflict on us." Therefore, the number of fighter aircraft was kept at the minimum necessary to man the Zone. This depended on the length of the front that a squadron could cover, the ability of the individual squadron to fight both by night and by day, and the probable scale of attack that the fighters would have to meet. The outcome was the division of the Aircraft Fighting Zone into ten sectors, each with a front of about fifteen miles. The four sectors to the south and east of London were to be manned by two squadrons, the others by one. In addition, three squadrons were to be stationed at advanced aerodromes near the coast in order to harass the enemy on his way to and from his targets.

A.H.B. IIA/1/7a Enclosure 43.

See Map No.

Raid Intelligence.

The structure of the Aircraft Fighting Zone depended on a further factor, the length of the warning period provided by the raid intelligence organisation. The thirty-five mile gap between the Aircraft Fighting Zone and the coast was dictated by the time taken by fighters to climb to 14,000 feet (the altitude at which day bombers would probably be flying), and the time interval between the receipt of a raid warning and the arrival of the enemy over the Aircraft Fighting Zone. If this interval could be increased, either by new developments that made it possible to locate aircraft some distance out to sea, or

by improving the efficiency of communication between the sources of raid intelligence and the fighters, then it would be possible to move the Aircraft Fighting Zone forward, and so provide better protection for the towns on the south coast.

H.P.C.89, 16 May 1924.

The first steps towards the formation of an efficient raid intelligence system were taken in 1924 by what was called the Romer Committee,(1) a joint Air Ministry and War Office committee set up to examine and report on the organisation of the Air Defence of Great Britain. The organisation that was recommended mainly consisted of observation posts covering all the country south of a line from the Bristol Channel to the Humber. These were to be organised into eighteen Observer Groups, each with an Observer Centre. Those on the coast would have sound locators in order to detect the approach of the enemy to seaward, and all posts would be provided with direct lines to the Observer Centre of the area in which they were located. Each Centre would be linked by direct line to the headquarters of the fighter forces, and in the case of Centres adjacent to fighter sectors, by direct line to the sector headquarters.(2)

There were also other sources of intelligence which could be utilised, notably coastguard stations, destroyer and trawler patrols, and W/T stations. No comprehensive plan was recommended for welding all these possible sources into a unified raid intelligence organisation; the committee contented itself by urging that information of enemy aircraft movements should be put at the disposal of the fighter aircraft as quickly as possible. But it became clear that a single control was necessary if raid intelligence was to be quickly available to the defenders, and in 1928-9 some improvement was made.

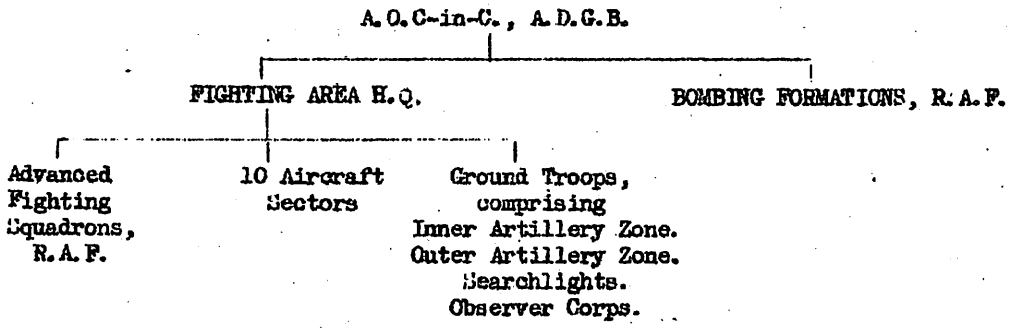
(1) After Major-General C.F. Romer, the chairman of the committee.

(2) The report of the Romer Committee appears to mark the origin of the present Royal Observer Corps. There had been observer posts during the Great War, manned by soldiers, and, later, by police, but the organisation had been disbanded. From 1924, when a beginning was made by enrolling volunteer special constables for this type of work, until the present day, the R.O.C. has an unbroken history.

But before this change is examined it is necessary to survey the changes that took place in the higher organisation of the air defence system between 1923 and 1929.

Relationship between the C-in-C. and subsidiary air defence formations

It had been established since 1918 that the Air Ministry was the authority responsible for the defence of the country against attack from the air, and it followed that whatever officer was appointed to command the air defence system was ultimately responsible not only for the operations of the Home Defence fighter and bomber squadron but also for those of the searchlights, anti-aircraft guns, and observer units. The first officer to hold such an appointment was Air Marshal Sir John Salmond, who became Air Officer Commanding-in-Chief, Air Defence of Great Britain in January, 1925. His relationship to the different parts of the A.D.G.B. system is best illustrated diagrammatically.



The A.O.C-in-C. was in supreme command and was responsible for all decisions regarding air defence both on the ground and in the air. The A.O.C. Fighting Area was responsible for the immediate control of defensive operations, and, to facilitate his task, the G.O.C. Ground Troops was stationed at Fighting Area Headquarters. The G.O.C. Ground Troops was responsible for the work of the Inner and Outer Artillery Zones, the Observer Corps, and the technical working of all searchlights, other than those in defended coastal areas.

These arrangements were the basis for all future organisation of the country's air defences. They confirmed the principle of Air Ministry responsibility for air defence, but, in fact, the A.D.G.B. Commander had not yet obtained full control of all parts of the air

Progress towards consolidating the air defences.

defence system. In the first place, the Observer Corps was as much a War Office as an Air Ministry responsibility. For training and operations it came under the control of the A.O.C-in-C., A.D.G.B., but for services, equipment, and administration it came under the War Office After a few years experience of this arrangement the Corps was wholly transferred to the Air Ministry, it being generally agreed that this important source of intelligence should be under the direct control of the service responsible for air defence. The transfer became effective on 1 January 1929. Secondly, the defended ports and coastal areas were outside the A.D.G.B. system, and their air defences operated under the orders of the fortress commander. The absorption of the Thames and Medway defences into the A.D.G.B. system in 1929 was the first step towards putting all air defences under the A.O.C-in-C., A.D.G.B., but until that process was completed the principle of Air Ministry responsibility for the air defence of the country was not being fully realised. Thirdly, the sources of raid intelligence were controlled by a number of authorities, and there was no machinery for ensuring that the A.O.C-in-C., A.D.G.B., could maintain control over operations. Until 1929 it had been intended that all raid intelligence should go to Fighting Area Headquarters, whence it would be relayed to A.D.G.B. Headquarters. The result of this arrangement in war would have been to reduce the status of A.D.G.B. Headquarters to a mere administrative body, with no means of realising its nominal responsibility for operatio It was doubtful, moreover, at this date whether Fighting Area Headquarte could handle efficiently the mass of information that it would receive. The Home Defence Committee of the Committee of Imperial Defence appreciated the importance of making the best possible use of raid intelligence, and it ordered an enquiry into the matter by representativ of the three service departments.(1) Their findings were reported in the spring of 1929, and were approved by the Committee of Imperial Defence on 2 May 1929. They fell into two categories, those concerned with the

C.I.D. 161-A, 16 October 1928

H.D.C.11-M, 22 April 1929.

(1) The chairman of this body was Air Commodore F.V. Holt.

use to be made of raid intelligence, and those concerned with the unification of the various sources of intelligence.

The former ensured that only information required for conducting operations against enemy aircraft should go to Fighting Area Headquarters, while a précis of this, with all remaining intelligence, should go to A.D.G.B. Headquarters. Here, a complete picture of all enemy air activities over this country would be displayed on a plotting table, which could be utilised by all departments needing a clear picture of the air situation. A.D.G.B. Headquarters would also be responsible for initiating air raid warnings. In detail this meant that all formations in the Aircraft Fighting Zone and the two artillery zones, all observer centres contiguous to the Aircraft Fighting Zone, and all defended coastal areas between Harwich and Milford Haven, sent their information of aircraft movements direct to Fighting Area Headquarters; all other observer centres and defended coastal areas, and the Admiralty (for the relaying of information from H.M. ships), were connected to A.D.G.B. Headquarters. The effect of these measures was to centralise the control of all home-based bomber and fighter operations in the A.D.G.B. Commander, while leaving the tactical direction of defensive operations in the hands of his subordinate at Fighting Area Headquarters.

The officers who examined the problem of raid intelligence stressed the importance of organising all potential sources of information into a co-ordinated scheme, for which the Air Ministry should be responsible even though some of the sources were administered by other government departments. By approving their report the Committee of Imperial Defence accepted this important principle. Some progress was made in applying it. Coastguard stations, observer posts, defended coastal areas, and naval patrols, were all brought into a comprehensive communication scheme, to be executed by the General Post Office, and methods of reporting the numbers, height, and course of aircraft were standardised. But even when these important points had been settled the system still required the co-operation of no less than four branches of government, namely the three service departments and the Board of Trade, which controlled all coastguard

stations, with a fifth, the General Post Office, responsible for the construction of the necessary telephone communications. Future development in this important branch of A.D.G.B. was to result in the Air Ministry exercising real control over all the raid intelligence organisation.

The Growth of the A.D.G.B. Command.

We have already outlined the higher organisation of A.D.G.B., and noted that the first officer to command it was Air Marshal Sir John Salmond. His headquarters opened at Hillingdon House, Uxbridge, in June, 1926. At that time the home-based air forces were divided into four areas - Wessex Bombing, Fighting, Inland, and Coastal Areas. The first two were taken over by A.D.G.B. Headquarters on 1 June 1926; the others became separate areas whose commanders were directly responsible to the Air Ministry. Coastal Area does not concern us, but it will be well to notice that Inland Area controlled not only the army co-operation squadrons and all non-operational units, such as flying and technical training schools, experimental establishments, maintenance and storage units, but also the Auxiliary Air Force and Special Reserve squadrons, which, in the event of war, would be needed for the air defence of the country. In January, 1927, however, these squadrons were transferred to A.D.G.B. and were known as No.1 Air Defence Group. The Wessex Bombing Area, Fighting Area, and No.1 Air Defence Group, remained the three subsidiary formations of A.D.G.B. until 1933. By that time the inaptly named Wessex Bombing Area (it had squadrons as far east as Bircham Newton in Norfolk, and Manston, near the North Foreland) had expanded sufficiently to be split into a Central Area and a Western Area. In January, 1934, these were strengthened by the addition of the five Special Reserve squadrons which had previously been part of No.1 Air Defence Group. No changes took place in Fighting Area until it became No.11 Fighter Group on 1 May 1936, shortly before Fighter Command took the place of A.D.G.B.

See Map No.

It contained only regular fighter squadrons,[1] and slowly grew in size[2] until, by the end of 1934, it was three squadrons short of its establishment of seventeen. The bomber squadrons, regular and auxiliary, were deficient in the same proportion, requiring seven more squadrons before their numbers were complete.

The numerical weakness of the R.A.F.

It is not our purpose to pass judgment on the policy that had laid down the 'ten year rule', and maintained it during the fourteen years following the Armistice. But it must be recorded that it had retarded the completion of the Air Force programme in general, and the Home Defence air force in particular. Nor had this taken place without the government being fully aware of the extent to which the Air Force was becoming steadily weaker in comparison with the air forces of other countries. In 1929 when Lord Thomson, then Secretary of State for Air, raised the question of postponing the completion of the Home Defence force until 1938 he pointed out to the Cabinet that the step could only be justified by the exceptionally serious financial situation. On most other grounds it was unjustifiable. The Air Force was already numerically inferior to the other principal air powers, and to retard the programme of expansion would prolong and increase this disparity of strength. At that time, the end of 1929, the position was as follows:-

C.P.355 (29).

Country	Present first-line strength.	First-line strength on completion of approved programme of expansion.
France	1,307	1,960
Italy	1,090	1,600
U.S.A.	914	1,400
Great Britain	772	974

(1) All fighter squadrons were formed from the regular air forces until July, 1934, when a beginning was made in the policy of coverting Auxiliary Air Force bomber squadrons to fighter work. Auxiliary Air Force fighter squadrons were first put into the line of battle in December, 1936.

(2) Orders of battle for the years, 1926, 1934, and 1936, are given in Appendix A.

Yet Lord Thomson felt justified in recommending the postponement of the Home Defence programme "solely upon the grounds that, although on the facts and figures as stated, our position is untenable, we can to some extent discount them and face the situation without undue anxiety, always provided that -

(1) The main outline of our expansion scheme is preserved intact; and

(2) Our Air Force continues to maintain its present exceptionally high standard of training and organisation, and is further enabled to keep its technical equipment in all respects adequate and up-to-date with new types and engine".

There is no need here to enter into the details of the deterioration in world politics which became clearly evident in 1931 with the attack on Manchuria by Japan and the start of the economic depression. It is sufficient to notice that it swiftly swept away that sense of security which, as much as the need for economy, had determined the policy of successive governments towards the defence departments since 1923. Nevertheless, even though the 'ten year rule' was withdrawn in 1932, the Home Defence programme made no progress for two years on account of the Disarmament Conference. The government strictly adhered to the armaments truce (November 1931 to February 1933) and as an earnest of its goodwill voluntarily extended the standstill well into 1933, with the inevitable result that the Home Defence programme was
P.245 (33) retarded for the fourth time. Originally intended to be completed in 1928 it would not now be realised until 1940. Clearly, however, the air defences of the country could not remain much longer in that position. The basic principle governing air defence was still nominally accepted by the government, namely, "that British air power must include a Home Defence air force of sufficient strength adequately to protect us against air attack by the strongest air force within striking distance of this country". If the

Disarmament Conference failed it would be immediately necessary not only to execute the original programme of Home Defence, but to increase it on the basis of parity with the strongest single air force. (1)

The rise of Germany and the first expansion of the Metropolitan Air Force.

I.D.1134-B
2 March, 1934

By the end of 1933 it was clear that the conference at Geneva was reaching a deadlock, and a new military power was emerging in Europe. Already there was evidence that Germany was about to take advantage of plans for industrial mobilisation laid long before Hitler's coup d'etat of January, 1933. Early in 1934 it was reckoned, by a sub-committee on industrial intelligence in foreign countries, that Germany was producing over 60 air frames and 90 engines a month, "while expansion under mobilisation conditions, might exceed 1,000 air frames and 750 aero engines per month, equivalent, on the basis of wastage in 1918, to the maintenace in war of some 800 first-line aircraft. The rate of expansion of the industry is still increasing, due solely to governmental orders and subsidies". In addition to concrete information such as this there were other features of the new Germany which, while they could not be reduced to statistics, made it quite obvious that her temper was all for re-armament and the revision of the disarmament clauses of the Versailles settlement. We could perhaps have remained content with the fifty-two squadrons for Home Defence so long as an unaggressive France remained the only air power capable of attacking the United Kingdom, but the attitude of Germany force the government to drop the policy of a cautious expansion of the Home Defence force, and plan a Metropolitan Air Force capable of dealing with the new and rapidly developing air power of Germany.

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(1) Lord Londonderry went so far as to interpret the British proposals for air disarament as amounting to a claim for a one-power standard in the air, which was certainly not the government intention, except as a basis for general disarmament (see White Paper No.11, 1932). But there was no doubt that it would be necessary to build up to the strength of the strongest air power if the conference failed and if politics continued unsettled. Indeed there were members of the Air Staff who believed that we should build beyond the strength of the strongest continental air force in view of the greater vulnerability of Britain to air attacks.

It must not surprise us that the first measures were unambitious. After fifteen years in which the Air Force had expanded almost imperceptibly it was impossible to plan and execute large programmes without notice. Early in 1934, when a special committee(1) was considering what initial programmes of re-armament were necessary, ten squadrons had yet to be formed to complete the 1923 Home Defence programme, and the committee recommended that these, and thirty squadrons for other branches of the Air Force, should be formed during the next five years. The members wished to increase this programme by twenty-five squadrons, most of which would have been absorbed in the air defences at home, but decided against this on the grounds of the "limited power of expansion of the Royal Air Force working under normal peace conditions. In fact, that power of expansion is not even adequate to bring within the five-year programme the whole of the forty squadrons mentioned above. The limiting factor is the capacity of the training establishments, other than the Flying Training Schools, and accommodation for squadrons when formed. To resort to emergency conditions would require a large increase in the Air Ministry Staff, especially in Works and Buildings personnel, as well as the additional expense involved in the provision of temporary accommodation which would have to be replaced later by permanent works. In addition, the conditions of recruitment and training of the more highly skilled other ranks would have to be altered, since it takes seven and a half years, under the existing policy, to make a fully trained aircraftman. Such an alteration in policy would only be accepted by the Air Ministry with great reluctance".

C.I.D.1147-B
28 February,
1934

(1) This committee, the Defence Requirements Committee, consisted of the Chief of Staff, Foreign Office and Treasury representatives, under the chairmanship of Sir Maurice Hankey. It had been appointed by the Cabinet on 15 November 1933, to prepare a programme for meeting our worst deficiencies. The Chief of the Air Staff at this time was Air Chief Marshal Sir E.L. Ellington.

In effect, this report was not accepted by the Cabinet, which considered that increased provision must be made for Home Defence, both by the number of squadrons allotted to that task and by the extension of the A.D.G.B. system to cover the Midlands and the North of England. At the same time, the Cabinet accepted the view quoted above that expansion in terms of aircraft was limited by numerous factors.(1). Accordingly, only five squadrons were added to the total number of squadrons recommended by Sir Maurice Hankey's committee, but thirty-three squadrons instead of ten,(2) were allotted to Home Defence, and were to be formed by 1940. But it must not escape attention that these seventy-five squadrons were not necessarily permanently based at home. The plan for the defence of India was still in being, and a further commitment had lately arisen through the decision to prepare a field force capable of continental operations, to which the air contingent, provided by the Home Defence air force, would be attached.

C.P.205(34) 31 July 1934

286th Meeting. Committee of Imperial Defence, 22 November 1934.

(1) A further factor that had to be kept in mind was the general financial situation. The Treasury continually pleaded the need for the strictest examination of all defence proposals from the financial point of view. Mr. Neville Chamberlain, indeed, could not promise to find all the monies necessary for the execution of this new air programme.

(2) The Fleet Air Arm was the chief sufferer from this change of plan. The Defence Requirements Committee had recommended a total increase in Fleet Air Arm strength, spread over the years 1935-1939, of twenty squadrons, four of which were to complete existing deficiencies, and the rest to strengthen our position against Japan. The Cabinet only allowed the first part of this proposal: the Home Defence air force thus received what was originally proposed for the Fleet Air Arm. Possibly in an attempt to sweeten the pill, the Cabinet recommended that the Admiralty and the Air Ministry should carry out experiments to see how far Fleet Air Arm and Home Defence squadrons were interchangeable.

The need for the re-orientation of the A.D.G.B. system

Cabinet 31 (34.) Conclusion 1.

However, with the Cabinet decision of 31 July 1934, to build a Home Defence air force of seventy-five squadrons, and with their instruction that "a start ought to be made with the extension of the Air Defence scheme to cover the wider areas of the country within range of attack from Germany", the lines along which the country's air defences were to develop were laid down. The principle of a sufficient air defence had been accepted, a considerable expansion of the Home Defence forces had been decided upon, and measures were to be put in hand to construct an air defence system designed to protect us against a likely enemy. Henceforward, our air defences were no longer governed by the somewhat academic assumption of an attack from France, but were constructed on the only too likely basis of an attack by Germany. Future political developments were to lead to successive increases in the size of the Home Defence air forces, but these were all absorbed within the framework of defence policy and organisation that resulted from the decisions of 1934.

In this sense, therefore, the history of Fighter Command begins with the execution of these decisions, but there was no clean break with its forerunner, the A.D.G.B. Command. There was a continuity of experience between the old air defence system, oriented towards France, and the new one, oriented towards Germany. Many of the staff of Fighter Command had learned their duties in the old A.D.G.B. system. There they had learned the operational control of fighter aircraft, had become accustomed to co-operative work with other parts of the air defence system, and to the intricate organisation that is necessary for the air defence of a complex industrial society. There, too, had been started many of the techniques that were to serve Fighter Command. Fighter Command, in short, was the fortunate legatee of ten years experience in the problems of air defence. The pity was that its inheritance was so much the smaller as a result of ten years economy.

THE RE-ORIENTATION OF THE AIR DEFENCE OF GREAT BRITAIN (i).

The formation of the A.D.G.B. sub-committee.

By the middle of 1934 it was clear that the new regime in Germany had laid the foundations of a considerable air force, and that it was necessary to increase and re-distribute the air defences of the United Kingdom to guard against the threat constituted by such a force. By the end of July in the same year the Air Staff had prepared a memorandum on the importance of re-orienting the air defences of the country in view of the new circumstances, and proposed a plan for effecting this. The memorandum (1) was circulated within the Home Defence Committee of the Committee of Imperial Defence, and, as a result, a body of Air Ministry and War Office representatives was formed to consider the question. It began, on 22nd December, 1934, a series of meetings, entirely devoted to the business of the Air Defence of Great Britain, which was to continue until the outbreak of war. It will be referred to here as the A.D.G.B. sub-committee. (2)

H.D.C. 164, 31st July, 1934.

Its chief terms of reference were as follows, "1. To prepare a plan for the re-orientation of the defensive system of the Air Defence of Great Britain. In framing this plan the forces to be allotted to the defensive system should be kept at a minimum compatible with an adequate degree of protection. 2. In drawing up the plan it should be assumed:-

a. In the first instance that the war is against Germany with France as an ally. The possibility of German aircraft infringing the neutrality of the Low Countries by flying over them must be allowed for, and also the possibility of her being able to occupy aerodromes in Belgium and Holland in the first stages of a campaign;

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(1) Printed as Appendix B.

(2) Its full title was "The Sub-committee for the Reorientation of the Air Defence System of Great Britain", and its first members were:
Air Marshal Sir Robert Brooke-Popham, A.O.C.-in-C., A.D.G.B., (Chairman).
Major-General H.F. Salt. Air Vice-Marshal P.B. Joubert de la Ferté.
Colonel T.J. Hutton Group Captain R.H. Peck
Wing Commander J.O. Andrews) Secretariat
Commander A.W. Clarke, R.N.)
Major C. de L. Gaussen)

b. that the Greater London and Thames area is the primary objective of enemy attack;

c. that it will be important to provide protection also for industrial and other important centres, including, inter alia, explosive areas, within practical range of enemy bombing aircraft, especially those in the Midlands and the north of England;

d. that it will be necessary to provide visible protective measures for the maintenance of public morale."(1)

Basic principles of air defence.

The sub-committee began its work by accepting much the same principles as those laid down in 1923, when the A.D.G.B. system had been originally planned. These presumed that no air forces, however powerful, can ensure complete immunity from air attacks; that the air forces allocated to direct defence should be as small as possible; that these should be so disposed that they have sufficient time to reach the point where interception should be made; that anti-aircraft defences are essential since they can either form the sole defence of important areas, or be used to co-operate with the fighters; finally, that a highly organised raid intelligence system is a pre-requisite of efficient air defence. With these principles in mind, the members of the sub-committee straightway proceeded to settle a most important practical question, should the system aim at providing a continuous defensive zone, or should each of the chief target areas, such as London, the Midlands, etc., have its own fighter and anti-aircraft defences?

See Appendix B.

Alternative defence schemes

The main argument in favour of the latter alternative was advanced by Major-General Salt, who pointed out what seemed to him to be its two prime advantages, firstly, that it provided an all-round defence for each important area, secondly, that it provided a number of bastions which could, if necessary, be linked up into a continuous defensive system when war broke out and financial considerations need no longer

(1) It is apparent from these terms of reference that the A.D.G.B. sub-committee was formed only for the specific task of re-orienting the air defences. It was not intended to be, what, in effect, it became, a permanent committee on air defence matters, and this is a measure of the value of the work that it did, and of the constantly increasing importance of air defence as the danger from Germany developed.

be taken into account. The chief objection to this, in the opinion of the Air Staff spokesman, Group Captain R.H. Peck, was that the linking up would be too late in war; the full weight of enemy attack must be expected at once and, consequently, the best form of defence should be available at the outbreak of war. No real controversy was involved, for the sub-committee was unanimous that a continuous defensive system disposed across the anticipated direction of attack was the ideal at which to aim. It was agreed, therefore, that the first stage in the development of the air defences should be the protection of London. Next, defences should be provided for the more important industrial centres, which, at the third stage, would be linked with those of London, and thus provide a continuous zone of defence. Fourthly, the question of providing London with a ring defence including fighters would have to be considered. This was not quite all. A number of ports were outside the province of the A.D.G.B. scheme, their defences being the concern of the Admiralty and the War Office. These, the sub-committee understood, would be strengthened parallel with the development of the general air defence scheme.

A.D.G.B.25, 31 January, 1935.

The remainder of 1934 was spent in working out the details of the proposed system, and early in the new year an interim report was forwarded to the Home Defence Committee. The latter studied it carefully, concurred in all that the sub-committee recommended, with an exception to be noted later, and passed it on to the Committee of Imperial Defence in April.

The weapons needed

After stating the general principles that had governed the work of the A.D.G.B. sub-committee the report listed the means of defence required for the air defence of the country. These were, fighter aircraft, of which twenty-five squadrons would be available for use at home[1], anti-aircraft guns and searchlights, with ancillary equipment

(1) It was intended to divide the seventy-five squadrons of the Home Defence force into forty-seven bomber and twenty-eight fighter squadrons, but, of the latter, three squadrons were earmarked for the air contingent that would go overseas with the Field Force. Again we feel it necessary to remind the reader that the Home Defence squadrons were looked on as a general reserve to be employed wherever danger threatened. The twenty-five fighter squadrons had their allotted functions in the air defence of the country but there was no guarantee that they would be in their places when required. For example, five fighter squadrons, which would normally have been stationed in England were withdrawn to Egypt from September 1935, to September 1936, owing to the tension between ourselves and Italy.

such as predictors, height finders, and sound locators, all of which would be manned by units of the Territorial Army, light automatics for defence against low-flying aircraft, balloon aprons, with which experiments were now taking place, passive defence measures, including air raid precautions, camouflage devices, smoke screens, and the control of radio broadcasting, an intelligence system comprising the Observer Corps, coastguard stations, ships, and other means of detecting aircraft movements, some of which were only in the first stages of development, and, finally, a comprehensive system of telephone communications.

The extent of the threatened area.

These had to be so disposed and organised as to form a defence against attack from Germany. The threatened area included the shipbuilding centre of the north-east coast, the West Riding of Yorkshire, the whole of Lancashire and the industrial Midlands, as well as Greater London. All these districts were within 375 miles of the North Sea coast of Germany, and so within range of the latest types of bombing aircraft. Obviously, as the design of aircraft improved, the whole of industrial Great Britain would be liable to attack. It was highly likely, so the sub-committee thought, that the London area would be the enemy's principal objective. In this connection they pointed out that the maximum offensive against the capital would be developed more easily if the Germans were able to operate from the Low Countries, and, conversely, the weight of attack would be alleviated if Belgian and Dutch territory was denied to the German air forces. But even if we succeeded in this, attacks could still be made on London, the Midlands, and the North of England, direct from German territory.

The first point that emerged, therefore, was that virtually the whole of industrial England was threatened. The second was that it was threatened at all times, for since, 1918, there had been great advances in aerial navigation and it was likely thatattacks by night would be as intense as those by day. It followed that the defences must be capable of operations in darkness as well as in daytime, and, for this, it was necessary to provide searchlights as well as fighters and anti-aircraft guns. Thirdly, air attack would probably synchronise with, or indeed form the commencement of hostilities, and so the air defences -

of the country must be fully ready when war was about to break out.

Recommendations, April 1935

Taking all these factors into account the A.D.G.B. sub-committee recommended that a continuous defence system should be established from Portsmouth, round the eastward of London, to the Tees, and, in addition, local gun and searchlight defences should be provided for the West Riding towns, the Manchester district, Sheffield, and Birmingham. The continuous defence system would be 26 miles deep, a distance which was based on the depth of illumination that would be required if the fighters were to intercept at night, and would consist of,

See Map No.

a. An Outer Artillery Zone, consisting of the forward six miles of the continuous defence system and containing 34 A.A. batteries and 19 searchlight companies.

b. An Aircraft fighting Zone, 20 miles in depth, containing 58 searchlight companies.

c. An Inner Artillery Zone, 20 miles in diameter, covering Greater London and containing 12 anti-aircraft batteries and 6 searchlight companies.

11 anti-aircraft batteries and 7 searchlight companies were allotted to the important centres liable to attack, but the sub-committee gave warning that much more would probably be required for this type of commitment. Outside this system, and within range of the enemy's bombers, were six important coastal areas, Portsmouth, Dover, Harwich, the Humber, Tees, and Tyne. These areas had never come within the A.D.G.B. system, and so were no concern, strictly speaking, of the A.D.G.B. sub-committee. Part of their report, however, noted the provision which was being made by the War Office for their defence, namely, 11 A.A. batteries and 7½ companies of searchlights.(1)

The Outer Artillery Zone served chiefly to give depth to the defences, By day its guns would assist the fighters by breaking-up

(1) An anti-aircraft battery at this time contained eight 3" guns and twelve Lewis guns, a searchlight company contained 24 searchlights and 24 Lewis guns. The complete scheme, therefore, including the defences of defended ports, required 2,334 searchlights, 544 3" guns, and over three thousand Lewis guns, exclusive of reserves.

enemy formations and indicating their whereabouts to the fighters by shell bursts. At night its searchlights would illuminate the raiders in order to assist in their interception by fighters patrolling a few miles back in the Aircraft Fighting Zone. The latter would be divided into fourteen sectors, the majority of which would contain two squadrons.

In view of the wide area that would be covered by the new system the sub-committee proposed that the Fighting Area of the A.D.G.B. should be divided into Northern and Southern Fighting Areas, the boundary line between the two being in the neighbourhood of Huntingdon. Otherwise the organisation of the higher formations of the A.D.G.B. Command would remain much the same; that is to say, the Air Officer Commanding-in-Chief, Air Defence of Great Britain, was in supreme command and responsible for all decisions regarding the conduct of air defence, both on the ground and in the air. He was also responsible for initiating air raid warnings. The Air Officers Commanding the two Fighting Areas were responsible for the immediate control of defensive operations, and in this they were assisted by the commanders of the anti-aircraft formations within their areas, who were stationed at Fighting Area headquarters. The G.O.C.'s of the army formations were responsible for the work of the artillery zones, and for the efficiency of the searchlights in the Aircraft Fighting Zone.

These were the main recommendations of the A.D.G.B. sub-committee. But a number of associated topics were also considered, and we should note them, if not in detail, if only to form some impression of the extent of the labours of the sub-committee, and of the ramifications of the problems connected with the air defence of the country.

The re-orientation and expansion of the air defences necessarily meant changes in the organisation of raid intelligence, particularly the Observer Corps. A special committee, under Air Commodore O.T. Boyd, had considered this question and submitted a report at the same time as that of the A.D.G.B. sub-committee. The report was approved by the Committee of Imperial Defence on 16 April 1935. It provided for sixteen observer groups covering an area bounded by a line from Middlesbrough - Mersey - Crewe - Cheltenham - Poole, and laid down

See Map No.

the organisation of the Corps. This immediately raised difficulties in respect of communications. The Observer Corps groups straddled the continuous defence system, and it was important that there should be no break in the continuity of tracking aircraft movements. This meant that telephone communications would have to be established between observer posts and searchlight detachments at the edge of the illuminated area, and the matter was referred to the Air Defence Land Line Telephone Committee, a body which had been in existence since the formation of the A.D.G.B. Command in 1925.

The sub-committee was also impressed by the potential danger from low-flying attack. Aerodromes, in particular, were threatened. Indeed, they were more likely to be attacked by that means than by high-altitude attack since they presented so small a target. None of the services had a land-based weapon that was effective against this form of attack, and the sub-committee recommended that the subject should be studied by a body representative of the three services.

One other point was raised which eventually caused great concern, though more to civil than to service departments, the location of industry. A number of important factories were so near the coast that the time of warning of attack would be too short to enable them to be defended by fighters. The locus classicus was the Imperial Chemical Industries works at Billingham-on-Tees, the loss of which would have been disastrous. Two courses were possible; direct gun defences could be provided, and the sub-committee warned that these would be required on a large scale to be effective; and, secondly, every inducement should be offered to prevent the erection of important factories within the danger zone.

This, then, in outline, was the report of the A.D.G.B. sub-committee. It marks a critical stage in the development of the air defences of the country, and of Fighter Command in particular, and all subsequent changes in our air defences were only commentaries upon it. No major alterations were made in the principles of air defence which it laid down, and here it must be recorded that Sir Robert Brooke-Popham and his colleagues owed much to the work of the

Steel-Bartholomew and Romer Committee of 1923 and 1924.

We have not mentioned so far the date by which the air defences envisaged in the report were to be completed. In considering this matter the sub-committee had kept in mind the financial provisions laid down by Sir Maurice Hankey's Defence Requirements Committee in July, 1934. These gave a sum of £2¼ million to anti-aircraft defence, to be spread over the period 1934 - 31 March 1940. At the time, the expansion of the air defences to cover the Midlands and the North had only reached the stage of preliminary examination; it will be recalled that the Air Staff memorandum calling attention to the need for re-orientation was dated 31 July 1934. Consequently, no monies had been set aside for any air defences other than those required for London. The A.D.G.B. sub-committee recommended, therefore, that their scheme should be executed in three stages, the first of which would cost very little more than had already been allotted to anti-aircraft defence. It would give the following defences:-

a. 8 batteries and 6 searchlight companies for the Inner Artillery Zone.

b. 9 batteries for the Outer Artillery Zone, 5 of which would be in the Thames and Medway area.

c. 36 searchlight companies for the Aircraft Fighting Zone, allowing its virtual completion from Portsmouth to Huntingdon.

d. The raising and training of the additional anti-aircraft units required by the full scheme.

e. The expansion of the Observer Corps to cover the whole area required for the full scheme.

Stage 2 would mean the completion of the Aircraft Fighting Zone at a reduced depth of 15 miles, and the addition of 21 batteries to the Outer Artillery Zone. Stage 3 would complete the full scheme, including the local defences of Leeds, Sheffield, Manchester, and Birmingham.

Implications of the Report

This was a long-term programme and the danger threatening the country was becoming steadily more urgent. Bound as they were by financial provisions that had already been made, the sub-committee could have proposed no other programme. In any case, they emphasised

that "the air defence of Great Britain cannot be considered as providing a reasonable measure of security until the third stage of our recommendations has been completed." All this meant that the state of the country's air defences was no longer a military question. It was now a political issue of the first order. Were the government prepared to accept a programme of air defence that would leave the country inadequately protected until some problematical date after 1940? Were they prepared to accept its hampering effect on their diplomacy?

Further deterioration in the political situation.

During the four months in which the A.D.G.B. report was in the hands of the Home Defence Committee the general political situation became more threatening. To appreciate this the reader need only recall the sudden diplomatic stroke of Hitler when, on 26 March 1935, he informed Sir John Simon, the Foreign Secretary, that Germany had already achieved air parity with Britain and intended to have equality with France. Consequently, the Home Defence Committee, while approving the report of the A.D.G.B. sub-committee, recommended that its execution be accelerated. They recognised that the requirements of other forms of defence were as clamant as those of A.D.G.B., but they proposed that Stage 1 and Stage 2 of the A.D.G.B. scheme should be completed by 31 March 1940, and Stage 3 two years later; alternatively, they put forward another programme for completion in 1946.

Suggested acceleration of the air defence scheme

Committee of Imperial Defence, 269th Meeting, 16 April 1935.

When the matter was brought before the Committee of Imperial Defence, Lord Londonderry, the Secretary of State for Air, pointed out that the provision of aircraft for the scheme, according to the latest approved expansion programme, would be completed by 1939 and the reserves for the Home Defence force by 1942. In his view, the anti-aircraft contribution to the A.D.G.B. system ought to be completed at the same time. He was supported at the meeting by Sir Edward Ellington who was particularly anxious that the proposed air defence system should be approved since on that depended the aerodrome building programme for the next four years. In any case, eight months had already elapsed since the question of re-orientation was referred to the A.D.G.B. sub-committee, and no executive action had been taken. The

whole matter was put before the Chiefs of Staff who thoroughly approved the system of air defence envisaged by Sir Robert Brooke-Popham and his colleagues. They did not attempt to fix a date for its completion, however, since in their view, it should be ready "by the time at which Germany could be ready to wage a successful war", and when that would be, nobody would say.

C.O.S.376, 14 May, 1935.

Decision of the Cabinet

The Cabinet came to a decision on 24 July. It approved in principle the report of the A.D.G.B. sub-committee, but only gave authority for the completion of part of Stage 1 by 1940, that part which provided partial protection to London and the Thames estuary, and saw the completion of the Aircraft Fighting Zone between Portsmouth and Huntingdon. The ground defences for this purpose would absorb 17 anti-aircraft batteries and 42 searchlight companies. This was a niggardly provision. Even though each of the defence departments had great deficiencies, and great care had to be taken not to overstrain the country's finances, it ought to have been possible to provide so small a number of anti-aircraft units in less than five years. The one happy feature of the whole position was that the War Office and the Air Ministry now knew what form the air defence system would eventually take. But the Cabinet's decision is all the more remarkable in that they had initiated a further programme of air force expansion over and above the seventy-five squadron Home Defence scheme of July, 1934. It is to the effect of this new expansion upon the air defences, and upon the organisation of the air froce at home, that we must now turn.

2. THE EXPANSION OF THE AIR FORCE AND THE FORMATION OF FIGHTER COMMAND

Until the spring of 1935 the Home Defence, or, as we shall refer to it henceforth, the Metropolitan Air Force, was expanding in accordance with the programme, agreed upon in July 1934, under which it would contain twenty-eight fighter, and forty-seven bomber squadrons by April 1939. By July 1935, only fourteen regular, and three auxiliary fighter squadrons, and twenty-six bomber squadrons, had been raised, but it was anticipated that eight fighter and twelve bomber squadrons would be formed in the next two years, leaving only three fighter and nine bomber squadrons to be formed in the succeeding two years. There is little doubt that this scheme would have been carried out without difficulty, but events in the spring of 1935 saw it replaced by a much larger expansion scheme which strained to the utmost the capacity of the Air Force to expand and yet maintain its efficiency.(1)

A.H.B.V/5/1, Expansion Scheme 'A'.

Air Staff view of the German claim to air parity.

During his conversations with Hitler in March, Sir John Simon was informed that Germany had already achieved air parity with Great Britain, and intended to achieve "air parity with the Force in Metropolitan France, plus that in North Africa." The first of these statements was taken to mean that the Germans already had 800 - 850 first-line aircraft, but the Air Staff were dubious of the value of these units for operations, and were not alarmed at the immediate situation. On the other hand, the claim for parity with France threw the future into uncertainty. When it was made Sir John Simon was handed a diagram which shewed a total French strength of 2,091 first-line aircraft. The Air Staff did not infer from this, however, that the Germans were engaged in building an air force of that strength. They pointed out that the same diagram had also shewn the air strengths of other European powers, most of which had been exaggerations, and concluded that Hitler had sought to give a false impression of German strength. In their opinion the first-line

C.O.S.373, 15 April 1935

(1) For some observations on the peculiar difficulties attendant on expansion, see Appendix C.

strength at which the Germans were aiming was one hundred and twenty-six squadrons, including 1,512 aircraft, to be completed by April 1937.(1) But, they went on, this force would not be adequately prepared for war for a further two years.

But even on this lower estimate of German strength the future was alarming. By April 1937, the existing expansion programme would see a total of 876 first-line aircraft in the Metropolitan Air Force, including Auxiliary Air Force and Special Reserve squadrons, only a little more than half of the German strength at the same date. Neither the Air Ministry, as the responsible authority for the air defence of the country, nor the government of the day, could accept this position.(2) Lord Londonderry, therefore, instructed Sir Edward Ellington to examine our air position in the light of the new circumstances, bearing in mind the government's policy of achieving parity in the air with the strongest air force within striking distance of this country. This came as no surprise to the Air Staff who had begun to draw up plans for an eventual expansion to 192 squadrons as early as the summer of 1934. Within three weeks' time they produced a memorandum proposing a scheme of expansion which would give us air parity with Germany on the basis of an anticipated German strength of fifteen hundred first-line aircraft by the spring of 1939.

ibid. p. 1

A.H.B. IIa/1/9a, Encl. 53A

C.O.S.373, p.2.

A new expansion scheme: the meaning of parity.

The Air Staff prefaced the details of their proposed expansion scheme by some observations on the meaning of 'parity'. They pointed out that the number of fighter squadrons required by any air force depends on the size of the area to be defended and the intensity of attack to be expected. It followed that the number required by one country bears no relation to that required by a possible enemy. Similarly, it would be foolish to build an equivalent

(1) See "Note on the Expansion of the German Air Force and the size of the German Aircraft Industry", pp.

(2) Cf. Mr. Baldwin in the House of Commons, 28 November, 1934: "His Majesty's Government are determined in no conditions to accept any position of inferiority with regard to what air force may be raised in Germany in the future."

number of army co-operation or coastal reconnaissance aircraft to that built by the enemy unless our own strategy demanded them. The number of the first type depended on the size of a country's army, and, of the second, upon the length of coastline to be patrolled, and the amount of convoy protection to be anticipated. In fact, the only branch of the Air Force for which the term 'parity' had any significance was the bomber squadrons, the offensive element of an air force. According to information available at the time, the Germans intended to form a bomber force of sixty-seven squadrons by April 1937. The Air Staff's expansion scheme, therefore, included the same number of bomber squadrons for the Metropolitan Air Force.

Proposed fighter strength

Thus it was never intended to offset the German bomber force by an equivalent number of fighters. The factor governing the size of the A.D.G.B. fighter force was chiefly the extent of the Aircraft Fighting Zone. Prior to the re-orientation the zone had been manned by fourteen squadrons, and three additional squadrons had acted as forward defences, being stationed at airfields near the coast. The expansion scheme of July 1934, had increased the number of fighter squadrons to twenty-eight, all of which would normally be stationed at home, but three of which would go overseas with the Field Force. Twenty-five fighter squadrons were thus available for A.D.G.B. Nineteen of these would man sectors in the extended Aircraft Fighting Zone and six "interceptor" squadrons would be stationed at aerodromes near the coast. The suggested expansion scheme of April 1935 increased the Metropolitan fighter strength to thirty-five squadrons, but ten of these were earmarked for the continental operations that might be required of us under the Locarno agreement, and so the number of A.D.G.B. squadrons remained the same. Five of the additional ten squadrons would go with the Field Force; the others would operate from Belgian territory as advanced air defences of the United Kingdom.

S.33237, Encl. 33A

A.H.B. IIa/1/9b, Encl.59

Acceleration of the Expansion Scheme

The scheme was examined, and in the main approved, by a ministerial committee on Air Parity. This body had been set up on 30 April 1935, to consult with the Air Ministry on what steps should be taken "to implement the policy stated in the House by the Lord President, that in air strength and in air power this country should not be inferior to any country within striking distance." Its first members were Sir Philip Cunliffe-Lister, Mr. Runciman, and Mr. Ormsby-Gore. They reported that the expansion scheme ought to be completed not by April 1939, the date that the Air Staff had originally recommended, but by April 1937, the date by which Germany would have reached a first-line strength of 1,500 aircraft. It was realised that this two year acceleration would multiply the problems of expansion, but the members of the committee considered that the government was so far committed to a policy of air parity with Germany that it must be able to claim that numerical equality with her had been achieved. They realised that there was no concrete evidence that Germany would expand her air strength beyond that of France, but obviously this was a question that would have to be closely watched in order that Britain might not fall behind her. The Cabinet approved the committee's report in June, and the Air Ministry was then committed to the following programme, known as Expansion Scheme 'C'.

C.I.D. 1179-B, Enclosures 1 and 2.

ibid. p. 1.

	Squadrons		Scheme 'C'	Total	First Line Aircraft
	Existing 1.VI.35.	Approved			
Fighter	17 (3 non-regular)	11 (5 non-regular)	7	35 (5 non-regular)	420
Heavy Bomber	5	3	12	20	240
Medium Bomber	2	8	8	18	240
Light Bomber	19 (10 non-regular)	8	5 (3 non-regular)	30(1) (11 non-regular)	360
				Total Bomber and Fighter:	1,260

(1) Excludes two A.A.F. light bomber squadrons to be converted in 1935-6 to fighters.

In addition to the above, two flying boat squadrons were to be formed by April 1937, which, with the five army co-operation, seven general purpose, and four flying boat squadrons already in existance, would give, by April 1937, a total Metropolitan Air Force of one hundred and twenty-three squadrons, containing 1,512 first-line aircraft. By the same date, there would be forty squadrons overseas, exoluding the Fleet Air Arm.

The consequent re-organisation of the Metropolitan Air Force.

We thought it best to acquaint the reader with the outline of this immense programme, even though our prime concern is with the fighter organisation at home, for the simple reason that it necessitated a complete re-organisation of the Metropolitan Air Force into separate Commands, one of which was Fighter Command. It meant that the fighter strength of 1935 would be doubled inside two years, the bomber force more than doubled, and a proportionate expansion in every branch of the Metropolitan Air Force and of the Air Ministry. Accordingly, there was great activity in the Air Ministry from the early summer of 1935 to the middle of 1936 drafting and perfecting plans for the re-organisation of the Air Force. The place of the A.D.G.B. system in this new organisation was only one of a number of problems, but it was the most important insofar as whatever solution was decided upon would dictate the organisation of the whole Metropolitan Air Force.

S.35818 Part 1, Enclosure 6B.

This is made quite clear by what is one of the primary documents on the re-organisation of the Metropolitan Air Force, a minute by the Chief of the Air Staff, Sir Edward Ellington, to his deputy, Air Vice-Marshal C.L. Courtney, dated 5 June 1935. In this the C.A.S. emphasised the magnitude of A.D.G.B. under the Expansion Scheme 'C'. In his view, "A.D.G.B. as one Command with six Bombing Areas, two or three Fighting Areas, even if grouped under a super Fighting Area, two or more Territorial Anti-Aircraft Commands, and a large number of Observer Corps, is going to be so large as to be unwieldy. Consequently I should like your views as to a proposal to separate the defence part of the organisation from the offensive part. This would be more in the direction which I believe things

will develop after the outbreak of war, if not on its outbreak, if a large part or the whole of the bombing squadrons are sent overseas." The Deputy Chief of the Air Staff agreed with his superior's minute, emphasising the importance of freeing the commander of the bomber forces from any direct responsibility for the defence of the United Kingdom, firstly because bomber operations would be sufficiently complex to warrant their direction by an officer responsible only to the Air Ministry, secondly in order that the bombing campaign should not suffer as a result of the pressing claims of the defensive operations.(1) This was the beginning of an exhaustive examination of Air Force organisation, much of which was carried out by the Director of Organisation, Air Commodore W.L. Welsh, and his staff. Many of the details have no place in this narrative but some points must be noted in order that the magnitude of the task is appreciated.

The necessity for strict economy during the period 1925-1934 had compelled the Air Force to be content with a staff headquarters organisation that was just sufficient for the business of a peace-time force; in the words of Air Commodore Welsh, "we have regarded the service rather on the lines of a business where every man was required to perform a full day's work, forgetting the important difference that no business organisation is ever likely to be called upon to meet the demands which war would impose on a Fighting Service." It was desirable that the new organisation should have at least three characteristics; first, that staffs should not be so strained in peace as to have no reserve capacity of effort available on the outbreak of war; second, that the peace organisation should embrace as much as possible of the war organisation, so that transition from one to the other would be simplified; third, that

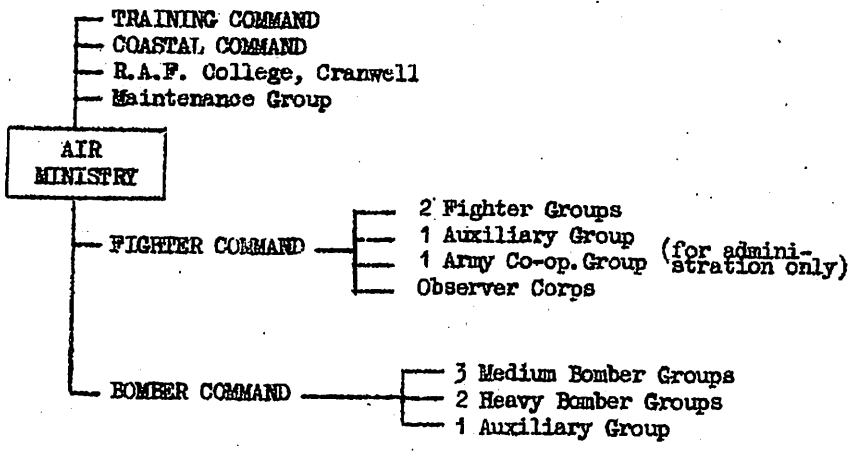
ibid.
Encl. 1A,
19 June 1935.

(1) It was felt that an A.D.G.B. commander in control of both fighter and bomber elements would be under this disadvantage, that, as soon as England was raided and civilian casualties were inflicted, pressure would be put upon him to use his bombers for reprisals at the expense of a properly formulated counter-bombardment policy.

administration should be speeded-up by decentralising as much of it as possible from the Air Ministry to individual commands.

Abolition of the A.D.G.B. Command.

The matter was under consideration throughout the rest of 1935 and it was not until the summer of 1936[1] that sufficient agreement had been reached between the various interested parties to enable the new organisation to be set up and so put to the test of experience. The following diagram illustrates the scheme as it affected the A.D.G.B. system; it will be seen that, for the time being, the offensive and defensive elements of the system have been separated, and A.D.G.B. abolished.



New Relationship between Air Ministry, Commands, and Groups.

The changes to which this re-organisation gave rise were not merely changes of nomenclature whereby A.D.G.B. became Fighter Command, and Fighting Area, No. 11 (Fighter) Group, and so on. Under the new arrangement the bulk of administration emanated from Command Headquarters. The latter dealt directly with the stations at which the various squadrons and units were located, though the group commander was responsible for all personnel questions relating to the units under his command, and for their discipline. It was appreciated that he would be seriously hampered unless he knew what was the state of equipment, its maintenance and supply, within his group, and so he was provided by Command Headquarters with a

(1) Extracts from the Air Council letter of 4 May, 1936, and its appendices, which announced the re-organisation are given as Appendix D.

maintenance liaison officer who kept the group commander in touch with the equipment staff there. The Air Ministry's intention, in thus breaking the administrative chain which had formerly linked it, through each headquarters formation, to the individual unit, was to decentralise administration, reduce the amount that fell to the Air Ministry, and give to Commands and stations in peace time something akin to the independence that they would have in war.

Opposition to the new system

It was not agreed to without opposition, and it is interesting that this should chiefly have come from Air Marshal Sir Hugh Dowding, at the time Air Member for Research and Development, who was himself soon to apply the new methods as A.O.C.-in-C., Fighter Command. He foresaw confusion resulting from the division of administration between Commands and groups; there would be a tremendous centralization of administration at Commands; and the C.-in-C. would lose touch with technical matters through the necessity of spending so much time visiting a large number of widely scattered stations. He was in sympathy with what was a minor motive behind the scheme, the need for an economical staff system to offset the shortage of staff officers under the new expansion, but he was opposed to economy at the expense of the administrative staff of groups on the ground that no group commander could possibly know the efficiency of his units if his contact with them was limited to operational matters. He reminded his colleagues that A.D.G.B. had originally been conceived as an operations Command free from administrative matters, but that it soon became necessary to provide it with a staff of its own. Sir Hugh expressed his views on the whole matter with such vehemence that he put on record, "if and when it should ever be my duty to command a formation under this system, I need hardly say that I should make the most loyal and whole-hearted attempt to make it a success."

ibid. Enclosure 30D also Enclosure 81B

ibid.

Control of Operations

Operations were to be controlled on more orthodox lines than administration. A.O.C.-in-C., Fighter Command, co-ordinated the training and operations of his groups, group commanders selected and directed the fighter squadrons that were to engage the enemy.

Fighter Command took over the position of A.D.G.B.[1] in respect of gun and searchlight formations, and it was to have its own operations room so that it would effectively carry out its responsibility for issuing air raid warnings. With the exception of the defences in certain coastal areas and anchorages, all units concerned in air defence were ultimately responsible to the A.O.C.-in-C., Fighter Command.[2] This remains broadly true up to the present day, though the degree of direct control by Fighter Command varies between different parts of the air defence system.

The opening of Fighter Command

It will be convenient, at this point, to review the forces that were at the disposal of Fighter Command during the first year of its history. The headquarters of the Command opened at Bentley Priory, Stanmore, under Air Marshal Sir Hugh Dowding, on 14 July 1936.

(1) The initials A.D.G.B. remained in current use, but to denote the air defence of Great Britain as a system not an operational command.

(2) The A.O.C.-in-C. was responsible to the Chief of the Air Staff. But about the time the Command came into existence, July 1936, it seemed likely that a Supreme Air Commander, occupying an intermediate position between the operational commands and the Air Staff, would be appointed in time of war. The chief arguments in favour of such an appointment were that, in its absence, too great a burden of operational control would be thrown on the C.A.S.; secondly, that a Supreme Air Commander would act as a 'shock absorber' to protect Fighter Command from political interference; thirdly, that he could effect co-ordination between Fighter and Bomber Commands, as well as between home commands and R.A.F. contingents overseas. Both Sir Edward Ellington and his successor as C.A.S., Sir Cyril Newall, were in favour of the innovation, but Sir John Steel and Sir Hugh Dowding, speaking for Bomber and Fighter Commands, opposed it. They considered that it would hamper their direct access to the C.A.S., it would detract from the authority of the C.A.S.; and, as a means of effecting co-ordination, it was unnecessary since all that was required could be arranged through the normal channels of inter-command liaison.

A corollary to the creation of a Supreme Air Commander was that similar officers should be provided by the other services, who would together act as a co-ordinating body, which would compile directives, based on War Cabinet and Chiefs of Staff instructions, for subordinate commanders. However, these officers could not be appointed without considerable re-organisation of the Admiralty and War Office, and the idea of a Supreme Air Commander was dropped late in 1937. In its place it was agreed that the Deputy Chiefs of Staff should meet in a Central War Room and there effect such co-ordination as might be demanded by the instructions coming to them from the Chiefs of Staff and the War Cabinet. The influence of the Deputy Chiefs of Staff on Fighter Command is most marked in those matters that affected services and interests other than the Air Force, in particular the distribution of the ground defences of A.D.G.B.

But direct contact between Fighter Command and the Air Staff was maintained. Air Staff instructions to the Command were normally passed through, and usually emanated from, the Directorate of Home Operations.

There were three subsidiary organisations under it, the Observer Corps, No. 22 (Army Co-operation) Group (for administration only), and No. 11 (Fighter) Group. This last formation was the nucleus of the Command and had formed on the previous 1 May under Air Vice-Marshal P.B. Joubert de la Ferte at Hillingdon House, Uxbridge. Previously it had been the Fighting Area of A.D.G.B., and had changed its title under the new policy of substituting the functional term 'group' for the geographical 'area'. In fact, its twelve squadrons were located at the same stations as they had occupied when part of Fighting Area; they were:-(1)

STATION	SQUADRON
Biggin Hill	Nos. 23 and 32
Duxford	Nos. 19 and 66 (formed 20.vii.36)
Hornchurch	Nos. 54 and 65
Kenley	No. 17
Northolt	No. 111
North Weald	No. 56
Tangmere	Nos. 1 and 43
Hawkinge	No. 25

Auxiliary Squadrons attached to Fighter Command

These squadrons were not the only fighter units in the country. In July, 1934, certain auxiliary Air Force squadrons had been converted from bombers to fighters, namely Nos. 600 (City of London), 601 (County of London), and 604 (County of Middlesex), but they remained in the Auxiliary Air Force group, No. 6 Group, under Bomber Command, when re-organisation took place in July, 1936. The policy was that until the auxiliary squadrons were fit to take their place in a regular fighter group they would be attached, for operations and training, to the group that they would eventually join. Thus the three auxiliary fighter squadrons in existence at

(1) The group had been depleted by three squadrons, Nos. 3, 29 and 41, in the previous September as a result of the tension between ourselves and Italy. One more fighter squadron, No. 74, had formed in September on board ship on the way out to Egypt, and another, No. 64, had formed there the following March. These five squadrons returned to England in September, 1936,

this time came under the commander of No. 11 Group for this part of their work. The first results of the policy were seen in December 1936, when these three squadrons were transferred to No. 11 Group. Hendon, the station at which they trained, came under Fighter Command. In July of the next year two more auxiliary squadrons were added to the strength of the Command, Nos. 607 (County of Durham) and 608 (North Riding); they had had ten and six months fighter training respectively.

During these months the formation of regular fighter squadrons, the transfer of existing stations, and the opening of new ones, had been proceeding very rapidly. No. 12 Group had formed at Uxbridge on 1 April 1937, under Air Commodore J.H.S. Tyssen, and had moved to its headquarters at Hucknall, Nottinghamshire, on 19 May. By July there were thirty squadrons in the Command, twenty-three in No. 11, and seven in No. 12 Group.(1)

Failure to achieve the planned expansion programme.

But despite this rapid expansion the fighter force had not quite reached the figure laid down in Expansion Scheme 'C'. Indeed, it had become clear early in 1936 that there would be great difficulty in executing that scheme owing to the shortage of aircraft.

A.H.B. V/5/4, Encl. 29.

The estimates of production made in the previous November had proved too sanguine, while the Air Ministry had itself contributed by deciding to provide the complete immediate reserve for each squadron immediately it formed.

ibid. Encl. 27.

Consequently, the completion of the last twenty squadrons of Expansion Scheme 'C' had to be delayed until June 1937. Only three of these squadrons were fighters, the others were bombers.

A compensating factor.

In any case, Fighter Command was less affected by the delay than it would have been six months previously. Until April 1936, the planned fighter force was thirty-five squadrons of 12

ibid. Encl. 26

aircraft each, but owing to certain changes in fighter tactics it was found possible to alter this to thirty squadrons of 14 aircraft each. The problem of expansion was thereby simplified to the extent of five squadrons, and the fighter force remained 420 aircraft

(1) A list of the squadrons and their stations is given in Appendix A.

strong. By July 1937, therefore, Fighter Command had achieved the thirty squadrons planned under Expansion Scheme 'C' and the amendments to it.

The new expansion scheme of February 1937

But before this figure had been reached, Fighter Command, in common with most other arms of the Air Force, had been set a new standard. This latest expansion scheme, Scheme 'H', was first discussed in October 1936, when it became clear to the Air Staff

C.I.D. 1264-B. 6 October 1936

that the Germans were planning an air force of some 4,000 first-line aircraft. It was reckoned that 2,500 of these would have been absorbed into the German Air Force by the spring of 1939, and that 1,700 would be bombers. Unless we were to renounce our aim of parity with Germany we, too, would have to create a striking force of that size. Unfortunately, this was not within the capacity of the Air Force and the aircraft industry. The best that could be done was to plan a bomber force of 1,600 aircraft by the date in question, leaving the residue to be formed as soon as practicable. But even if we succeeded in this it was only too likely that by that time Germany would have expanded her air force to the higher figure of 4,000 aircraft. The Secretary of State for Air, Lord Swinton, in a

C.I.D. 1312-B

memorandum dated 11 February 1937, left no room for doubt that Germany was quite capable of this further expansion.

Scheme 'H', therefore, was chiefly concerned with augmenting the strength of Bomber Command. At the same time, the need for some extension of the air defence system was recognised, and the scheme proposed that four auxiliary bomber squadrons should be converted to fighter work, giving Fighter Command a total of thirty-four squadrons. But when it came before the Cabinet early in 1937 a

C.I.D. 241-A 7 October 1936

comprehensive review of the A.D.G.B. system, initiated in the previous October, was being prepared. Pending its circulation such

C.I.D. 1312-B

proposals in Scheme 'H' as affected the fighter force were set aside.

We must now see what amendments had been made to the A.D.G.B. system since its re-orientation in 1935, particularly those proposed in the review mentioned above.

THE RE-ORIENTATION OF THE AIR DEFENCE OF GREAT BRITAIN (ii).

The need for new techniques of air defence: the formation of scientific committees.

When Sir Robert Brooke-Popham and his colleagues had examined the air defences in 1934 it appeared to them that new devices were badly needed in order to offset the advantage so clearly held by the attacker, and they recommended that a committee of scientists should be formed to survey the whole field of air defence. Two such committees were set up late in 1934, one by the Committee of Imperial Defence, the other by the Air Ministry, respectively termed the Air Defence Research (A.D.R.) sub-committee, and the Committee for the Scientific Survey of Air Defence (the C.S.S.A.D.). Each covered much the same ground and examined during their existence a remarkable number of ideas and devices, but one problem, that of obtaining adequate warning of the approach of aircraft, was paramount in their discussions, and it was as a result of progress in this respect that a number of important modifications were made in the air defences during the four years prior to the outbreak of war.

C.I.D. 205-A, para. 92.

Abolition of the Outer Artillery Zone due to new methods of aircraft location.

The first change was the abolition of the Outer Artillery Zone in 1936. Prior to this date the existing raid intelligence system could only detect aircraft as they were crossing the coast; thus their course would only be known at Fighting Area Headquarters when they were already some distance inland, and more time would elapse before defending fighters were in the air. It was imperative, therefore, that fighters should contact the enemy with as little delay as possible, and the guns of the Outer Artillery Zone, in front of the fighter sectors, would help in this by indicating the enemy's position by means of shell bursts. They had a second function. The individual fighter had little, if any, superiority of armament over the bomber at this time. Consequently, it was a positive advantage if enemy formations could be broken up by the fire of the guns in the Outer Artillery Zone and then engaged individually by fighters.

However, on 6 April 1936, Mr. H.T. Tizard, the chairman of the

C.S.S.A.D. and a member of the A.D.R. sub-committee, attend a meeting of the A.D.G.B. sub-committee and reported that aircraft had already been detected sixty miles out to sea by new methods of detection that were being developed. (1) It followed that fighters would be given ampler warning of raids than had been available hitherto, so that there was no longer any need to restrict the Aircraft Fighting Zone, at any rate by day, t a strip some miles inland. Now the fighters could go forward and engage the enemy before he reached the Outer Artillery Zone. The first function of the latter, to indicate the enemy's whereabouts, was, therefore, no longer required. Its second, to split up the hostile formations so that the individual bomber could be successfully engaged by the more manoeuvrable but less heavily armed fighter, was also considered to be out of date. In the first place, the performance of bombing aircraft had improved so much that they would be able to fly above the range of anti-aircraft guns, even of the new ones that were being put into production. Secondly, faster and more heavily armed fighters, which would be able to tackle enemy formations successfully, would soon be available. The production of the Spitfire and Hurricane had already been decided upon, and fighters with even heavier fire-power had reached the design stage.

C.A.S. Liaison Letter, 25 June, 1935.

It was with some relief that the sub-committee recommended the abolition of the Outer Artillery Zone. The guns that became available could now be used to thicken the local defences of important towns, and other towns given protection that had not previously been available. For the time being, searchlight dispositions remained the same. The lights of the Outer Artillery Zone were a useful supplement to those of the Aircraft Fighting Zone as they increased the depth of the illuminated area within which interceptions took place at night.

D.G B.52 9 May 1936.

ew disposition of the un defences.

Twenty-nine batteries of guns, exclusive of those in the Thames-Medway area, had been allotted to the Outer Artillery Zone in the original re-orientation scheme, and its abolition would release this

1) This was all he said about the new technique, or, at least, all that was reported in the minutes of the meeting. Outside the two scientific committees all references to R.D.F., for it was this to which Mr. Tizard was referring, were couched in the vaguest terms for some time to come.

number of batteries. The Home Defence Committee decided, therefore, before formal approval to the abolition of the zone had been obtained, that the redisposition of so large a proportion of the guns allotted to the A.D.G.B. system gave an opportunity to review the gun defences of the whole country, including the defended ports.

The body that carried this out was again the A.D.G.B. sub-committee, this time under the chairmanship of Air Vice-Marshal P.B.Joubert de la Ferte, A.O.C., Fighting Area. It made its report on 17th June 1936.

C.I.D.230-A.

The previous report on the re-orientation of the A.D.G.B. system had recommended anti-aircraft defences for only four inland areas other than London, namely Leeds, Manchester, Sheffield, and Birmingham, but it contained a warning that there were a number of other places with a good claim for defence, and that this number would increase. That of 1936 went a stage further and specified certain inland towns that ought to be protected, but, recognising that there was a limit to the number of Territorial units that could be raised and equipped within the next two or three years, it sought rather to provide the most efficient distribution of the defences already approved than to recommend defences which would provide more comprehensive protection, but which could only be raised over a long period. For this reason, they stressed the importance of creating a pool of mobile guns (1) which could be used to meet any changes in the character of the enemy's attacks. Altogether 608 guns were recommended for the defence of the London area, Birmingham, Sheffield, Leeds, Liverpool, and Manchester, and for the important south and east coast ports, including a small allotment for the anchorage at Scapa. (2) But only 384 of these (288 being static 4.5" equipments) were looked on as permanent defences; the remainder were mobile 3.7" guns forming a pool which could be drawn on for the defence of towns in the Midlands, and such ports as had not been given permanent defences.

(1) The 3" gun was not considered a first-rate weapon, and two new guns, the 4.5" and the 3.7", had been developed by the Navy and Army respectively, and were about to be put into production. The former had somewhat the better performance, though at a slower rate of fire, but it took two to three days to dismantle and re-erect in a new position, so it was not capable of that tactical mobility on which the sub-committee set so much importance. The 3.7" gun, however, could be mounted on a semi-mobile carriage.

2) The detailed allotment is given as Appendix E.

This recommendation involved only slight additions to the number of guns and searchlights already approved, but the sub-committee drew attention to the fact "that, if the speed and range of aircraft continue to increase, it will be necessary to consider the need for air defences further north than the Tyne to provide protection for Southern Scotland, including the Forth and the Tyne." Unfortunately, the cost of the scheme as a whole was considerably enhanced by the introduction of the new types of gun. The original scheme had involved an expenditure of about £13½ million pounds spread over ten years. The new one would cost approximately £30 million, including £2 million for the provision of twenty anti-aircraft machine-gun batteries for defence against low-flying attack. Those who had formulated it may well have wondered how it would be received by the government. Nevertheless, they emphasised the importance of its early execution, and asked that the necessary army formations should be equipped on a training scale as soon as possible.(1) They also returned to an argument that we have met before, that guns and searchlights should be provided as quickly as fighter aircraft.

The scheme was considered by the Committee of Imperial Defence on 25 June 1936, and was approved in principle, but the government were unwilling to give it full approval until its financial and economic aspects had been more closely examined. Yet the logic of events was driving the government itself into extending the air defences of the country. At this same meeting, the attention of the Home Defence Committee was drawn to the importance of protecting the towns at which the aero-engine industry was located. As a result of this, 16 guns were taken from the London dock area and assigned to Coventry; 16 were taken equally from Manchester and Plymouth and given to Derby and Bristol.

Unsatisfactory production position: effect on defence policy.

But as soon as the government were made aware of the exact position in regard to anti-aircraft munitions, permission was given to the War Office to press on with the production of all the guns and searchlights

(1) The training scale was 25% of the war scale. It was expected, in June, 1936, that 54 batteries and 88 searchlight companies would have been formed, and equipped to training scale, by the end of the year, leaving 22 batteries and 20 companies to be formed if the new scheme was approved.

280th Mtg. Committee of Imperial Defence, 10 July, 1936.

C.I.D.233-A, 8 July, 1936.

required under the new programme. This change from the previous cautious policy appears to have been brought about simply by the unsatisfactory production position. Only some four hundred 3" guns would be available for A.D.G.B. by the spring of 1938, and the production of 3.7" and 4.5" guns would not begin until some time in the same year, but, once it had begun, the 608 guns of the new programme would be provided by 1940. The searchlight position was a little better. It was anticipated that the 108 companies that had been approved would be fully equipped by the spring of 1939, though part of their equipment would be an obsolescent type of sound locator. In short, the position was that anti-aircraft equipment would be limited in numbers and unsatisfactory in quality until the end of 1939. By that time the production of new equipment would be under way, many of the guns and searchlights recommended in 1936 would have been provided, and, after that had been done, the anti-aircraft requirements of the Field Force and defended ports abroad could be met.

Further expansion of the German Air Force.

C.I.D.1264-B, 6 October, 1936.

Within three months yet another examination of the scales of air defence had been initiated. The circumstantial background was that the Air Staff reported, in October, that the German Air Force would reach the strength that we had expected it would achieve, by April, 1937, namely some fifteen hundred first-line aircraft, but that its expansion would not stop there. Private reports, and public speeches by Nazi leaders, indicated that Germany was aiming at parity with the Red Air Force, whose strength she estimated as 4,500 first-line aircraft. The Air Staff inferred, not that Germany was intending to attack Russia, but that she was determined to expand to the limits of her capacity. The claim to parity with Russia set a convenient standard rather than indicated her military intentions. Her expanded force was a threat to all European countries that stood in her way. Accordingly, the Minister for Co-ordination of Defence, Sir Thomas Inskip, after consultation with the ministers of the defence departments and the Chiefs of Staff, instructed the A.D.G.B. sub-committee to report on what they considered was the "ideal air defence of the country, irrespective of considerations of supply." Sir Thomas Inskip also asked the

The "Knock-out" blow.

approval of the Committee of Imperial Defence to the following basic assumption governing anti-aircraft defence:-

> "Our plans for anti-aircraft defence in the event of war with Germany should be made upon the assumption that Germany may attempt a knock-out blow from the air and that this blow would be delivered with the maximum intensity at the moment of the declaration of war."

C.I.D.241-A, October 7th, 1936

This assumption was a more emphatic re-statement of a principle enunciated in the Brooke-Popham report of 1935, "that air attack will synchronise with, or indeed form the commencement of, hostilities. Therefore, the whole of the defence system in this country must be working at its full efficiency in the first hour of war." Its strategic implications will be more fully discussed at a later stage, but this may be noted; it demanded a concentration upon home defence to the exclusion, so far as it might be necessary, of all other commitments, for, if the "knock-out blow" at the heart of the Commonwealt succeeded, then the best preparations elsewhere would not save the whole of it from ruin.

C.I.D.205-A, para. 22.

The immediate question was, how far were the resources of the country to be concentrated on air defences? Mr. Neville Chamberlain pointed out that the scale of defence had already been increased three times in successive years, and seemingly, was about to be changed again. He wondered whether the money set aside for air defence would be better spent on offensive weapons. A number of members of the Cabinet were in sympathy with his view, but the inescapable and all-important fact appeared to be that the potential scale of German air attack was increasing.(1) Consequently, the A.D.G.B. sub-committee was directed to continue with its examination of the "ideal" air defences, and, in the meantime, the War Office was to see how far the production of anti-

283rd Mtg., Committee of Imperial Defence, 29 Oct.,1936.

(1) Three days before this meeting was held a paper (C.O.S.513(J.P.).) was circulated to the Committee of Imperial Defence containing, amongst other things an alarming appreciation of the scale and character of a German air attack upon the United Kingdom in 1939. Copious extracts from it form Appendix

aircraft equipment could be accelerated. The former body, under the chairmanship of Air Chief Marshal Sir Hugh Dowding, spent the next three months on its task, and presented its report on 9 February 1937.

C.I.D.255-A

"Ideal" Air Defence Scheme

The detailed recommendations of the report were preceded by two important observations on the strategy of air defences. First, that a well-organised and comprehensive scheme of passive defence was as much a part of the air defence of the country as guns, searchlights, and fighter aircraft, second, that however numerous and efficient the active defences they cannot guarantee security; "it is the air offensive which, if successful, will ultimately contribute most to a successful outcome of the war." The report then went on to define the meaning of an "ideal air defence." This could only have an ascertainable meaning if the scale of attack, against which an "ideal" defence was needed, was itself known. The sub-committee assumed, therefore, that their task was to report on what defences would guarantee us against successful attack by a force of 1,700 bombers, the force which Germany would have by March 1939. Moreover, having done this, they outlined the steps by which their proposals could be achieved, though they admitted that this matter was outside their terms of reference.

The basis of the defensive system that was proposed was the existing Aircraft Fighting Zone. This was extended, in the north, from the Tees to beyond Newcastle; in the West Riding and the Midlands it was widened so as to embrace the industrial towns in those areas; in the London and Thames estuary areas extra searchlight companies were so disposed that a ring defence was provided for the whole region. In addition, new illuminated areas were proposed between the Forth and the Clyde, and in the Cardiff, Newport and Bristol districts, and existing illuminated areas at Manchester, Liverpool and Plymouth were strengthened. The intention was to widen the searchlight zone along all the likely routes that the enemy would take to his targets, in order to lengthen the period in which the raider could be illuminated, and so increase the chances of fighter interception. It involved increasing the number of searchlight companies from 108 (2,547 lights) already approved, to approximately 200 (4,700 lights).

See Map No.

Gun defences for places over and above those for which a scale had already been laid down were only recommended for Glasgow, Cardiff and Newport, (this was part of a policy for strengthening west coast ports in view of the increased volume of traffic that would pass to them in wartime instead of to the east coast), but the total provision was more than double that which had been approved. The number of guns required for the defence of any objective depends as much on gun density, i.e. the number of guns that can be brought to bear on any given avenue of approach to the target, as on the size of the target area. There was, at this time, little practical knowledge of the effect of anti-aircraft fire in war, and the sub-committee adopted the arbitrary assumption that a 16-gun density was required for the defence of very important objectives and a 4-gun density for the general protection of any area. In the former category were included London and the Thames-Medway area, which were allotted 450 guns, and all the important ports with the exception of Glasgow and the South Wales group; in the second were the main industrial areas. Altogether 153 batteries, containing 1,264 guns, were recommended, an increase of 82 batteries, or 656 guns, over the existing scale of defence. In order that a portion could be switched as the direction of the enemy's attack changed, and to give the defences the opportunity for surprise, 88 of the batteries would consist of mobile 3.7" guns. For the same reason, 6 batteries were not allotted to any objective, but were always to be at the immediate disposal of the A.O.C.-in-C., Fighter Command.

No detailed recommendation for light anti-aircraft weapons were made. The type of gun required for defence against low-flying attacks had been decided upon, the Vickers twin-barrelled 2-pdr., but exactly how many would be needed could not be known until a survey of the vital points requiring this sort of defence had been completed. The sub-committee thought that about 600 guns, or twice that number of barrels, would be needed. For the same reason no estimate of balloon barrage requirements[1] was made.

(1) The use of balloons as a means of countering low-flying attacks, was one of the first items examined by the scientific committees. By October 1936, the Air Ministry had obtained permission to start recruitment, and the provision of equipment, for a London barrage of 450 balloons. The headquarters of No. 30 Group was formed under Fighter Command on 17 March 1937 for the administration of the London barrage.

The most important additions were of fighter aircraft. By February 1937 there were twenty-eight fighter squadrons in Fighter Command, and two more were about to be formed. But since at least four of these were earmarked for the Field Force, and five for advanced air defence on the Continent, the air defence plans were based on a strength of twenty-one squadrons, disposed at eleven sector stations. This was the fighter defence deemed sufficient to withstand attack by a German striking force of 900 aircraft. Under the "ideal" scheme, presupposing a German bomber force of 1,700 aircraft, four more sectors were planned; one each in the Forth-Clyde and Bristol areas, to utilise the illuminated zones there, one between Digby and Church Fenton, where there was a gap in the existing chain of fighter stations, and one between Wittering and Duxford, to strengthen the defence of the Midlands. At each of the fifteen sector stations three fighter squadrons would be located; these forty-five squadrons, in the opinion of the sub-committee, would constitute "a reasonable 'ideal' defence." It would then be possible for any large enemy raid, approaching through any part of the line between Catterick and Biggin Hill, to be engaged by nine fighter squadrons within fifteen minutes of the first report, provided that these squadrons were not otherwise committed at the time. On the other hand, a number of simultaneous smaller raids could be engaged individually by squadrons, flights, or sections.

See Map No.

The next problem was the provision of the twenty-four extra squadrons required under the "ideal" scheme. The full total could not be raised until some time after 1939, so an intermediate provision, to be completed by the spring of 1939, was recommended. Four new fighter squadrons would be formed, and the five squadrons that had been intended for advanced air defence would be kept in this country. So, by 1939, there would be thirty-four squadrons in Fighter Command, four of which would go with the Field Force. These would be stationed at fourteen sector aerodromes (Bristol remaining to be formed), at most of which there would be two squadrons, except for the four sectors protecting London, namely, North Weald, Hornchurch, Biggin Hill and Kenley, where there would be three. Sir Hugh Dowding uttered a caveat at this point,

that all these squadrons would need a properly organised system of control from the ground if they were to fight successfully. Therefore, if this intermediate scheme was adopted, all the necessary group and sector headquarters, and operations rooms, must be completed in peace tim In addition, he wanted each station to have accommodation for three squadrons, even though fewer than that would normally be stationed there. For the same reason, extra Observer Groups would be necessary, three in Scotland, two of which had already begun to form, and one in the Bristol area, making a total of twenty Observer Groups for the whole defence system.

The reception of the 'ideal' scheme.

So far as this intermediate provision affected the Air Ministry no undue difficulty was anticipated. The War Office, on the other hand, had no immediate capacity for expansion and could not promise to provide the equipment for the full scheme until 1941 at the earliest. Also, to provide the necessary units would be impracticable under the existing voluntary system. Consequently, when the scheme was put before the Committee of Imperial Defence, the proposals of the Air Ministry received most attention. Lord Swinton, the Secretary of State for Air, announced that four auxiliary bomber squadrons could be converted to fighters, and four regular squadrons would then be formed to take their place (this was the fighter provision proposed in Scheme 'H'); he explained that it was undesirable that fighter strength should be increased at the expense of the bomber force. But the Chancellor of the Exchequer, Sir John Simon, could not accept any detailed proposals until their costs had been worked out, and the meeting merely approved the 'ideal' scheme in principle, and recommended that its details should be further examined.

294th Mtg., Committee of Imperial Defence, 17 June 1937

Temporary ban on further re-armament scheme

This conditional approval was nullified, to some extent, by a Cabinet decision of 30 June, that no further large expenditure on armaments should be incurred until the Treasury had examined the whole question of finance and re-armament, and when the intermediate stage of the 'ideal' scheme was brought before the Committee of Imperial Defence for approval, Sir John Simon could only agree to the provision of a new group headquarters at Catterick, and new operations rooms at Usworth and Turnhouse.

297th Mtg., Committee of Imperial Defence 15 July, 1937.

The Cabinet did not lift its ban until the following December, but two important changes took place before that date. The first concerned the Observer Corps, the second the deployment of the A.D.G.B. ground forces in an emergency.

Expansion of the Observer Corps.

The Observer Corps had been founded in order to transmit raid intelligence to the active defences. The movements of aircraft were tracked by the observer posts and communicated, by way of Observer Centres, to Fighting Area headquarters for the use, primarily of fighter squadrons. But the Corps also assisted the Home Office to carry out its responsibility for giving air raid warnings to the general public, and, for convenience, the initiation of these was centred at the old A.D.G.B. Command headquarters. This was now the duty of Fighter Command. By 1937 no part of the United Kingdom was free from the threat of air raids, and the Air Ministry and the Home Office together recommended that the observer system be expanded to cover practically the whole of the country. From the point of view of the Air Ministry this was a corollary of the active defences already planned, from that of the Home Office it was a move necessary for public security.

C.I.D.261-A, 22 July, 1937

The dual function of the Corps was reflected in the details of the recommended expansion. Five new Observer Groups were to be formed to cover the Northumbrian coast and the Forth-Clyde area, and they would be just as much a part of the A.D.G.B. system as the long-established groups in the east and south-east of England. In addition, fourteen groups, that were not immediately necessary for the effective working of the active defences, were recommended. These were intended solely to meet the Home Office requirements of safeguarding the public from unannounced air attack.(1) In sum, the Observer Corps would consist of thirty-six Observer Groups, covering the whole country with the exception of Northern Ireland, the extreme north and west of Scotland, the west coast counties of Wales and Cornwall. The obvious advantage

See Map No.

(1) Two of these groups, one in the extreme south-west of Scotland, the other astride the Caledonian Canal, were not immediately required by the Home Office. They were included in the recommendations in order to shew what form the comprehensive observer system would finally take. They were not formed, in fact, until late in 1940.

of the new scheme was that there would be little difficulty in bringing all groups into the A.D.G.B. system should it be necessary, especially as the Air Ministry would continue to control and administer the Corps. The recommendations of the two departments were approved by the Committee of Imperial Defence on 29 July, 1937.

Deployment of A.A. defences.

C.I.D.265-A, 25 October, 1937.

The second matter the deployment of the anti-aircraft defences was considered in the autumn. At the time the anti-aircraft units were organised on the basis of 48 hours for deployment from peace to war positions, but both the Air Ministry and the War Office considered that this was dangerously slow. Some defences would be available before these units had got into position. The regular squadrons of Fighter Command would be at readiness throughout the period of tension that would precede war as most of them were normally located at their war stations; the Auxiliary Air Force, which could be called out by individual letter on the authority of the Secretary of State for Air, and the Observer Corps, the members of which were enrolled as special constables, could also be called out before the outbreak of war without much publicity. But the mobilisation of the anti-aircraft units of the Territorial Army, involving, as it must, the calling out of thousands of men, might need to be postponed until the last possible moment for political reasons. If this was as late as the outbreak of war it would mean, under existing schemes for deployment, that the country would have practically no ground defences for 48 hours, the very period in which they might be needed most. The new scheme reduced the period taken for deployment to 12 hours; as such it contributed to insuring against the 'knock-ou blow'. Like the Observer Corps expansion it was sanctioned without much difficulty.

300th Mtg., Committee of Imperial Defence; 28 October, 1937.

The lifting of the Cabinet ban

A.H.B. 11a/1/54b, Encl.36.

Shortly afterwards the Cabinet's ban was lifted. Thenceforwards the progress was more rapid, and there was much less reference than hitherto to the financial aspect of any defence measures. This was an improvement from the point of view of the defence departments on the previous cautious policy. We shall now see what use was made of this greater freedom to build up the country's air defences in the two years prior to the war. First we shall examine the, so far, ill-fated 'ideal' scheme, and other defence plans that were made during this period. Then we shall return to the beginning of 1938 and see what progress was made between that date and the outbreak of war in actually putting these plans into effect.

4. FURTHER PLANS FOR AIR DEFENCE, 1938-9.

Approval given to part of the 'ideal' scheme.

The 'ideal scheme had been conceived a sufficient defence against the scale of attack which the German bomber force would be capable of by April, 1939. It was only 'ideal' in the sense that existing rates of recruiting and production would not allow the units and equipment, recommended in the complete scheme, to be provided by that same rate. The intermediate stage, however, could be carried out without undue difficulty, and represented, in the view of the Air Staff, the minimum defence that security demanded. This view was expressed in June 1937, before the Cabinet had decided not to sanction any further re-armament programme. It was even more to the point six months later, when the Cabinet's ruling was rescinded; and one of the first of the new projects to be approved by the government was this intermediate stage. By this, the number of squadrons in Fighter Command was raised to thirty-eight[1], that of guns from 608 to 640, and that of searchlights from 108 companies to 128. All these additions were required for completing the Aircraft Fighting Zone in Northumberland, and for the separate defensive system for the Forth-Clyde area.

S.353d1/II. Encl.45 A. 16 June, 1937.

Changes in searchlight and sector lay-out.

This was the first of a number of changes in the scale of air defence, each of which was dictated by the increasing magnitude of the threat from Germany. The next was the result not of any extraordinary increase in the size of the German bomber force, but of the increasing range and speed of all bombing aircraft. In March 1938, the A.D.G.B. sub-committee reported that the Aircraft Fighting Zone should be deepened in the London area, given a minimum depth of 40 miles over all its length, and extended as far as Bristol.

C.I.D.282-A, 26 March, 1938

(1) Unless otherwise stated the four squadrons earmarked for the Field Force will henceforth be included in all statements of the strength of Fighter Command.

There were two reasons; firstly, German bombers striking at the Bristol Channel area or the Midlands could fly across France and the Channel as far as the Isle of Wight before turning north or north-west, and so outflank the existing defensive system, which terminated at Portsmouth; secondly, the modern high-performance bomber would cross the existing Aircraft Fighting Zone, which was only 25 miles wide, so swiftly that its illumination by the searchlights was problematical and the chances of interception by fighters correspondingly small. These additions to the air defences chiefly affected the number of searchlight companies. If they were approved it would mean an increase of 44 companies, making a total of 172, containing 4,100 lights, only 24 companies less than that recommended in the 'ideal' scheme.

In this same report provision was made for retaining the 3" guns that would be thrown up under existing plans as the 3.7" and 4.5" equipments came into service. Forty batteries of the old type of gun would shortly become available, and it was recommended that these should be used to thicken the defences of areas already allocated some protection. Just as in the case of searchlights, nobody could foresee where the demand for more gun defences would stop. About this time, for example, the Air Ministry were considering what gun defences would be required for the exposed aerodromes in East Anglia.

No additions to the fighter force were recommended by the sub-committee, chiefly because there had been a difference of opinion on the need for them. The Air Staff considered that thirty-four fighter squadrons, with the possible reinforcement of the four Field Force squadrons, could operate, given the necessary ground facilities, on a frontage from Edinburgh to Bristol, but they would require a bigger illuminated area even than that visualised in the 'ideal' scheme. In otherw words, an

A.D.G.B.106
19 March,
1938

extension of the illuminated zone did not necessarily involve an increase in fighter strength. The sub-committee took a different view. They held that extensions of the illuminated zone were not justified unless fighter aircraft were permanently located in the area and they made the provision of the searchlights for the extension of the Aircraft Fighting Zone to Bristol contingent on the formation of three fighter squadrons to man the extension. But in view of the controversy the sub-committee would not definitely recommend the formation of these extra squadrons, and, instead, put the whole matter before the Home Defence Committee, which, in turn, sought a decision from the Committee of Imperial Defence. There Lord Swinton pointed out that the number of fighters in a squadron was about to be increased from 14 to 16; consequently, thirty-eight squadrons would now include more aircraft than the forty-one squadrons, with 14 aircraft each, that were favoured by the A.D.G.B. sub-committee. Presumably Lord Swinton, in arguing thus, was supporting the Air Staff view. But the number of fighters required was not the point at issue. It was, could the existing sector organisation be made flexible enough to provide fighter defence for areas in which squadrons were not permanently stationed? the A.D.G.B. sub-committee thought it could not, but the Air Staff view prevailed, the extensions to the illuminated zone, including that to Bristol, were approved, and no fresh fighter squadrons were formed.

518th Met., Committee of Imperial Defence, 7 April, 1938

C.I.D.288-A, 16 May, 1938

Further discussions clarified the position and in June a searchlight lay-out was agreed upon that remained virtually unaltered until the re-organisation brought about in 1940 by the defeat in France. This provided a perimeter defence for the industrial heart of England, and increased the depth of the illuminated zone at all points to at least 40 miles. Every raider that crossed the coast between Blyth in the north-east,

See Map. No.

and Lyme Regis in the south, could immediately be engaged by searchlights, and no bomber could reach the industrial quadrilateral, bounded by Manchester, Sheffield, Birmingham and Coventry, without passing through a belt of searchlights, even if it came in from the west. The lay-out demanded less of the national resources than the 'ideal' scheme; by using a wider spacing of lights than hitherto, 5,000 - 6,000 yards compared to 3,500 - 4,500 yards, it needed only the 172 companies that had already been approved. Its chief weakness was that the peacetime headquarters of a number of units would be so far from their war positions that they would not be able to complete their deployment within the 12 hour period now laid down.

No changes in fighter strength were contemplated. Three aerodromes in the west, Sealand, near Chester, Ternhill, near Stafford, and Elmdon, near Birmingham, and a new sector station between Portsmouth and Bristol, would provide facilities for fighters to operate in conjunction with the searchlights in those areas, but it was not intended that Squadrons should be permanently stationed there.

Provision for the defence of vital points.

The next major amendment to the A.D.G.B. system was the result of a survey of vital points throughout the country that had been going on for the last two years. By 'vital point' was understood any place the continued functioning of which was essential to the country's war effort. The following selection of vital points illustrates how this definition was applied in practice:-

Enfield Lock Royal Small Arms Factory.

Northfleet Electricity Transformer Station.

Isle of Grain Oil Depots.

Bristol Aircraft Company, Filton.

Weymouth R.N. Torpedo Factory.

Barry Docks.

Manchester Ship Canal, Eastham Locks.

Fleethorpes Wireless Telegraphy Station.

Chapeltown Coke Ovens, Sheffield

Huddersfield I.C.I.

British Aluminium Company, Burntisland.

Most of such targets were inside areas for which heavy anti-aircraft defences had already been provided. The task was to provide them with some defence against what seemed to many to be the greatest danger, low-flying attack. The general principle adopted was that an isolated vital point, like the great Llandarcy oil refineries near Swansea, needed light anti-aircraft guns, while vital points inside an already defended area could be protected by balloons, assisted by both heavy and light guns. This resulted in the following recommendations:-

Balloons.

(i) For the primary defence of areas containing a number of vital points.	980
(ii) For points or small areas for which light A.A. guns are the primary defence.	25
Total Balloons	1,005

Light A.A. Guns.

(i) For isolated points or small areas	559
(ii) For areas for which balloons are the primary defence	81
(iii) Mobile Reserve	72
Total Barrels	712

Tentative figures were also advanced for the guns needed for the protection of aerodromes, aircraft storage units, and certain vital points on the country's railway system. These brought the total number of guns to 1,112.(1)

(1) In the number of light guns given here, and in all future instances, the twin-barrelled Vickers 2-pdr. is counted as two. The other gun that was to be used for this type of defence was the Swedish Bofors 40-mm.

The balloons were mostly to be disposed in barrages, containing from 40 to 70 balloons, at the main ports and industrial areas.(1) The light guns would protect some sixty isolated vital points and areas. The provision of these defences was approved in July, 1938.

331st Mtg., Committee of Imperial Defence, 27 July, 1938.

The approved air defences of the country now included the following:-

38 fighter squadrons	= 608 fighter aircraft
120 heavy anti-aircraft batteries	= 960 guns
172 searchlight companies	= 4,100 searchlights
London balloon barrage, 450 Provincial balloon barrage, 1005	= 1,455 balloons
Light anti-aircraft defence	= 1,112 guns

In a little more than three years since the re-orientation of the A.D.G.B. system, the number of fighter aircraft deemed necessary for the defence of the country had been more than doubled, that of heavy guns and search-lights had been almost doubled, and new balloon and light anti-aircraft defences had been accepted. In the same period the German bomber force had grown from about six hundred first-line aircraft in April, 1935, to some fourteen hundred by the middle of 1938. So far, then, our plans for air defence had kept pace with German air expansion.

The final pre-war plans for air defence were initiated, as we might expect, shortly after the Munich agreement. At the time, the German aircraft industry was still producing far more aircraft and aero-engines than our own, and we could no longer hope to reach even approximate parity with the German Air Force unless the peace time organisation of the whole British economy was radically altered. Whether this was done or not, it was obvious that a further expansion of the air

(1) Details are given in Appendix E. This increase in the number of balloon barrages demanded a bigger organisation than could be provided by the one balloon group, No.30, in existence at this time. Consequently, on 1 November, 1938, Balloon Command came into being. It was intended eventually to consist of four groups, eighteen balloon centres, and forty-seven squadrons. The operational control of balloons was still the responsibility of Fighter Command, and, to facilitate this, the headquarters of Balloon Command moved to Stanmore two days before war was declared.

defence system would have to be planned, and so, at its first meeting after the conclusion of the Czecho-Slovakian crisis, the Committee of Imperial Defence drew the attention of the Cabinet to the fact that, "this country could not be regarded as safe until the Royal Air Force and the anti-aircraft defences had been increased, and our passive defence arrangements had been substantially improved."

346th Mtg., Committee of Imperial Defence, 1938.

Full 'ideal' scheme sanctioned, November, 1938.

On 7 November the Cabinet gave its decision on a number of matters affecting the air defences. First and foremost, fifty squadrons of fighters, a total of 300 first-line aircraft, were sanctioned; 500 heavy anti-aircraft guns and 600 searchlights were to be added to the numbers already approved (this meant 1,264 guns and 4,720 searchlights, much the same figures as had been recommended in the 'ideal' scheme of February 1937); finally, the Cabinet ordered a comprehensive review of the arrangements for home defence. The recommendations that were a result of these decisions formed the last of the pre-war reviews of the air defence system. As such, they deserve examination in some detail since they represent what was considered necessary for the country's security only a short time before that security was actually threatened. The report was circulated in February 1939, and was divided into an Air Ministry and a War Office programme. It was approved shortly afterwards.

C.I.D. 306-A, February 7th, 1939.

346th Mtg., Committee of Imperial Defence 9 February, 1939

Final pre-war provisions for air defence.

The Air Ministry were not so much concerned with new plans for expansion as with the consolidation of the defence organisation. The basis of any air defence system must always be an effective technique for obtaining raid intelligence, and here, it could be fairly claimed, British science led the world. As far back as the autumn of 1935 a beginning had been made with the formation of a chain of R.D.F. stations for the east and south-east coasts. Eighteen of these stations, known as Chain Home (C.H.) stations, had already been sanctioned, and were expected to be ready by April 1939. They would provide R.D.F. observation between Dundee and the Isle of Wight. The Air Ministry recommended, in February, that four more stations should be constructed in order to give cover to Scapa Flow in the north, and to Bristol and

C.S.S.A.D., Minute 161

C.I.D. 306-A, para. 7.

South Wales. They would be established at Kirkwall, Stonehaven, Prawle Point and Exmoor. It was anticipated that these twnety-two C.H. stations would satisfy the primary requirement of air defence, the long-range (60-100 miles) detection of approaching aircraft.

At this stage of their development the C.H. station detected only in a seaward arc, and the tracking of aircraft overland remained the responsibility of the Observer Corps. This, we have noticed, had previously been organised on a dual basis whereby certain Observer Groups were part of the A.D.G.B. system, and provided information for the use of the fighter force, while others, established at a lower standard of efficiency, were used only to give information that would assist the air raid warning organisation. As progressively more of the country came within range of air attack, and the active defences were disposed to cover a wider area, it was necessary to re-organise some of the secondtype of group so that they could function for fighter interception purposes as well as for giving warning of raids. The groups in question were Nos.22,23,24, and 27, with centres at Yeovil, Bristol, Gloucester, and Shrewsbury. Altogether, there were to be twenty-four Observer Groups equipped with instruments that enabled the individual posts to give fairly accurate information about the course, height, and numbers of observed aircraft, and with direct telephone communications between the Observer Centre and the operations rooms of adjacent fighter sectors and Fighter Groups, and Fighter Command. Ten groups would remain on a less highly-organised scale.

C.I.D.303-A, 20 January, 1939

Fighter Command itself would consist of three Fighter Groups, Nos.11,12 and 13, containing the fifty squadrons sanctioned by the Cabinet's decision of November, 1938. The defence would be based on forty-six squadrons disposed in eighteen sectors, and the four Field Force squadrons would be deployed in the line in such a manner that their withdrawal would not disorganise the defence. Broadly speaking, each sector would contain two squadrons of single-engined fighters, chiefly for day operations, and one of twin-engined fighters for night work. Three new sector stations were to be established to the west of

See Map No.

A.H.B.IIH/143 Enclosure 50.

C.I.D.309-A, Para.5.

the Midlands, and one in Norfolk, and a new airfield would be constructe near the Firth of Forth, but the first three would not be permanent squadron stations. By means of these additional stations, and the extensive use of satellite airfields and landing grounds within sectors, it was hoped to give considerable flexibility to the fighter defences.

The War Office programme first detailed the searchlight defences that were needed. No changes were made in the extent of the illuminated zone that had already been planned, but there were some modifications to equipment. A new and more powerful type of searchlight projector was about to come into production, the 150 cm. type, and it was intended to use these in the proportion of 1 : 5 of the older 90 cm. type, involving the supply of 756 of the new projectors. Some progress had also been made in the development of an R.U.F. device for the control of searchlights and guns, and nearly 700 of these were to be provided for searchlights. No reductions were made in the number of searchlight units for the present, but it was hoped that future improvements in G.L.(R.D.F. used for gunnery purposes) would enable anti-aircraft guns to engage unseen targets successfully, and so do away with the need for searchlights in gun-defended areas.

ibid.para.14.

When the review came to the question of gun defences its recommendations were divided into two parts, the first containing those that would be carried out as quicly as possible, the second indicating future requirements. Prior to the review the provision of 1,264 heavy guns had been sanctioned, amongst which would be 320 3" guns that would be replaced as soon as 3.7" and 4.5" guns became available. The only change that was now approved was the maintenance of these 3" guns, after their replacement, for use as a mobile element, and for the protection of certain exposed aerodromes. Ever since the re-distribution of gun defences brought about by the abolition of the Outer Artillery Zone in 1936 a mobile element had always been included in the defence, but chiefly owing to the greater difficulty of producing mobile compared to static guns the proportion had steadily fallen until only 352 out of 1,264 guns would be mobile, and 108 of these had already been accepted on semi-static mountings. It was

intended to convert these but, in any case, the additional 3" guns, all of which could be quickly moved, brought a much needed mobility to the gun defences. Two months later, in fact, it was decided to form a Command Reserve of 21 batteries of mobile heavy guns and seven light anti-aircraft regiments, to be used by the A.O.C.-in-C. Fighter Command as events demanded.

The second part of the programme, that dealing with future requirements, demanded no less than 1,144 guns, or a similar number of U.P. projectors, a weapon under development at this time over and above the 1,584 guns recommended in the first part of the War Office programme. This great increase had not been related to any parallel expansion of the fighter force, and was intended to provide objectives such as London, the east coast ports, and the armaments towns of the Midlands with a 72-gun density, i.e. more than four times the gun density recommended in the 'ideal' scheme. The Air Staff were not opposed to the increase providing it bore some relation to the anticipated scale of attack, and providing a proper balance was maintained between ground and fighter defences. But as there had been no change in the anticipated scale of attack since earlier defence plans had been drawn up they considered that these new additions were unwarranted. Quite apart from this, the total cost of the gun defences would then reach some £77 million, and it was doubted whether this was a just distribution of national resources between defence and offence. The question was referred to the A.D.G.B. sub-committee, which decided that a 36-gun density was a sufficient defence even for vital areas, and recommended an increase of 328 guns to effect this.

Since the last review of vital points requiring protection against low flying attack a number of new requirements had been revealed. Most of them were isolated R.A.F. establishments, including C.H. stations, aircraft storage units, and airfields, and so were better protected by light guns than by balloons. No additions to the balloon barrage were recommended but the first part alone of the War Office programme included 700 additional 40 mm. guns, and the second part, that dealing with future requirements, nearly two thousand more. This

latter increase was examined by the A.D.G.B. sub-committee at the same time as they reviewed the question of gun densities. The War Office representative argued that the increasing efficiency of the fighter and heavy gun defences would compel the enemy to concentrate on low-flying attacks; consequently, an over-all increase of light guns would be necessary. However, the same principles were adopted as for heavy gun defences, i.e. adequate initial protection and a mobile reserve in the hands of the A.O.C.-in-C. Fighter Command. Thus only 302 light guns were added to those already approved.

Altogether, when war broke out, 2,252 heavy anti-aircraft guns, with the necessary auxiliary equipment, including 500 G.L. sets and 2,000 light anti-aircraft guns, were reckoned a reasonable gun defence against the scale of attack that the Germans were thought to be capable of, and, as such, their provision had been approved by the government.(1)

Prior to the latest additions to the air defences the army formations had been organised in one corps of five divisions, and Sir Hugh Dowding had found it a great advantage to be able to work with a corps commander who was responsible for all the ground troops in A.D.G.B. In February, however, the War Office decided to form a further two divisions to absorb the new units that were contemplated, and to make a second anti-aircraft corps. For a short time the instructions of the A.O.C.-in-C. were still carried out by the commander of the 1st A.A.Corps, but towards the end of March an Anti-Aircraft Command was formed and a single officer once more became responsible for the whole of the anti-aircraft formations. The first G.O.C., Anti-Aircraft Command, was Lieut.-General A.F.Brooke, who was

(1) It was clear that numerous demands for special protectionwould arise in wartime, so the approved gun defences included what was termed a New Requirements Reserve which would be used to satisfy these demands without weakening existing defences. It was to contain about two hundred heavy and three hundred light guns, and would be controlled by A.O.C.-in-C., Fighter Command. Later it was decided that as so many conflicting claims would be made, involving different services and departments, the responsibility for settling priorities would be more satisfactorily vested in an inter-services committee than in a single officer, however high in rank, and a sub-committee of the Deputy Chiefs of Staff sat almost daily during the war settling these matters.

succeeded in August by Lieut.-General Sir Frederick Pile, Bart. The great and obvious merit of such a move was to facilitate speedy co-operation in the higher direction of the air defences.

This section of the narrative has aimed at describing what was considered necessary for the air defence of the country. It is hardly a matter for speculation that if the planned air defences had been in being at the outbreak of war, and the Germans had then attempted that 'knock-out' blow that was so much feared, the German effort would have been defeated. But plans are drafted more easily than they are executed, and we shall turn now to the progress that was actually made in building the country's air defences during the last two years of peace.

THE GROWTH OF FIGHTER COMMAND, JULY 1937 - SEPTEMBER 1939

Expansion of First-Line Strength.

Fighter Command remained nominally up to strength, at a figure of thirty squadrons, until the summer and autumn of 1938. In rapid succession it was then given two new targets at which to aim. First, under the intermediate stage of the "ideal" scheme, a further eight squadrons were to be formed by April 1940. Then this scheme was absorved within Scheme 'M', to which all Commands were working when war broke out. This provided for forty fighter squadrons by April 1939, and the formation of ten more squadrons in the year beginning April 1940. The Command would spend the intervening year completing its re-equipment with Hurricanes, Spitfires and Defiants. The final force of fifty squadrons was to contain fourteen auxiliary squadrons, that is practically the whole of the Auxiliary Air Force of the time. This meant converting a number of auxiliary bomber squadrons to fighter work, a change that had the advantages of facilitating the training of auxiliary squadrons and of quickly increasing fighter strength. Infact the whole of the expansion of Fighter Command during the last year of peace was in terms of auxiliary squadrons. Six were transferred from No. 6 (Auxiliary) Group before Christmas, two in January 1939, and two more from other groups by the same date. By August, 1939, the full complement of fourteen auxiliary fighter squadrons had been formed, making thirty - nine squadrons in the Command. This left only one regular squadron to be formed to satisfy the requirements of Scheme 'M', but eleven squadrons before the planned strength of the Command was complete.

By that time a third fighter group, No. 13, had come into existance. Its headquarters started to assemble at No. 12 Group Headquarters, Hucknall, from May onwards, and it opened in Newcastle on August 1st under the command of Air Vice-Marshal R.E. Saul. The group was responsible for the defence of the country between the Humber and the Forth. For this task it was divided into four sectors containing seven squadrons.

The Command lay-out for the fifty squadrons that it would eventually contain also visualised a fourth group, No. 10, in the south-west for the control of the sectors that were to be formed to the west of Portsmouth. Shortages of personnel, aircraft, labour, and building material all combined to delay the project, and it was not until January 1940 that final instructions were given to go ahead with work on No. 10 Group Headquarters at Colerne. It is mentioned here in order to dispel any impression that No. 10 Group, which was not ready to begin operations until July 1940, was only formed as a result of the outflanking of the three existing fighter groups through the German occupation of France. It did not form earlier simply because the necessary material was not available.

S.59178
Minute 6.

Problems of Expansion.

Leaving aside for the moment the question of how far the squadrons of Fighter Command could have carried out their duties efficiently between the summer of 1938 and 1939 it will be obvious to the reader that mere strength in aircraft is no criterion of the fighting efficiency of an air force. Fighter Command needed a properly equipped ground organisation andraid intelligence system; airfields, operations rooms, and communications between the various parts of the defence organisation, had all to be in working order. Above all the Command needed an adequate war reserve of aircraft, equipment, trained pilots and ground staff, backed by a sufficient flow of trained men from the training schools, and aircraft from industry, to enable it to maintain operations at any scale set by the enemy. The expansion programme required that progress in each of these directions should proceed at an equivalent rate, for if there was a hold up in one the programme as a whole would suffer.

Shortage of Reserves.

From 1937 onwards the expansion programmes were not satisfactorily carried out. Peacetime conditions in the British aircraft industry and the voluntary system of recruiting could not provide the aircraft or the men

required to complete the expansion schemes in full, and, towards the end of 1937, the Air Ministry were faced with the alternatives of maintaining first-line strength without adequate reserves, or of building up sufficient reserves for a smaller number of first-line squadrons than they were publicly committed to raise. It is doubtful whether even this unhappy choice existed as far as Fighter Command was concerned. The scale of the home-based bomber effort could be controlled in wartime in the interests of economy, but not that of the fighters. This would be dictated by the size and intensity of the enemy's attacks. In consequence, while some retarding of bomber expansion was accepted in order to form reserves behind the first-line bomber squadrons, fighter squadrons had to be reckoned mobilisable regardless of the reserves of fighter aircraft and fighter pilots.

15th Meeting, Mobilisation Committee, 22 Sept. 1937.

The Position in September 1938.

There could be no better illustration of the difficulty of at once expanding Fighter Command and yet maintaining its effectiveness as a fighting force than its position in September 1938. This shews how far the Command had travelled along the road of expansion, and to what extent it could have fulfilled its role at a time when it seemed likely that war would break out. It provides a useful standard by which to measure how much progress was made during the year preceding the war. Finally, it furnishes evidence that should be taken into account in any estimate of the rightness of the government's policy at that time.

i: Likely Weight of Attack

We cannot judge whether Fighter Command had sufficient forces at "its disposal", or whether those forces were sufficiently equipped to carry out the tasks of air defence except we know what weight of attack it would have had to meet. Patently, this cannot now be known. But there is, at least, no doubt of what the Air Staff thought might happen. Assuming the worst, i.e. that the whole of the German long-range bomber force of 1,400 aircraft was directed against this country, it was reckoned that 720 sorties could be despatched by the Germans in one day, representing a bomb load of over 900 tons. During the first two months of the war between 400 and 500 sorties could be expected

A.H.B. II H/157, Enclosure 25.

daily. To be balanced against this were a number of factors whose effects could not be mathematically calculated. The scale of attack would be reduced if the Germans did not violate the "territorial air" of the Low Countries; and it could only be maintained at a uniformly high level if the weather was consistently good and if the German Air Force had reached a high standard of training. Taking all this into account the Air Staff concluded that the Germans would be unable to reach in practice the maximum weight of attack which they were capable of in theory, but what the actual weight might be they could not estimate. In any case, the Germans would not be capable of directing their whole bomber force against us for some incalculable time after war had broken out; part of their forces would be used against France and Czecho-Slovakia, and part might have to take up defensive positions against Russia. In sum, the Air Staff were optimistic about the German capacity to attack us at the outbreak of war, but within a matter of months the position might be much more dangerous.

No one could be as optimistic about the defences. A description of them as they were on 1 October, when the anti-aircraft units, the Observer Corps, and part of the Auxiliary Air Force had been called out, is an unavoidable catalogue of deficiencies in every department. Fighter Command alone concerns us here but it should be borne in mind that Bomber Command was in even worse case.

ii: The Strength of Fighter Command

On that date only one of the squadrons of Fighter Command was not reckoned mobilizable, and there were twenty-nine fighter squadrons in the line of battle. Seven army co-operation squadrons would also have been placed under Sir Hugh Dowding, the A.O.C.-in-C., if war had broken out, but three of these would not have been available if the Field Force had gone to France. One of the army co-operation squadrons was set to guard each extremity of the fighter line, at Turnhouse near Edinburgh and at Old Sarum. Emergency communications would have linked these stations to No.'s 12 and 11 Groups respectively. The line of battle, including these two squadrons, was as follows:-

WAR STATION	SQUADRONS	TYPE	
No. 11 Group			
Biggin Hill	32	Gauntlet	Re-equipping with Hurricanes
	79	Gauntlet	" " "
	601	Demon	" " Gauntlets
Debden	29	Demon	
	87	Hurricane	
	85	Hurricane	
Hornchurch	54	Gladiator	
	65	Gladiator	
	74	Gauntlet	
Kenley	3	Gladiator	
	17	Gauntlet	
	600	Demon	" " Gladiators
Tangmere	1	Fury	" " Hurricanes
	43	Fury	" "
North Weald	36	Hurricane	
	151	Gauntlet	
	604	Demon	" " Gladiators
Northolt	25	Gladiator	
	111	Hurricane	
Old Sarum	59(A.C.)	Hector	
No. 12 Group			
Catterick	41	Fury	
Church Fenton	64	Demon	
	72	Gladiator	
Digby	46	Gauntlet	
	73	Hurricane	
Duxford	19	Gauntlet	
	66	Gauntlet	
Usworth	607	Demon	
Wittering	23	Demon	
	213	Gauntlet	
Turnhouse	13(A.C.)		

This force was less strong than appears at first sight. Firstly, four squadrons were being prepared for work with the Field Force, No.'s 23, 25, 29, and 64. Only one, No. 29, was considered fully prepared in September 1938; the others would not be ready until the following year. It is hardly to be doubted, however, that all

ibid. Enclosure 9, Appendix B.

four squadrons would have left Fighter Command soon after a British force landed in Europe. Secondly, only five out of the twenty-nine fighter squadrons were equipped with a modern fighter aircraft, the Hurricane, although three more were soon to be equipped with this type. Even the Hurricane would have been ineffective over certain heights, as no arrangements had yet been perfected for heating the Browning guns with which the Hurricanes were armed, and they could only fight up to a height of about 15,000 feet in summer. The mainstay of the Command would have been the Gladiator and Gauntlet squadrons. In the light of later events, it is probable that the former, at any rate, would have taken a good toll of unescorted bombers.

ibid. Para. 17 (ii).

A ground organisation for the control of fighter operations was only partially completed, but some control would have been possible. How long it could have continued to function in the face of sustained attacks is problematical, for communications between the various parts of Fighter Command were more vulnerable than they were to be two years later. The G.P.O. Ring Main system, which was intended to reduce the centralisation of telephone communications in London, had not come into operation, and its absence jeopardised many of the air defence circuits. None of the operations rooms in the Command were protected against direct hits, and work had not yet begun on the underground rooms that were to be provided at Stanmore and the Group Headquarters at Uxbridge and Hucknall.

In the fifteen fighter sectors a Direction Finding system that enabled fighters to "home" on to their bases, had been set up, but a further refinement, which made it possible for a sector commander to control his squadrons from the ground, had been provided in two sectors only. Thirty-one D/F stations had still to be provided for this purpose; meantime the majority of the fighter force relied on intercepting by means of the less satisfactory method of Dead Reckoning navigation.

The sectors were also short of satellite landing grounds. Only nine were available out of the twenty-two required, and until this side of the fighter organisation was satisfactory there was a lack of mobility within sectors and a dangerous concentration of aircraft at sector stations.

iii. The Intelligence System

On the intelligence side the Observer Corps could have carried out its duties efficiently enough, but the R.D.F. chain was far from complete. Five permanent and three mobile C.H. stations were available, and a further five mobile stations were being constructed. At any time in the autumn of 1938 R.D.F. cover could have been provided between the Wash and Dungeness, and a proportion of raids approaching the south-east and East Anglian coasts would have been detected and probably intercepted. The risk of serious raids further north was smaller, but, if they had been made, their interception would have been difficult.

iv. The Reserve Position

The unsatisfactory quality of the aircraft available in Fighter Command at this time has already been remarked. In war this would doubtless have led to a high rate of wastage in pilots and machines, and adequate reserves ought to have been available to take the place of casualties. But the reserve position in Fighter Command was truly desperate. At a meeting of the Air Ministry Mobilisation Committee on 15 September, the Director of Postings, Air Commodore Babbington, stated that out of the total pilot reserve of 2,500 only about 200 were fit to go into service units immediately. Until the others were brought to the required standard of training there was practically no source for the replacement of casualties in any of the operational Commands. However, the position in this respect would have improved after a few months provided that the Air Force was not required to operate intensively.

Aircraft reserves for Fighter Command were as weak as those of pilots. The following table shews this clearly:-

TYPE	NO. OF SQUADRONS	TOTAL INITIAL EQUIPMENT	AVAILABLE RESERVES	STORED RESERVES
Hurricane	5	70	23	
Gladiator	5	70	40	
Gauntlet	9	126	33	
Demon	7	98	53	NIL
Fury	3	42	11	
	29	406	160	

Available reserves included the Immediate Reserve with the squadron and a workshop reserve that was kept by the maintenance units. They should have amounted to 75% of the initial equipment of the squadrons; as we see, they were little more than half that figure. Behind these reserves there should have been what was called the Stored Reserve, which would be kept at aircraft storage units and would contain the majority of reserve aircraft in the proportion of nearly three to one first-line aircraft. There was no such reserve at this time. This great shortage was chiefly due to the change over to new types of fighter that was taking place at this time. Of the five types of aircraft in the Command only two were being manufactured and neither were yet in sufficient supply to allow adequate stocks of reserves to be built up. For this very reason it was necessary that there should be an organised salvage scheme, backed by an effective repair system, in order to make the limited resources of aircraft and spare parts go as far as possible. Some of the worst effects of the shortage might have been minimised in this way, but there was no such provision, although an attempt was made to improvise a repair and salvage scheme late in September. If Fighter Command had begun serious operations the shortage would soon have restricted the size of its effort.(1)

A.H.B. II H/150, Encl. 5.

A.H.B. II H/158, Encl. 19, para. 57.

(1) It is difficult to say who, or what, was to blame for the deplorable shortage of reserves throughout the Air Force. At least one member of the Air Staff has committed himself to the view that it was due to linking the expansion of the Air Force to political needs rather than to the capacity of the Air Force and the British aircraft industry, (Cf. II H/157, Encl. 21). Nominal first-line strength, he implies, was expanded to a high figure, even though the necessary reserves were not in existence, in order to impress political opponents at home and potential enemies abroad. One expansion scheme, Scheme 'C', was accelerated by the government; the Air Staff originally recommended that it should be completed in April 1939, but the government brought it forward by two years. Another one, Scheme 'J', was turned down on the grounds of expense, and the economies that were made in its successor, Scheme 'L',

vi. State of the Ground Defences

The ground formations of the A.D.G.B. system were in no better position than Fighter Command. The approved programme for the air defences and the weapons actually available at the time of the crisis are compared in the following table:-

EQUIPMENT	APPROVED PROGRAMME	AVAILABLE 1.10.38	
Heavy A.A. Guns	4.5" 288) 960 3.7" 352) 3" 320)	4.5" Nil) (1) 334 3.7" 44) 3" 290)	(1) Include regular units that were part of the Field Force.
Searchlights	4,128 (2)	1,430	(2) Approved 23.6.38.
Light A.A. Guns	1,112 guns (3)	Nil	(3) Approved 27.7.38 Temporary deployment of: 52 3" guns 46 2 pdr. guns 4,424 Lewis guns
Balloon Barrage	1,455 (4)	500	(4) Approved 27.7.38.
Vickers 'K' Light Automatics (for airfield defence)	1,300	Nil	

163 of the available heavy guns were available for London and the Thames Estuary, and the large towns and ports were given token defences, ranging from 4 guns for Derby and Coventry to 14 for Portsmouth, Birmingham, Liverpool and Sheffield. Likewise a small number of searchlights were deployed at east and south west ports, Liverpool and Birmingham; but most of the available lights were used to form an illuminated area covering London itself and protecting its flanks as far as the Channel in the south and Huntingdon in the north. The two anti-aircraft divisions and two anti-aircraft groups that would have handled this equipment were practically up to strength in all ranks, but the standard of training was low amongst

were chiefly at the expense of reserves, (IIa/1/54b, Encl. 36). However, the British aircraft industry must bear some of the blame in that it did not fulfil its own production forecasts. Nor can the Air Ministry itself be absolved from responsibility for the shortage of trained aircrews.

many of the Territorials. The balloon barrage units were short of men; of the 500 balloons available for the London barrage it was only possible to deploy 140, and this could not have been done without the assistance of some 500 soldiers and 400 airmen who were temporarily attached to the barrage organisation. The limiting factor, in addition to the scarcity of trained men, was the shortage of hydrogen gas cylinders.

ibid., Encl.1

vi; The Production Position

All these shortages of fighters, guns, and other anti-aircraft equipment would have been of small importance if war had broken out provided that no attack had been launched upon Britain before British industry had produced sufficient weapons to overcome the shortages. But armament production was unsatisfactory in nearly all categories.(1) Only two of the five types of aircraft with which Fighter Command was equipped were being produced in any notable quantity, namely the Hurricane and the Gladiator; production of the Spitfire had only just begun and no Defiants had yet been delivered. In the ordinary course of events the squadrons equipped with Gauntlets, Furies and Demons were due for re-equipment with more modern types. This process would have become imperative within a matter of days if these squadrons had had to go to war since the casualties they suffered could only have been replaced from small existing reserves behind which was no output from the aircraft industry. In this event the first-line strength of the Command would have been rapidly reduced unless sufficient Gladiators and Hurricanes could have been produced not only to keep in being existing squadrons of those types but also to permit the re-equipment of the squadrons armed with obsolete aircraft. During the July - September quarter 28 Gladiators 56 Hurricanes and 9 Spitfires were delivered; in October and November 52 Hurricanes and 20 Spitfires.

D.P.R.285. ibid. 291

(1) It is difficult to say when it became apparent to the British government that Germany's lead in industrial mobilization and re-armament was so great that there was nothing for it but to take up an essentially defensive attitude towards her. A.D.G.B. equipment, however, had priority over all other requirements from November 1937, when a decision was taken to that effect in the Committee of Imperial Defence. From then onwards air defence was the paramount immediate concern of all our military preparations. This is a measure of the extent to which the German Air Force was reckoned to hold the initiative, and, conversely, of the degree to which the country was expected to need the services of Fighter Command. Unfortunately, this avowed concentration of defensive weapons had not borne fruit by September 1938.

According to the autumn forecasts 25-30 Gladiators, 30-35 Hurricanes, 20-30 Spitfires and 10-20 Defiants would be delivered monthly by the beginning of 1939. Whether these would have been sufficient to maintain the strength of the Command in war would obviously have depended on what form the war had taken. This, at least, is certain, that if the Germans had commenced attacks on strength on London, Fighter Command would soon have been a wasting asset.

The Army anti-aircraft units were in a happier position than Fighter Command. Guns and searchlights are not subject to wastage to the same extent as flighter aircraft, and additions to the strength of the anti-aircraft batteries and searchlight units during the critical period were cumulative in effect. In the last half of 1938 about 30 heavy anti-aircraft guns, with sufficient predictors and height-finders to serve them, were being delivered monthly to the Army ordnance depots, but the production of Bofors guns had hardly begun. Searchlight projectors were being made at the rate of 150 a month, and sound locators at about 100 a month. The position in respect of the only expendable item, ammunition, was fairly satisfactory; over a million rounds were available for the 3" guns and 200,000 for the 3.7" guns; by November 40,000 rounds of 3.7" ammunition were being produced monthly. However, these monthly rates of production were far from satisfactory if the approved scales of anti-aircraft defence were to be provided by the beginning of 1940.

ibid.290

ibid.298

Effect of the Emergency upon Command organisation.

During the first week in October all immediate danger of war disappeared and a grand inquest upon the unhappy experiences of the crisis was set in train by the government. Each Command through the Air Force, and every department of the Air Ministry furnished a report upon its shortcomings, and many useful lessons were learned. Most of the weaknesses of Fighter Command have already been pointed out. The majority of them were not peculiar to the Command; they owed their origin to the impact of a massive expansion programme upon a small professional Air Force and upon an industrial economy unmobilised for armament production. Further consideration of them is not, therefore, proper to this narrative. But the emergency also disclosed a fundamental

weakness in the organisation of all operational Commands at home. It will be recalled that when the system of Commands came into being the individual Group Headquarters were kept free of nearly all administrative equipment and supply matters. Each Group Headquarters dealt directly with the Air Ministry on all questions concerning personnel but otherwise it was simply an organisation for the control of operations. It had only a small administrative staff and no technical staff officers, except for a liaison officer, between itself and the parent Command. Those who had opposed the scheme had argued that there would be an excessive centralising of administration at Command Headquarters; that, on the other hand, to put personnel questions outside the responsibility of the Command was impracticable and would lead to confusion of group and Command functions; and, most important of all, no Group Commander could be omitted from the chain of command on practically all matters except operations, and be expected to control his squadrons efficiently.

A.H.B. II H/158, Enclosure 19.

Judging by the evidence of the official Air Ministry report on the lessons of emergency these criticisms were justified. The emergency formed the expansion programme of the Air Force only partly completed. Individual commanders were required to bring their units to the highest possible efficiency in as short a time as possible. Consequently, the administrative, equipment, and engineering services were put under a strain comparable to that of war at the same time as they were coping with the problems of expansion. Bomber Command, in particular, found that it only stood the strain with difficulty. The Air Ministry report said, of this Command, "if war had eventuated, it seemed likely that the whole system of administration would have broken down." Part of the failure was due to the inadequacy of peacetime headquarters staffs when faced with what were virtually war conditions. During the emergency it was necessary to move large numbers of officers and men from their peace stations to operational squadrons in order that these should be brought up to thin mobilisable strength, and questions of personnel were undoubtedly badly handled. This shortage of adequate trained staffs had been recognised for some time. It was only one of a number of categories in which deficiencies of personnel existed, and

ibid.para.31.

A.H.B. IV C/4/169, Encl.1. para.34

recruiting and training schemes were in hand that would, in time, ease the position. In addition, however, the whole policy laid down in 1936 regarding the status of groups was called into question. The reforms that were recommended, Sir Edgar Ludlow-Hewitt of Bomber Command being the spokesman, were as follows:-

(a) essential services, such as equipment, signals, engineering, and medical, should be placed at group headquarters;

A.H.B. II H/158, Enclosure 19, paras.32 and 33.

(b) staff officers for these services, and an organisation staff officer, should be permanently attached to group headquarters;

(c) Command headquarters should be given more control over personnel administration.

It was also suggested that Commanders-in-Chief and group commanders should be given some latitude in financial matters so that they could put in hand any extraordinary measures that they considered necessary for the security of their units, and, later, monies up to the sum of £25,000 were put at the disposal of Commanders-in-Chief. Most of the other recommendations were also agreed to, but owing to the great shortage of suitable officers it was some time before the specialist staffs of bomber and fighter groups were at full strength.

It had been argued that this was a retrogressive step; administration was slowed down by the necessity of passing all communications through the hierarchy of headquarters between Air Ministry and the squadrons, which was precisely what the 1936 re-organisation was intended to avoid. The intention behind the reforms, however, was to improve the efficiency of the Group as a means of controlling actual operations, and there is no doubt that this was improved when each Group contained a full headquarters staff capable of advising the Group Commander on all questions affecting the efficiency of his units.

Expansion Policy in the Last year of Peace.

The September crisis had underlined the importance of an adequate system of defence, and henceforward even more emphasis was placed on air defence than formerly. Sir Kingsley Wood, the Air Minister, told his colleagues in a memorandum dated 25 October 1938, that he proposed "to give priority to building up our fighter force as soon as possible with fully adequate reserves both of aircraft and

C.P.218 (38) para.37.

personnel, and to aim at as high an output of fighter aircraft in war as can be secured from that section of the industry devoted to their production." This did not imply that the canon of aerial warfare had been rewritten; the belief that only a powerful counter-offensive can bring final relief from air attack was still accepted. But in the circumstances of late 1938, when there were good reasons for assuming that warfare would break out in the following spring, attention was necessarily concentrated on the fighter force, for it was unlikely that Bomber Command would be a danger to Germany until the summer of 1941. Meantime, Germany held an initiative in the air that registered her political and economic victories of the previous five years, and all that the Air Force could do was to concentrate on avoiding defeat rather than obtaining victory.

ibid. para. 51.

The chronological pattern of crisis was well established by the autumn of 1938 and so the first extra-ordinary measures that were taken to strengthen Fighter Command were intended to fit it for a possible clash in the April of 1939. It was recognised that the initiative lay with the enemy and every available fighter must, if necessary, be used in the line of battle. The critical period might well be the first three or four weeks of war and for that period only a small reserve of fighters could be accepted in order to ensure that the line squadrons were at full strength. In the view of the Air Staff this reserve sh be at least 50% of first-line strength, and, altogether, their requ ments for April 1939 were just over 700 modern fighters; Demons, Gauntlets and Furies were not taken into account. According to the autumn forecasts only 400 Hurricanes and Spitfires would have been produced by that date, and according to the aircraft census compiled in the Air Ministry's Directorate of Equipment 270 Hurricanes and 130 Spitfires had actually been delivered by the end of March 1939. There were, in addition, 170 Gladiators in England. The Air Staff and Fighter Command were wise, therefore, to look round, as they did in October 1938, for an aircraft that would serve as an interim type between the obsolete biplane fighters and the Hurricane and Spitfire.

A.H.B. II H/157, Encl. 31.

A.H.B. V B/2

It was decided that extensive use should be made of the Blenheim. Special sets of machine guns were designed to give it the necessary fire power for fighter work, and it was used for re-equipping the four Field Force squadrons. Sets of guns were also earmarked for seven medium bomber squadrons and two army co-operation squadrons so that these could be used as a reserve by Fighter Command if the situation demanded it.

These were extraordinary measures, designed to give the Command a reserve of aircraft as quickly as possible. Action was similarly taken to provide a reserve of pilots. A reserve of at least 150 trained fighter pilots was reckoned essential if the Command was to undertake intensive operations with any hope of maintaining its strength, and it was decided that such a reserve should be created, if possible, by the end of June 1939. Every Command, Bomber Command in particular, was crying out for pilots at this time, and this decision emphasises the value which was set upon fitting Fighter Command for war with the utmost speed. It was hoped to effect it by giving Fighter Command priority in a training scheme that had been under consideration for some time.

C.P.218 (38) para. 44.

Sir Cyril Newall had decided in May 1936 that it would be an advantage to form training units intermediate to the Flying Training Schools and the operational squadrons in order to accustom newly-trained pilots to aircraft of similar characteristics, though less expensive and elaborate, to those that were in use at the squadrons. At this stage he intended to apply the scheme only to Bomber Command but in November, on the suggestion of Air Vice-Marshal Portal, the Director of Organisation, it was agreed that the new units should be used not only for training but as pools for the replacement of casualties in both Bomber and Fighter Commands. In view of the priority that was to be accorded to the needs of Fighter Command the first two of the new units, which had now been entitled Group Pools, were attached to it, and served No.11 and No.12 Groups exclusively. There was some delay before either was actually engaged in training pilots. No.11 Group Pool commenced work at Andover in March 1939, being transferred to St. Athan in June. No. 12 Group Pool at Aston Down only started to function after the

S.46936, Encl.1A

ibid.Mins. 2 & 14.

outbreak of war.

State of Fighter Command in March 1939

C.I.D.309-A, passim.

Although considerable progress had been made since September 1938, spring of the following year saw many gaps in the air defences. Pilots and aircraft were available for the mobilisable squadrons of Fighter Command, but there was still a serious shortage of reserves. None of the underground operations rooms had been completed, and the Ring Main System that was so essential for the security of telephone communications in and around London would not be ready for at least another year. Operations rooms were short of staff and their establishment could only be completed with the help of Territorials. The sector organisation was further weakened by the absence of a complete D/F system; since the previous September only one sector in the Command had been equipped with full D/F facilities. Out of the 18 R.D.F. stations contemplated in the existing plan, 12 were working, and 21 of the 33 approved Observer Corps groups were in readiness. More guns and searchlights were available than six months previously; 570 heavy guns and nearly 2,000 searchlights could have been deployed within 48 hours, but these represented less than half the requirements laid down two years before, and, as far as guns were concerned, only a third of the new scale agreed upon in February 1939. Communications between gun operations rooms and individual gun sites were satisfactory, but this was far from being the case in the searchlight organisation. The necessary wiring to enable searchlights to function efficiently in the Aircraft Fighting Zone had only been completed as far north as Gainsborough; elsewhere no searchlight communications existed except in the gun zones of the large towns. The London balloon barrage had been strengthened and Balloon Command Headquarters had been formed, but owing to faulty equipment and a shortage of trained balloon operators it was not possible to deploy the whole of the existing barrage.

C.I.D.308-A

The only truly satisfactory feature of the defence position at this time was the marked improvement in fighter production. Between February and May output exceeded forecasts by 25%, and 467 Hurricanes, Spitfires and Gladiators were delivered during the four months. By the

end of June a reserve of two hundred modern fighters had been assembled. There was still an alarming discrepancy between reserves and production on the one hand and anticipated wartime wastage on the other but if the improvement in production continued this could be expected to disappear. Time was obviously the vital factor here, as it was in the matter of reserves of pilots. As yet there were practically no reserves of fighter pilots but the recruiting measures of the last year were beginning to shew results and some 200 Volunteer Reserve pilots had received their "wings" by the end of June 1939. This did not mean that these men were thereby fully trained for war, but they were ready for the intermediate training provided, as far as Fighter Command was concerned, by the Group Pools. The questions undecided were whether, first, sufficient pilots could be trained in time to act as reinforcements for Fighter Command during the first few weeks of war, and, second, whether the training organisation was big enough to ensure a flow of pilots sufficient to maintain the strength of the Command and leave a surplus available for further expansion.

E.P.M.128(39)
Appendix 'B'

It should not be forgotten that the inter-relationship between production, training and expansion was complicated by the successive extension of R.A.F. commitments, especially air defence commitments. At no time between 1934 and 1939 could the architects of the air defence system be sure that their plans were complete. The air defences planned by the Brooke-Popham Committee in 1934 were amended on a major scale no less than five times prior to the outbreak of war, and each amendment, with the exception of that of 1936, was inspired by the continuous expansion of the German long-range bomber force. There was no guarantee in 1939 that the expansion of this force had come to an end; indeed there were indications that expansion would continue beyond the 2,050 first-line aircraft that the force was expected to contain by the spring of 1940. Nevertheless the difficulties that were being experienced in England were such that the completion of the fifty fighter squadrons that could contain the German force was scheduled for as late as the spring of 1941. Moreover during the last few months of peace Fighter Command was committed to a number of fresh tasks, all of which further widened the gap between the actual and the planned strength of the Command.

EXTENSION OF THE COMMITMENTS OF FIGHTER COMMAND, 1939.

Protection of coastal shipping in home waters.

The last year of peace saw Fighter Command set a number of new tasks. The first of them meant that the Command was no longer confined to the defence of territory in the United Kingdom proper; henceforth it would assist the Navy and Coastal Command in protecting coastal shipping. The circumstances that gave rise to this new duty were these. For some years a special committee appointed by the Committee of Imperial Defence had been directing numerous experiments aimed at establishing the respective merits of air attack against surface ships and anti-aircraft defence at sea. In its third report the committee concluded, amongst other things, that "the problem of protection of merchant shipping from air attack is at present unsolved", and recommended that the whole policy of protecting naval and commercial shipping should be re-examined. At the same meeting of the Committee of Imperial Defence, at which this report was considered, Dr. Leslie Burgin, the Minister of Transport, submitted a memorandum on the diversion of shipping from east to west coast ports which appeared to shew that complete diversion was impracticable. The matter was not settled outright at the meeting, but there was little doubt that some traffic would pass round the south-east and east coasts in wartime and would need protection against air attack. In view of the findings of the sub-committee on air attack at sea it followed,(1) to paraphrase the remarks of Admiral Sir Roger Backhouse, that British coastal shipping must travel in convoy wherever it was exposed to air attack, it must be provided with an escort, and it must steer as close to the coast as possible in order to derive maximum protection from the squadrons of Fighter Command. The

Committee of Imperial Defence 349th Meeting, 3 March, 1939.

(1) The views of the Admiralty and the Air Ministry on the lessons to be learned from the Spanish Civil War about the efficacy of air attack on shipping were much the same. Sir Roger Backhouse stated that during the war ships under way had seldom, if ever, been hit by high-flying bombers; almost all the damage had been done to ships lying in port. On the other hand, low-flying attacks had met with some success against ships at sea. Sir Cyril Newall said that during the twelve months ending 1 October, 1938 there had been 31 attacks on ships at sea, of which 41.9 per cent. were successful in that the ships were either sunk or damaged. The percentage in the case of ships in harbour was 86 per cent.

The question was further considered in April 1939 by representatives of the two services concerned and they concluded that fighter aircraft were the best means of protecting merchant shipping. Unforunately, there were no aircraft available for the specific duty of protecting shipping, and the cover provided by the general fighter system only extended some 5 miles out to sea. In any case the time of warning was unlikely to be long enough to give the fighters a chance to intercept before the convoy was actually attacked. The only possible course of action, therefore, was to provide a small air escort for all convoys passing between the Firth of Forth and Southampton in daylight. Four squadrons of 16 aircraft each were reckoned sufficient for this task, and they were allotted to the Command as additional to its establishment of fifty squadrons.

Committee of Imperial Defence 371st Mtg., 1 August 1939.

Fighter Defences for Scapa Flow.

The second of the new commitments was the defence of Scapa. In April 1939 the Admiralty informed the Home Defence Committee that Scapa would be used as a base for the Fleet during a European war. In these circumstances there would be in the Flow in wartime a large number of base ships, depot ships and shore establishments of all kinds which would need protection against air attack. The Admiralty made it clear that they were not seeking protection for the Fleet itself, which was capable of providing its own anti-aircraft defence, but for the base facilities on which the operations of the Fleet depended. The first step was to increase the allotment of heavy anti-aircraft guns from 8 to 24 and also provide a battery of light guns. There remained the question of what fighter defences could be provided. Obviously these could not be a part of the A.D.G.B. system, which terminated just north of the Firth of Forth, nor, in view of the desolate nature of the country, could they serve any useful purpose other than the defence of the Fleet base. The Air Staff appreciated the matter in this wise:- "Since Scapa Flow is in the Orkney Islands and some 15 miles from the mainland it would be

Ibid. 373rd Mtg., 3 August 1939.

ibid. 319-A Appendix B.

A.H.B. 11 B.I Encl. 70.

be impracticable to provide, in the vicinity of Scapa, a fighter force capable of meeting the maximum scale of attack on equal terms. Furthermore the fighters could only operate effectively during the hours of daylight as the avenue of attack is over the sea where illumination is impossible. It follows, therefore, that if Scapa is to be defended by fighters, it should be provided with the minimum force that would exercise a deterrent to enemy attack and that arrangements should be made to enable this force to be reinforced in the event of prolonged and determined air bombardment. The details of the defence of Scapa, like all air defence matters affecting more than one service, were referred to the A.D.G.B. sub-committee under Air Chief Marshal Sir Hugh Dowding. As a result it was recommended that two fighter squadrons should be permanently stationed at Wick, in the absence of a suitable aerodrome in the Orkneys, and ground facilities should be provided to enable a further five squadrons to be transferred from A.D.G.B. to the defence of Scapa if the scale of attack warranted it. The Air Staff did not expect that even the two permament squadrons could be provided for at least two years, but the additional commitment was agreed to prior to the outbreak of war, when the provision of the squadrons became an urgent necessity.

New defences for Northern Ireland

Committee of Imperial Defence 358th Mtg., 19 May, 1939.

H.D.C. 312

One more squadron was added to the establishment of the Command in May 1939 in order to provide a nucleus defence for Belfast. The city derived considerable security from its position behind the general air defence system of the United Kingdom but since it was within range of the German long-range bombers and contained important industries certain defences were allotted to it. In addition to the fighter squadron mentioned above these were to consist of one regiment each of heavy and light guns. To enable the warning system to operate in Northern Ireland two R.D.F. stations, one at Stranraer and one in the Isle of Man, were to be set up.

Effect of the new commitments on A.D.G.B.

These three new tasks meant that within a year of the decision to build a fighter force of fifty squadrons seven more squadrons had been added to the planned strength of Fighter Command. All the fifty squadrons, less four allotted to the Field Force, were earmarked for the defence of London and the industrial areas of the country, and the complex ground organisation required by this force was already planned and under construction. In the summer of 1939, however, the Command only boasted thirty-nine squadrons and it was inevitable when war broke out in September that the question should arise whether the main fighter force should be depleted in order to carry out the tasks newly imposed on the Command or whether these should remain unprovided for until the main force had reached its planned strength. In fact, as we shall see, fighters were provided for the protection of Scapa and for trade defence duties. Sir Hugh Dowding was always quick to oppose any policy that diverted Fighter Command squadrons from what was their prime duty, the defence of the country against large-scale attacks, but he appears never to have pressed his point of view unless there seemed to him to be a danger that squadrons would be irrevocably diverted from the Command.

Fighter Command and the Field Force.

But what was to prove the most onerous of all the commitments of Fighter Command was the support of the Field Force of the Army. The extent of this had been settled as far back as 11 December, 1935 and included four fighter squadrons. Since then squadrons had always been earmarked for the particular duty of protecting the Field Force and the area in which it operated, and this was the position when the Anglo-French conversations opened in London on 29 March 1939. Despite strong pressure on the part of the French to increase the allotment of fighters no specific increases were agreed to by the British representatives on the grounds that it was vitally necessary to maintain in England a sufficient fighter force to guard against the possibility of a 'knock-out blow'. However, the French were told that the Air Staff were examining

C.O.S.924

examining the possibility, first, of accelerating the date by which the four squadrons could be in action in France, and second, of releasing further squadrons for France should the situation in England warrant it.(1) This clearly gave our ally the right to raise the matter again if, in the event of war, heavy attacks were not made on England. Meantime, no changes were made in the number of promised fighter squadrons.(2)

In June 1939 further pressure was brought to bear in favour of a large air contingent for the Field Force, on this occasion by the War Office itself. Lord Gort, the C.I.G.S. at that time, presented demands far exceeding anything that had previously been agreed upon. He based his claims on the Cabinet decision of April 1939 to increase the Field Force to 32 divisions as well as upon the lessons of wars such as the Spanish Civil War which, in the Army's opinion, made it clear, that the scale of air support accepted by the War Office in December 1935 was no longer adequate to the needs of modern warfare. The C.I.G.S. did not presume to state exactly how many fighters and bombers would be required by the complete Field Force; he left this to be decided by joint Air Ministry and War Office meetings. But he claimed that if war broke out during the next three months the Field Force would require six fighter squadrons within six months of mobilisation. As in the case of the French demands so also those of the War Office were resisted and no specific additional fighter commitments had been agreed to when war broke out. Nevertheless nobody could doubt

ibid.

(1) This matter is treated more fully in R.A.F. Barrative, "The French Campaign", Pt.I, pp. 25 -27.

(2) Fighter Command, therefore, did not suffer any numerical loss. Until the summer of 1939, however, it had always been understood that twin-seater fighters should be provided for the Field Force squadrons. Then, not least as a result of an able paper on the requirements of a "battlefield fighter" by Sir Hugh Dowding, which emphasised the importance of performance in such an aircraft, it was decided to send Hurricanes instead of Blenheims. This was a greater relative loss to the Command than the despatch of Blenheim squadrons in that its main strength early in the war was the single-seater squadrons of the regular Air Force.

doubt that when the Field Force expanded beyond the size for which four fighter squadrons were deemed sufficient protection the inevitable demand for further fighter squadrons would hardly be gainsaid.

Conception of an Air Defence system common to France and the U.K.

The four squadrons were intended for the protection of the Field Force and, as part of its Air Component, came under the command of the G.O.C.-in-C. There was strong opposition amongst the Air Staff to this particular method of providing air protection for a ground force, opposition which appears to have centred in Group Captain J.C. Slessor, the Director of Plans. It was held that the most effective and economical method of air defence was by a system of territorial sectors and zones similar to that constructed in Great Britain. Group Captain Slessor even envisaged a common Anglo-French air defence system "from Scapa to the Mediterranean", and, during the summer of 1939, it seemed likely that the four Field Force fighter squadrons would be allotted two sectors of the French air defences between the Channel coast and Lille. This policywas an argument against agreeing to the Army's claims for more fighter squadrons to be attached to the Field Force, but it was no guarantee against the dispersion of the resources of Fighter Command. On the contrary, the long-term plans advocated by Group Captain Slessor required that twenty fighter squadrons should be put on a mobile basis in order that they could be used anywhere within the Anglo-French system. This could only mean, to put it bluntly, that they would be used in France. This is not conjecture; a prophetic minute by the Director of Plans, dated 6 April 1939, to Air Commodore Donaldson, the Director of Organisation, shews quite clearly what was in his mind. In it he stated, "I have felt for some time - and my feeling has been reinforced by the recent conversations - that we should be ready with some arrangements whereby, if necessary, we could send some fighter squadrons to Northern France. The French are deplorably weak in fighters and have an immense front to defend. The thing they are most frightened of is a repetition on a larger scale of 1914 - a sudden invasion

A.H.B. II H/97 Encl. 32, pp.5-6.

ibid., Encl.42, p.7.

A.H.B. II H/121, Encl.56.

invasion by a mass of divisions, headed by armoured and motorised formations, through the Low Countries. It seems quite possible that such an invasion might be supported by the bulk of the German Air Force, with the object of eliminating France from the war before turning on us. We could help the French with the bombers. But unless we can make some arrangements for operating fighters from French bases, we might be faced in the initial stage of such a war with the spectacle of five or six hundred good short-range fighters sitting in England unable to contribute at all to the issue of the struggle in the Low Countries - a struggle on which the subsequent fate of England might ultimately depend. I know the difficulties only too well. It is unfortunate that our quite natural and proper obsession with the danger of a "knock-out blow" against this country has forced us to concentrate on a type of fighter and a static fighter defence organisation at the expense of our capacity to assist easily in resistance to a knock-out blow of a different kind against France, which, if successful, would only be a first stage of a knock-out against England". This did not mean that the Air Staff were prepared to sacrifice the efficiency of Fighter Command for the sake of additional fighter strength in France. Whenever the question of fighters for France was considered in inter-service meetings, such as the Chiefs of Staff sub-committee, or in conversations with the French, Air Ministry spokesman consistently emphasised the prime importance of maintaining a fighter force in England sufficient to defeat any German attempt at a "knock-out blow". They were willing, however, to consider ways and means of sending additional squadrons to France if the situation at home warranted their despatch, and on 11 May 1939 the C.A.S. decided that six additional single-seater fighter squadrons should be established on a mobile basis by the beginning of 1940 so that they could be transferred to France at short notice. In conformity with previous Air Ministry pronouncements Sir Cyril Newall maintained that all arrangements going beyond the four squadron commitment were conditional upon

E.g.See C.O.S.912.

A.H.B. II H2 passim.

Conditional promise to send more fighters to France.

A.H.B. II H/97, Encl. 22.

C.O.S.912

upon the air situation at home.

In sum, the Air Staff took the line that the Army should not be allowed a fighter force the commander of which was subject to the orders of an Army general officer. It was regretted that even four squadrons had been specifically allotted to the Field Force, but the Army was not pressed to release them.(1) This did not involve the Air Staff in a consequent refusal to despatch more than four squadrons to France; there was at least one section of it that was very willing to release more squadrons provided that they were controlled and employed according to the Air Staff's conceptions of the use of air power. Finally, preparations were set in train to send six more squadrons to France.

Reaction of Fighter Command.

A.H.B. II H/97 Encl. 37.

Sir Hugh Dowding entered a protest against this policy in a letter to the Air Ministry dated 7 July 1939. He said, "If this policy is implemented and 10 Regular Squadrons are withdrawn from this country, the air defence of Great Britain will be gravely imperilled. The Air Staff estimate is that 50 Fighter Squadrons are necessary for its defence. I calculate that by January 1940 I shall have 25 Regular Squadrons equipped with modern types plus 14 Auxiliary Squadrons in various stages of efficiency. Of these 14, 6 will be nearly as efficient as Regulars, 5 will be semi-efficient, and the remainder of little value. If 10 Regular Squadrons were withdrawn, the remaining resources would be altogether inadequate for the defence of this country". From the beginning of 1939 to the collapse in France Sir Hugh Dowding consistently took the line that nothing should be allowed to interfere with the creation of the force of fifty squadrons to which Fighter Command was entitled. This was no more than his duty as the officer primarily responsible for the air defence of Great Britain, but he was willing to make his contribution to solving the French problem. In the letter quoted above he maintained

(1) For a fuller treatment of this matter see A.H.B. II H2 - "Air Ministry policy during the Anglo-French Conversations, 1939"

maintained that a corollary of the conditional commitments to France was the acceleration of the 1940 programme for the formation of new regular fighter squadrons and he urged that this should be done, giving a list of six Fighter Command stations which had accommodation for extra squadrons. Unfortunately, any project of this sort seems to have been practicable only at the expense of the bomber programme, which was already behind schedule. For example, the four trade defence squadrons, which were formed in the autumn of 1939 in Fighter Command, were provided from resources originally earmarked for new medium bomber squadrons, and every such diversion weakened the counter-offensive power of Bomber Command. The advent of the 8-gun fighter and of R.D.F. had given rise to a more optimistic view of the possibilities of direct defence than there had been in the early 'thirties', but the Air Staff still pinned their hopes of victory in the air upon the bomber, and were loath to propose any retarding of bomber expansion.

Summary of Air Staff policy.

ibid.Encl.53.

The final pre-war statement of Air Staff policy on this matter appeared in papers compiled by the Air Staff in August 1939. They contained a summary of policy on the employment of fighters in support of the Field Force and also a detailed plan for the employment of the four fighter squadrons allotted to it. They were approved in the third week of August by the D.C.A.S. and the D.M.O. & I. at the War Office. Nothing was specifically promised beyond the original four squadrons, but in the event of a heavy scale of attack developing upon the Army the air defences of Great Britain would be relied on to provide reinforcements. Due warning was given, however, that 'for political reasons' it might not be possible to take squadrons from Fighter Command; for this reason a reserve of two squadrons ought to be earmarked for France. It was recognised that this force would be insufficient to give protection to the full Field Force of 32 divisions, which would require the support of fourteen fighter squadrons, but the Air Staff emphatically stated that neither the extra ten squadrons nor the

the reserve of two squadrons could be formed until the completion of the existing expansion programme in April, 1940. In the meantime six regular squadrons of Fighter Command would be placed on a mobile basis before the end of 1939, but the decision to despatch any of them overseas must rest with the Cabinet.

Weakness of this Policy views of Sir Cyril Newall and Sir Hugh Dowding.

This policy appeared to hold adequate safeguards for Fighter Command but, in fact, it was not difficult to visualise circumstances which would lead to an urgent and irresistible demand for the additional Field Force squadrons. The War Office intended to expand the Field Force to its full strength within twelve months of the outbreak of war. If a British force of 32 divisions was committed it would have been impossible to avoid providing the agreed fighter strength of 14 squadrons whatever the air situation at home and even if the expansion programme had not been completed. It is quite clear that the two senior air officers most concerned in the matter, Sir Cyril Newall and Sir Hugh Dowding, thought that the Army's case in those circumstances would be very strong. In July 1939 Sir Cyril Newall expressed himself to that effect in a memorandum that was placed before the Secretary of State, Sir Kingsley Wood, at a meeting of the Air Ministry Expansion Progress Committee. He pointed out that it was no answer to the War Office to promise to form additional squadrons for the support of the Army only as soon as the Air Force had completed its own current expansion programme. Clearly the Field Force had a right to at least a minimum standard of air protection. "Sooner or later", the C.A.S. went on, "We shall have to meet certain unavoidable requirements of the new Field Force. We have already done much to meet the Admiralty in the matter of personnel for the Fleet Air Arm. But if the demands of the Admiralty and the War Office are to be pressed regardless of the effect on the air defence situation at home it becomes a duty to resist them".

E.P.M.128 (39)

179th E.P.M. Mtg., 4 August, 1939.

Sir Kingsley Wood agreed that as a result of a general impression that the R.A.F. was rapidly overcoming the difficulties of

of expansion there was a danger that its future needs might be overlooked in a desire to put the other services on a proper footing. Nevertheless he felt that there was no immediate danger of the government approving large Army and Navy air programmes at the expense of the Metropolitan Air Force, and there the matter appears to have temporarily rested. This at least is certain, that the C.A.S. feared that the growth of Bomber and Fighter Commands might be endangered through air requirements of the Field Force and Fleet Air Arm that were not, in his view, vital to national defence in a war against Germany.

Sir Hugh Dowding's fears were of a different sort. He felt that such commitments to the Field Force as had already been entered into constituted a threat to the efficiency of Fighter Command. Some indication of his opinion has already been given but it was not until war had actually broken out that he had an opportunity of officially expressing his views with all the considerable downrightness of which he was capable. After personal interviews with Sir Kingsley Wood and the D.C.A.S., Air Vice-Marshal R.E.C. Peirse, which cannot have been satisfactory to him, Sir Hugh Dowding wrote to the Air Council on 16 September to ask whether they were satisfied with the existing fighter defences of the country and with any arrangements that were immediately in hand to strengthen them. The relationship between fighter strengths at home and in France occupied much of the letter. Sir Hugh admitted that for many years four squadrons had been earmarked for the Field Force but expressed his "consternation" that they had been despatched within a few days of the declaration of war and before any attack had been made on England, since he had always understood "that these squadrons would never be despatched until the safety of the Home Base had been assured". Referring to the six squadrons of Fighter Command that were to be placed on a mobile basis and to the condition that they would not be withdrawn unless it was safe to do so, he said, "I know now how much reliance to place on

A.H.B. IV C/4/294, Encl. 2.

ibid. Encl. 1.

on these assurances". The Air Council in their reply of 21 September reiterated that these six squadrons would not be sent overseas except by decision of the War Cabinet. As for the early despatch of the original squadrons the Council referred to Sir Hugh Dowding to a paper bearing his signature that had been circulated in the early part of 1938, implying by this that he could hardly have been surprised when the squadrons went to France in view of his own previous prophesy. The passage in question states that "it is by no means impossible that these (four) squadrons might have been sent abroad before the opening of hostilities". Arrangements had in fact been concerted with the War Office and the French to move four fighter squadrons to France for the protection of the Field Force as soon as it began to cross the Channel. These arrangements were only completed during the last week in August, but ever since the opening of the Anglo-French conversations in the previous March the Air Staff had been studying the problem of accelerating the despatch of these squadrons. Thenceforwards there was never the slightest likelihood that the four squadrons could ever be kept in England once the Field Force began to move, and Sir Hugh Dowding being aware of the plan, S.51683, Encl. 30A, Letter D. of Organisation - Dowding, 7 July, 1939, ought not to have expected it.

A.D.G.B. 109, para. 4, 26 March, 1938.

A.H.B.II H/97, Encl.53-57.

That the move was inevitable is beyond doubt. In the circumstances, the Air Force was in honour bound to protect the Army. Sir Hugh Dowding emphasised this point in a further letter to the Air Council, dated 25 September, 1939. He did not doubt that 'irresistible pressure' was brought to bear upon the Council to despatch the four squadrons immediately war broke out, 'but similar pressure is likely to be applied to keep these 4 Squadrons up to strength and to despatch 6 more Squadrons'. He foresaw a steady drain upon the resources of Fighter Command if hostilities actually broke out in France, and again he appealed for the formation of more fighter squadrons as soon as possible.

A.H.B.IV C/4/ 294, Encl.5

Conclusion.

This exchange of correspondence will demand our attention later. Sufficient has been said of its contents to shew that the pressure of British troops in France constituted a potentially large commitment, and moreover, in the view of Sir Hugh Dowding, an irresistible commitment whose satisfaction would debilitate the air defences at home. As the officer responsible for the air defence of Great Britain Sir Hugh Dowding, by definition, had to take an insular view of British strategy and speak out against any policy that seemed to him to weaken his forces without promising any weakening of those of the enemy. But the C.A.S., as we have seen, was also concerned at the potential drain upon the air strength available for national defence, and by national defence he did not mean only guns, searchlights and fighter aircraft; he was thinking equally, if not more, of Bomber Command. Whether Sir Cyril Newall, any more than Sir Hugh Dowding, took too restricted a view of the possible functions of the Air Force cannot be judged within the limits of an Air Force narrative. A verdict should only be passed as a result of a historical survey of the grand strategy proper to this country in the five years prior to the war. But it should not be forgotten that both these officers had given warning of the danger of so weakening the defences at home in order to give aid to France that they would not be strong enough if Britain was attacked singly.

FIGHTER POLICY, SEPTEMBER 1939 - MAY 1940.

Introduction

The history of Fighter Command during the first nine months of war revolves round the clash between the air defence needs of Great Britain itself and those of the B.E.F. in France, of the naval bases in Scotland and of the merchant shipping that plied along the East coast of the United Kingdom. The points of view of the different interests concerned in what became a matter of controversy cannot be understood, nor can their validity be assessed, unless certain broad aspects of air defence policy during the five years preceding the war are first appreciated.

In 1934 there existed no considered plans for the use of British forces against Germany. Up to that time the Far East had seemed the most likely theatre of future conflict. Consequently when the Chiefs of Staff began to study the problem of war with Germany they were unable to give an immediate and agreed answer to the question of how British air forces would best be employed. It is clear enough that the attitudes of the Air Ministry and the War Office were radically different. The Air Ministry were concerned to defend the United Kingdom against air attack by means of an organised defence system at home and by a sustained counter-offensive against the German bases. The War Office, however, were not convinced that the German bomber force was a major threat to the home base and were anxious to avoid retaining large air and ground forces there that could be employed in support of the Army on the Continent.

C.O.S.125th Mtg., 14th May, 1934.

The C.I.G.S. of the time, General Sir Archibald Montgomery-Massingberd, invoked the assistance of the Germans themselves to support his argument, giving as the opinion of the Reichswehr chiefs that bombing outside the zone of the armies

was undesirable unless success on land had been assured.

The C.A.S., Air Chief Marshal Sir Edward Ellington, admitted that the air threat to Britain would be reduced if the security of the Low Countries could be guaranteed and if France was our ally, but he believed that air forces could and would be used in large-scale independent bombing operations. Germany might well be able, even when fighting more than one opponent, to concentrate the bulk of her bombing force against single objectives. It followed, therefore, that Great Britain must budget for an establishment of air defence weapons sufficiently large to maintain her even in a single-handed war against Germany.

ibid.

S.33237, Minute 62, CAS-D.D.O.I., 1 August 1934.

The obvious application of this principle was accepted, nominally at any rate, by the administration of Mr. Baldwin and Mr. Chamberlain. Each successive expansion programme from 1935 - 38 was designed to give the country a bomber strength equal to that of Germany, and a fighter force that would be capable, it was hoped, of defending the country against the full weight of German attack. From the autumn of 1936 the air defences were planned on the assumption that Germany might turn the full weight of her bomber force against us in the opening stages of another war in order to administer a 'knock-out blow'. A year later air defence equipment was given priority over other sorts of weapon.(1) It was as part of this strategy of 'island defence' that the Air Ministry planned not only an elaborate air defence system under Fighter Command but a bomber force that would operate most effectively against Germany from bases in this country.

But there was another element in the Government's policy which, when translated into military terms, laid upon the Air Force a number of tasks which could not be carried out from bases in England: this was the policy of European

(1) See 'The Origins and Pre-War Growth of Fighter Command', Part I.

alliances. In 1934 the Government accepted the fact that an expeditionary force would have to be sent to the Continent if the British contribution under the Locarno Pact was to satisfy France and Belgium. As matters stood at that time there could be no question of a large British army fighting in Western Europe for many years to come. In any case, the Government was anxious to avoid a great continental expedition; and it looked upon the force that might be sent more as a contribution to British security from air attack, since it would help to deny the Low Countries to the Germans, than as the first instalment of the great armies that we had raised and despatched there during the Great War.

This point of view had the full support of the Air Staff. They were quite eager to support an expeditionary force provided that it had the limited and specific aims of securing Belgium from the German Air Force and, conversely, of providing air bases there for our own striking force. They planned to base there some twenty light bomber and five fighter squadrons in addition to the air component that would accompany the Army. This, it was agreed in December 1935, would amount to four fighter, two bomber and seven army co-operation squadrons. Further than this the Air Staff were reluctant to go.(1) They conceived the military expedition to be chiefly a move in the air war that would enable detachments of the Metropolitan Air Force to operate from continental bases. It is not too much to say that they looked forward to a time when the performance of aircraft would have improved

C.I.D. 1181-B, page 21. April 29, 1935.

(1) There could be no clearer statement of the views of some at any rate of the Air Staff than the following extract from a minute by Group Captain R.H. Peck to Air Vice-Marshal Ludlow-Hewitt (A.H.B. IIA/1/11a, D.D.O.I.-D.C.A.S., October 1934):- "I feel that there are many more army officers who feel that while they have got the Government to agree to send an expedition to the Low Countries as a security measure for the protection of Great Britain against air attack, this should not be allowed to be a real role to be assigned to the expedition. The security measure aspect of it will I feel sure, be glossed over and it will be, as the months go on, turned into the first step towards the great military offensive on which they pin their faith as the offensive measure best calculated to secure victory."

to such an extent that it would no longer be necessary to base squadrons on the Continent in order to carry out attacks on targets in Germany. In those circumstances the need for an expeditionary force would, from the Air Force point of view, have disappeared.

So long as there was no increase in the size of the Army that was earmarked for Europe the Air Ministry could and did continue to concentrate on building a Metropolitan Air Force, understanding by that term a force trained and equipped to operate defensively and offensively from this country against Germany. With each German success, however, the isolation of Great Britain and France became more marked until the Government could no longer evade the fact that if any real stand was to be made against Germany there must be a big British contribution on land to assist the otherwise heavily outnumbered French. The decision was not made until April 1939 when the Cabinet set the Army a target of 32 field divisions and introduced the measure of conscription that such a force demanded.

With that decision the Air Ministry found itself in a most serious dilemma.(1) Its plans for a Metropolitan Air Force were maturing to the extent that the long term composition of the force and the duties that it would perform were known, but none of the Commands was up to strength, nor would be, under the latest expansion scheme, until the Spring of 1941 at the earliest. The offensive element of the force was to consist almost entirely of heavy bombers, which however admirable for carrying heavy loads of bombs from bases in England to targets in Germany were practically useless for the support of ground forces on or near a battlefield. The defensive force of fighters

(1) The C.A.S., Air Chief Marshal Sir Cyril Newall, said, "On the widest grounds of national policy this decision was perhaps unavoidable, but I do not think it unfair to say that it was perhaps taken .....without adequate regard to whether this country.....could afford to run three great services simultaneously." (E.P.M.128 (39), para. 14, July 1939).

while more flexible than the heavy bomber squadrons, was being built up to resist the heaviest attacks that the German bombers could make on this country, and no reduction in it could be accepted. Nevertheless the Army could not be expected to go into action without air protection. The dilemma was, therefore, which of the two forces, the Metropolitan Air Force or the Field Force, was to suffer. In the last few months of peace the Air Ministry took its stand on the principle of the 'knock-out-blow' and would not promise to release more squadrons to the Field Force over and above those already allotted. It agreed, however, in June to submit the whole subject to a joint War Office and Air Ministry Committee, but this body had made no recommendations when war broke out about the fighter requirements of the forces that were to be sent to France.

The Functions of Fighter Command at the outbreak of War. 1.The Defence of London.

It would be tedious to chronicle all that was said for many years before the war, privately by responsible air officers and publicly by statesmen and every organ of public opinion, about the peculiar vulnerability of London to airattack. The form of such an attack and its effect upon the life of a civilised community was depicted in the press and cinema with every circumstance of horror; while the supposedly more objective estimates of air raid damage which were made for the guidance of the government drew a terrible picture of chaos and destruction. Some words of Sir Edward Ellington, the Chief of the Air Staff during the early years of the re-armament period, can be taken as typical of the more soberly expressed opinions: "In approaching the prospects of a successful air campaign either against Great Britain alone or against both Great Britain and France, there is one conspicuously favourable factor which will tend to influence Germany's judgment and encourage her to hope for success, and that is the exposed position and vulnerability of London ..... France offers to German attack no such favourable objective. Nothing that either France or ourselvescan attack in Germany can have quite the immediate and decisive results which Germany may well hope to gain by an overwhelming attack on London.'

C.O.S.343, para 5
11 July 1934

It was primarily to defeat such a stroke that the old A.D.G.B. organisation and, later, Fighter Command had been built up.

ii. The Defence of other Centres of Population and Industry.

Relative to their proximity to Germany the other large towns of the United Kingdom were liable to attack to the same degree of intensity as London. Accordingly as the range of bombing aircraft and the size of the German bomber force increased prior to the war so additional fighter squadrons had been formed to cover the air approaches from Germany to the Midlands, Lancashire, the North-East coast and the Forth-Clyde area.(1)

iii. The Defence of the Supply and Distribution System.

These two functions of Fighter Command, the defence of London and the main centres of industry, insofar as the chief ports and centres of communications were thereby protected, embraced a third task, the defence of the supply and distribution system of the country. But until the last year of peace the protection of shipping at sea, which was a vital part of that system, was not a duty of the Command. It was only when it was decided in the summer of 1939 not to divert shipping completely to ports in the West that Fighter Command was given, albeit in no clear directive, some responsibility for the protection of shipping passing round the East coast.(2)

iv. The Defence of Naval Bases.

The first two functions of the Command also automatically ensured some protection for the majority of navalbases. The fighter squadrons that were, by the outbreak of war, stationed near the Forth for the defence of Edinburgh and Glasgow were ideally in a position to intercept attacks on the Fleet base at Rosyth. Portsmouth and Plymouth obtained some security from their position to the west of the fighter stations originally sited for the defence of London. In April 1939, however, with the Admiralty's decision to make Scapa Flow into a base for the Home Fleet a new situation arose. Air defences were henceforth required for an area remote from the unified system of defence, which had been created in England and Southern Scotland. Consequently a separate organisation had to be planned for a new type of task, the specific defence of a naval base.

(1) See 'The Origins and Pre-War Growth of Fighter Command,' pp.
(2) ibid. pp.

It will not escape attention that the last two of the four tasks that have been outlined above were, so to say, last minute additions to the responsibilities of Fighter Command. The programme of fighter expansion to which the Air Ministry had been working when these new commitments arose was based on the fighter strengths needed to defeat the German long-range bomber force operating from Germany against targets inside the United Kingdom. It followed that until that strength had been reached any forces that were detached for the protection of Scapa or for convoy escort duties could only be found at the expense either of other Commands of the Metropolitan Air Force or of Fighter Command itself.

The Anticipated Strength and Direction of German Air Attack.

Estimates of the likely strength and direction of German attacks on this country and the size and dispositions of the defending fighter force necessarily changed as fresh intelligence of the German Air Force came to hand. It will be sufficient here, therefore, to examine what were the last plans made by the Air Staff before war broke out.

It was estimated in October 1938 that by the Spring of 1940 Germany would possess a long-range bomber force of about 2000 first-line aircraft.(1) Assuming that this force was used without regard for losses in an attempt to 'knock-out' Great Britain in the first few weeks of war it was reckoned that it might make 1000 sorties a day for the first fortnight. This was confessedly a somewhat unreal hypothesis. It assumed either that Britain alone was fighting Germany or that, if she had allies, the Germans would choose to ignore them; that there would be no reduction in the scale of attack through bad weather; and that German reserves and production would be able to make good the high rate of wastage.

S.44460, Encl.22A, "Air Staff Note on Fighter Strength etc", 31 Oct.1938

The Likely Direction of German Attack and the Fighter Force required to Defeat it.

The four main areas that the Germans were expected to attack were London, the Midlands, Forty-Clyde and South Wales - Portsmouth, single attacks being concentrated on one area or dispersed between two or more. The defence problem as the Air Staff saw it, was to deploy the defending fighters in such a way that each of the main areas had a

(1) Estimates made at various times during the last year of peace varied between 1950 and 2050 aircraft. By 'first-line aircraft' was understood all operational aircraft on the normal establishment of operational squadrons.

minimum force, which relied upon reinforcements from other areas when a concentrated attack developed. Thus each area was to be a Defence Zone, corresponding territorially to a Fighter Group. Those for the North and West would have a permanent allotment of only five fighter squadrons, but each would be reinforced to twenty-five squadrons if a heavy and concentrated attack developed against it. Under the same circumstances London and the Midlands, which would normally have fourteen and ten squadrons respectively, would be strengthened to thirty-three squadrons. To carry out the full reinforcing plan there were to be forty-six fighter squadrons in the country. With this force the Air Staff believed that losses of 13-16% could be inflicted on theGermans if they attacked en masse, a casualty rate which no air force could sustain

Basic Assumptions of the Air Defence Plan.

Certain assumptions that had never been tested in actual warfare were made when this rate of losses and the corresponding fighter effort were being worked out. They are worth recording as, later on, the Air Staff affirmed that most of them proved their validity during the fighting of 1940. They were,

a. That two fighters are required to destroy one bomber.

b. That only two fighters intercept out of every three sent up.

c. That it would take the enemy three hours to carry out a concentrated attack by 1,000 aircraft on an objective like London.

d. Only three out of four squadrons should be regarded as available for action at any one time.

e. Only 75% of the initial equipment of the remainder would available at any one time, for reasons of maintenance.

The importance of this plan lies in the fact that the num of squadrons recommended in it was that actually allotted to Command in the last pre-war expansion scheme. When war bro therefore, Air Chief Marshal Sir Hugh Dowding could claim, that if his Command was to carry out its duties successfully

should have the force that the Air Staff itself had originally laid down. Moreover, by the time that heavy fighting began in May 1940 Fighter Command had practically reached the strength in question, whereas there were very few British fighter squadrons in France to meet a German attack. Inevitably the question arises, was the plan an over-insurance?

Feasibility of the Air Staff Plan: View of Sir Hugh Dowding.

In this connection there are two vitally important points to be noted. First, the Air Staff plan postulated a high degree of flexibility in the defence organisation. Second, it assumed that the Germans would operate from their own country without violating the neutrality of Holland and Belgium.

S.44460, Encl.18A, Letter, Dowding - D.C.A.S., 12 October 1938.

As to the first, the A.O.C.-in-C., Fighter Command believed that the Air Staff were asking too much. He was doubtful whether the swift moves by large numbers of fighter squadrons, which the Air Staff plan required, could be carried out;(1) whether the concentrations of fighters that were projected could be controlled effectively; and, above all, whether R.D.F. could give sufficiently precise information about incoming raids in sufficient time to set the reinforcement machinery working. In fact he never attempted to apply this part of the plan. The three Fighter Groups that were in being at the outbreak of war, with a fourth that was projected in the West of England, corresponded to the Defence Zones of the Air Staff plan and were intended eventually to contain forty-six squadrons;(2) but the resources of the Command were spread more evenly between each Group than they were in the Air Staff scheme, nor was there any elaborate plan for reinforcement between Groups.

(1) Indeed he was rather more than doubtful, viz:- "the suggestion that a raid on London can be 'held' for two hours, while fighters fly down from Scotland to intercept it, can only be described as fantastic."
(2) Plus the six squadrons added in the last three months of peace for the specific tasks of the defence of Scapa Flow and the protection of coastal convoys.

Sir Hugh Dowding realised the obvious limitation of this linear deployment, that except in the London area, where he expected the initial battles to be fought, it would be impossible to meet a concentrated German attack with so powerful a defence as the Air Staff visualised; but he was prepared to accept this. It meant, of course, that if the same scale of casualties was to be inflicted on the German bomber force, wherever it might choose to strike, a bigger fighter force than forty-six squadrons would be necessary. To this extent, therefore, it would not appear that the Air Staff's recommendations were excessive, nor that the Government's acceptance of them was to be blamed.

The Place of the Low Countries in the Air Defence of Great Britain.

The second point, that the Germans would only operate from their own country, supports the same conclusion. For many years the importance of the Low Countries in the air defence of Great Britain in a war with Germany had been appreciated. It has already been pointed out that the Air Ministry favoured an expedition to Belgium as a means of denying the Germans an easy passage on the direct route from Germany to London. When it was no longer likely that Belgium, and Holland even more so, would be willing to take part in another German war the significance of the Low Countries changed somewhat. From 1937 the question was whether Germany would, despite their neutrality, send her bombers over the Low Countries to attack England. On balance it seemed unlikely that she would since Britain would immediately retaliate by using the same route for attacks on the Ruhr. For this reason air defence plans assumed that the Germans would only attack the United Kingdom after a long flight over the North Sea; and thus only Germany's long-range bombers were taken into account.

But there was another move open to the Germans which would seriously affect the air situation, namely the physical occupation of the Low Countries. There was certainly nothing in Germany's record to suggest that she would be restrained from such action by nice considerations of legality; and the advantages it would give her for the attack of this country and for deepening the defences

of the Ruhr were obvious enough. It was not until July 1939 that any attempt was made to assess in terms of fighters what a German occupation of the Low Countries would mean to the air defence of Great Britain. Ten more fighter squadrons were recommended to offset the German dive-bomber units, which could only operate effectively against Britain from bases in Holland and Belgium. No additions were recommended to deal with the increased effort which the long-range bombers would be capable of, nor to counteract the escort fighters which might accompany them.

A.H.B. IIH/144, Encl. 12, Minute D.H.O. - D.C.A.S.

The Cabinet was not asked to sanction this suggested increase in the fighter force; in fact, the recommendation never passed outside the Air Ministry. It is mentioned here simply to support the proposition that the force allotted to Fighter Command when the war broke out could not be reckoned a guarantee of security if the German Air Force obtained bases in the West.

Possible Course of Action open to the Germans at the Outbreak of War.

The fact remains that when war broke out this particular postulate of the Air Staff' plan of defence actually applied; and the mass of the German bomber force at the conclusion of the Polish campaign took up positions in Germany itself. From there it was capable, if used primarily against the United Kingdom, of pursuing one, or a combination of more than one, of three policies: it could attack the morale of the civilian population, attempt to dislocate Britain's war industry, or attack her seaborne supplies and distribution system. This at any rate was what the Air Staff had thought prior to the war, concluding that of the three the last was the more likely though not so much so that special defensive arrangements could be made to counteract it.(1)

S.1053, Encl.15A, Air Staff Memo. on 'Possible German Courses of Action', compiled March 1939.

(1) Extracts from this particular appreciation are given as Appendix

The lesson of the Polish Campaign: Possibility of Attack on the Aircraft Industry

D. of Plans O.R.B., Appendix.W.S.25, 'Note by C.A.S. on Protection of Aircraft Industry', 15 Sept. 1939.

This view was considerably modified by the Polish campaign. So isolated was Poland that for some time there was little dependable intelligence of the precise methods used by the Germans, but it was clear enough, said the C.A.S., "that they regard the destruction or neutralization of the opposing air force as the primary aim at the outset." We ourselves at the time were so manifestly inferior to Germany in air power that it seemed likely that such a stroke might be made against us before our position, especially our counter-offensive force, was strengthened. An opponent's air force was obviously understood by the Germans to include his aircraft industry as well as his airfields and aircraft; and of these, so the C.A.S. thought, it was the British aircraft industry, rather than the squadrons and stations of the Metropolitan AAir Force, that was chiefly menaced.(1) To increase the defence of the industry did not entail a redeployment of fighter squadrons, whose sector stations were so sited as to cover the main industrial areas of the country: but it did demand a new disposition of the existing ground defences. These had been planned before the war on a system of priorities based chiefly on proximity to Germany, and as those available in September 1939 were barely half of what was considered necessary the approval of the Chiefs of Staff had to be obtained for any redistribution. This was granted on 16 September and a directive was therefore sent to Air Chief Marshal Sir Hugh Dowding stating that "the aircraft industry is to be regarded as a very probable first objective for enemy air attacks against this country", and instructing him to re-examine the defences on this basis, particularly bearing in mind the importance of Sheffield, Coventry, Derby and Bristol. The actual dispositions that were made to satisfy the terms of this instruction will be examined later. What must be noticed

D.H.O. Folder "Defence of the Aircraft Industry" Encl.3A, 17 Sept. 1939

(1) "In the view of the Air Staff, attacks on aerodromes, if the aircraft are adequately dispersed and protected, is usually likely to be uneconomical and ineffective." (Extract from Directive from S. of S. for Air to A.O.C.-in-C., Bomber Command, 8 April 1940).

here is that the directive was still in force at the end of 1940, having been officially re-emphasised in May, June and November of that year.

Fighter Protection for East Coast Shipping and Naval Bases.

As the discussions that preceded this decision were taking place the problem of the protection of seaborne trade, which, it will be recalled, had been considered a likely initial target of German attack, was claiming attention. This was not the specific concern of Fighter Command, as was the defence of the aircraft industry, but it affected the Command in two ways. Firstly, as the organisation controlling the air defence system it had to provide protection for all ports, anchorages and naval bases within the system, as well as for the isolated fleet base at Scapa. Secondly, the general cover of the air defences was supposed to extend sufficiently far out to sea to give some security for coastal convoys over much of the East Coast route.

i. The Problem of Scapa.

The naval base that caused most difficulty to Fighter Command was Scapa Flow, partly because of its remoteness from the main air defences of the country, and partly because fighters had only been allotted to its defence in the summer of 1939. Consequently there were no fighters protecting Scapa when war broke out. The position was examined on September 6th and 7th by the Deputy Chiefs of Staff and the War Cabinet, and it was decided that certain balloon defences should be provided immediately, (1) a fighter sector station should be prepared at Wick, but that no Fighter Command squadron could be spared until the Summer of 1940. Shortly afterwards, however, the Admiralty agreed as an interim measure to provide two Fleet Air Arm squadrons for the defence of the anchorage when the Fleet was there.

D.C.O.S.(39) 10, 19th September 1939.

(1) For details of the expansion of the Scapa defences see pp.

S.2413, Encl. 1A, Statement by the Deputy Chief of Naval Staff.

At this date the Admiralty still intended to use Rosyth as the main North Sea base, until Scapa was ready to take its place. But the raids on both places in October exposed their their vulnerability, and from 28 October the Clyde became the main Fleet anchorage. From there it was difficult to say the least, for the Fleet to exercise its chief roles of protecting the United Kingdom from seaboarne attack and maintaining the blockade by means of the Northern patrol. Throughout the winter of 1939 therefore, work on the defences of Scapa was pushed ahead to make it secure from air attack by early Spring of 1940. The part played by the Air Ministry and Fighter Command was to prepare Wick for the operation of three Hurricane squadrons by 15 February, (1) with facilities for controlling up to four reinforcing squadrons. This entailed accelerating the schedule agreed upon in the first month of war whereby Fighter Command was not expected to provide squadrons for Scapa, and then only two, until the summer of 1940.

C.O.S.(40) 10th Mtg., 18 January 1940.

ii. The Defence of Coastal Convoys.

Another and similar acceleration of the fighter expansion programme had already been decided upon in October 1939 in order to provide some protection for shipping off the East Coast. A joint memorandum on this subject by Lord Stanhope and Sir Kingsley Wood had been circulated to the Committee of Imperial Defence in June 1939. In this it was pointed out that Fighter Command could not provide effective protection for shipping, except when it was routed close inshore, and even then there might not be sufficient warning for fighters to reach a convoy or group of ships before the initial attack was made. Accordingly it was recommended, and later approved, that four squadrons of fighters should be formed for the sole duty of providing close escorts for shipping passing between the Firth of Forth and Southampton.

C.I.D. 1557-B, 'Protection of Merchant Shipping against Air Attack', Joint Memo. by the First Lord of the Admiralty and the S. of S. for Air.

C.I.D. 371st Meeting, 1 August 1939.

(1) This was to act as sector station until Castletown, 12 miles north-west of Wick, was completed, which was not expected to be until May at the earliest.

If protection further north than the Forth was required a further two squadrons would be needed. Unfortunately the existing expansion programme would not admit the formation of these squadrons until the financial year 1940 - 41, and when war broke out no steps had been taken to provide them.

Early in October, however, attacks on East Coast shipping had been successful enough to warrant special measures to combat them. The danger was not so much present as potential, for the attacks had only been on a small scale. Nevertheless they must have shewn the Germans that shipping was peculiarly vulnerable in this area and would suffer heavy losses if attacked in force. At the time the Government was about to announce its rejection of the German peace offer of 6 October and a number of members of the War Cabinet, including Mr. Churchill and Lord Halifax, thought that the violent military reaction with which the Germans were likely to receive it might well take the form of a heavy attack on East Coast shipping. On 10 October, therefore, the Director General of Operations at the Air Ministry, Air Vice-Marshal R.H. Peck, consulted Air Chief-Marshal Dowding on what could be done to counteract such a move. In the opinion of the Commander-in-Chief if the Germans struck in the near future they would go for London or the aircraft industry or both; but if strong attacks, say of 100 - 200 bombers, were made on the East Coast convoys no fighter protection, however strong, could prevent severe losses among the ships as the R.D.F. system did not as yet give warning of the approach of low-flying aircraft. He asked that his opinion should be placed before the War Cabinet so that if heavy shipping losses were unacceptable the convoys could be temporarily stopped. He promised in the meantime to move some of his squadrons to forward airfields near the coast.

D. of Plans O.R.B., appendix W.S. No; 70, Statement by A.V.M. Peck.

ibid.

W.M.47(39) Conclusion 6.

On the following morning the C.A.S. informed the War Cabinet that this was being done, giving warning that interception would be difficult, especially if the enemy aircraft flew in low.(1)

Clearly enough the time had come for the formation of the four trade defence squadrons which, by providing close escorts, would ensure a minimum standard of protection. Instructions to this effect were given by the C.A.S. on 17 October some months earlier than had been anticipated when the squadrons were originally approved. Neither the Air Staff nor Fighter Command believed that the operation of these squadrons would solve the problem. This, it was felt, would only be achieved by a large-scale diversion of shipping to West Coast ports. In its absence, however, a great volume of shipping continued to use the East Coast;(2) and the Air Force was obliged to protect it as far as it was able.

S.2110, Encl. 19A Minute A.M.S.O.-C.A.S.

Air Staff Annex to C.I.D. 1557 - B (Air Historical Branch Copy)

Unfortunately there was some doubt as to which of the two Commands, Coastal or Fighter, was to control the air defence of shipping. When Air Chief Marshal Dowding had promised Air Vice Marshal Peck to do all he could to help the East Coast convoys he had only done so after stating that he had always understood the trade defence squadrons would be allotted to Coastal Command: it was that Command which, with the aid of the Fleet Air Arm, should be responsible for the protection of convoys at sea. Not only would the new task compel him to redeploy a number of squadrons but it would lay upon his Command

(1) For an account of the operations undertaken by Fighter Command in defence of shipping and of the measures taken to obtain longer warning of enemy attacks, see pp.

(2) The following statistics have been extracted from the Statistical Digest, Series B, No.3

Arrivals of Shipping with Cargo at U.K. Ports (Foreign Trade)

Thousand Net Tons.

	North-East Coast	Grimsby and Hull	London.
1939 September	142	233	654
October	104	154	739
November	136	190	961.

the burden of improving the warning system which, while fairly satisfactory for the defence of the United Kingdom proper, was incapable of providing the necessary intelligence for fighter squadrons operating more than 5 - 10 miles out to sea. What the Commander-in-Chief feared, though he did not explicitly say so, was that the protection of coastal shipping would demand so big a proportion of his resources that Fighter Command would be less efficient for the performance of its chief tasks, the defence of the aircraft industry and London against mass attacks. Thus at the conclusion of the meeting on 10 October he asked for the C.A.S.'s guidance on the relative importance to be assigned to the defence of shipping and "his primary responsibility for the Air Defence of Great Britain."

On the following day this was received in the following words: "the defence of Great Britain and, in particular, the protection of vital points in the aircraft industry, remain the primary commitment of your Command. It is noted that in order to afford a measure of protection to convoys on the East Coast it will be necessary to move certain of your forces to other aerodromes nearer the coast and that this will to some extent detract from the efficacy of your dispositions for your primary commitment. This is accepted and the movements required should now be made". This was more compromise than guidance and it left open the issue between Air Chief Marshal Dowding and the Air Staff. The latter held that to provide air cover over coastal convoys was in no sense an invasion of the responsibilities of Coastal Command; it was rather the extension seaward of the organisation that had been built up over a period of years under

D.H.O. Folder "Defence of the Aircraft Industry", Encl.23A, Letter D.C.O.- Dowding 10 October 1939.

Fighter Command for the defence of the mainland. As for the trade defence squadrons, these were intended to act, so to speak, as outposts for those fighter squadrons that would only take-off when danger actually threatened. In theory, therefore, it was only proper that these squadrons should become a part of Fighter Command, as they did on their formation in the last days of October. Nevertheless the fact remained that the Command had not been trained or equipped for the defence of shipping, and towards the end of the year the Air Council decided that the four squadrons that had been formed for trade defence should be transferred to Coastal Command. If this had meant that he was henceforth relieved of all responsibilities in this sphere Sir Hugh Dowding would doubtless have been satisfied; but this was not the case. The official Air Council letter of December made it clear that the transfer was only a temporary measure which would apply until enemy activity ceased to be concentrated on the North Sea or until Fighter Command was capable of assuming control over all fighter operations based on the United Kingdom. Both Air Chief Marshal Dowding and Air Marshal Sir Frederick Bowhill, the A.O.C.-in-C., Coastal Command, disliked this policy. The former still maintained that Coastal Command should undertake the air defence of the coastal convoys, but if it was eventually to be his responsibility he preferred to keep the four squadrons and use them as a nucleus for the necessary organisation. Air Marshal Bowhill, for his part, was anxious to retain the squadrons permanently; not, it is important to note, because he was eager to carry out the duties in question but because he needed the squadrons for an entirely different task, the importance of which had not been realised prior to the war, long-range fighter reconnaissance over the North Sea.

A.H.B. IIH/120, Encl 44, Air Council - Dowding, 28 December 1939.

Ibid. , Encl.56, Minute D.H.O.-D.G.O., 18 January, 1940.

However, for the time being the policy was unaltered and the four squadrons, Nos.235,236,248 and 254 were transferred at the end of February 1940 and were armed with Mark IV Blenheims. With the exception of No.254 squadron, which, until the opening of the Norwegian campaign, put in many hours protecting coastal convoys and the fishing fleets on the Dogger Bank, the squadrons were chiefly engaged for the next six months(1) patrolling and reconnoitring the coast from Trondjhem to Brest, escorting Coastal Command and Fleet Air Arm bombing attacks and providing air cover for naval operations. All these duties were important but they were not those which the squadrons were originally intended to carry out. Consequently for the whole of the period under review, October 1939 - May 1940, the burden of protecting coastal convoys fell almost entirely upon Fighter Command.

It was not a heavy burden in comparison with the efforts which the Command was to make in the summer and autumn of 1940 with a force not much greater than that available in the previous winter and spring. Nor was there at the time any other important claim upon the fighter force, apart from the provision of security patrols for the B.E.F. leave boats. By the end of February 1940 the daily routine North Sea duties were stabilised by agreement with the Admiralty at one standing patrol for each of the four convoys or groups that were usually moving along the East Coast, one patrol over the Dogger Bank and, occasionally a special detachment to cover mining operations.(2) The alarming

S.2295,Encl.14B, Note by D.H.O.dated 25 February 1940

(1) During the French campaign two of the squadrons were placed in Fighter Command for a short period in order to relieve single-seater squadrons in quiet sectors. No. 248 Squadron operated under Fighter Command from Dyce, near Aberdeen, from 22 May to 20 June: No.236 Squadron operated in the Middle Wallop sector from 10 June to 4 July chiefly in defence of the Portsmouth and Southampton district.

(2) The only figures at present available to illustrate the extent of the fighter effort expended in protecting East Coast shipping are given below. They aretaken from a brief prepared by the Director of Plans for the use of the C.A.S. at the War Cabinet, (D. of Plans O.R.B., W.S. No.284, 28 Feb.1940)

	Month	Number of Patrols	Number of Sorties.
1939	October	386	1,080
	November	347	971
	December	377	1,137
1940	January	911	2,521
up to	February 20.	887	2,252

features, as the Air Staff saw it, were, first, that this effort had been forced upon the Command by less than 8% of the German long-range bomber force of 1,750 aircraft and, second, that at any time the Command might have to meet a greatly intensified attack on shipping combined with action against objectives inland. In other words, there was an increased danger that the resources of Fighter Command might not be equal to its tasks.

It will be wise at this point, therefore, to examine the Air Ministry's policy for the expansion of fighter strength both in the United Kingdom and in France, and how far it was fulfilled.

Expansion of Fighter Command and the Fighter Forces in France.

i. Position at the Outbreak of War.

On 3 September 1939 the Air Ministry and Fighter Command were working to a programme of fifty-seven fighter squadrons which were allotted as follows:-

Air Defence of Great Britain	46 Squadrons
Field Force	4 "
Trade Defence	4 "
Scapa Flow	2 "
Northern Ireland	1 "

The squadrons for the last three of these tasks and ten of those required by Fighter Command were not due for formation until the financial year commencing in April 1940. Thus at the outbreak of war the Metropolitan fighter force was in the comparatively early stages of a considerable programme of expansion. At the same date Fighter Command actually contained twenty-five regular and fourteen auxiliary squadrons, and of these the four Field Force squadrons, Nos.1, 73, 85 and 87, were despatched to France within a week, leaving Fighter Command with thirty-five squadrons to carry out duties for which fifty-three squadrons were reckoned necessary. The danger was obvious, and on 13 September at the daily conference held by the C.A.S. his deputy Air Vice-Marshal Pelrce, stressed that, as matters stood, the needs of home defence, Scapa Flow and France were likely to clash. The only way to avoid this was to increase the fighter force. The Air Member for Supply and Organisation, Air Vice-Marshal Welsh, reported that there was no chance of forming new single-seater fighter squadrons, but

S.2116, Encl.5A, Letter from Air Council - Dowding, paras.2 - 3, 21 September 1939

Minutes of C.A.S.'s Daily Conferences, 13 September

Ibid.

that there were some 450 Blenheim Mark I aircraft which might be used. Accordingly the C.A.S. instructed him to report on how many squadrons could be formed on this type.

ii. Sir Hugh Dowding's Request for Reinforcement: Correspondence with the Air Council

But if the need for more fighter squadrons was apparent to the Air Staff it was at least as obvious to Air Chief Marshal Dowding; and about this time he asked that twelve squadrons should be formed immediately.(1) The Air Staff soon convinced him that the production position made this impossible(2) and in a letter to the Air Council on 16 September he amended his request to eight squadrons. This claim was supported by a wealth of argument expressive of his policy; and it inspired a reply from the Air Council which admirably illustrates the different points of view of Fighter Command and the Air Ministry.

ibid. Statement by D.C.A.S.

S.2116, Encl.1A

ibid., Encl.5A, 21 Sept.1939

Air Chief Marshal Dowding first brought up the question of the relationship between what he called Home Defence and the needs of the Field Force: "On September 3, 1939, I had 25 Regular Squadrons and 14 Auxiliary Squadrons in various stages of efficiency; say the equivalent of 34 Squadrons. This, although much below the Air Council's estimate of requirements for Home Defence, was, in my opinion, sufficient to cause such heavy casualties to an attacker that in a comparatively short space of time his attacks would be brought to a standstill. In August I was asked to broadcast to the nation and I expressed myself to this effect. My opinion, however, was based on the assumption that, on the outbreak of war, every nerve would be strained to increase the Defence force up to the strength laid down by the Air Council themselves. It is true that 4 Squadrons had for years been earmarked for despatch with the Field Force, but I had been repeatedly told that these Squadrons would never be despatched until the safety of the Home Base had been

ibid., Encl.1A, paras.3 - 9.

(1) This was a verbal request made to Air Vice-Marshal Peirse on 14 September.

(2) Fighter production in September had been very disappointing: only 93 single-seat fighters had been produced for a total of thirty-two single-seater squadrons in Fighter Command and France.

assured. My consternation, then, will be understood when I learned that 4 Hurricane Squadrons were to be despatched to France within 10 days of the Declaration of War and before any attack had been made on this country. In addition, I had received orders to put 6 more Hurricane squadrons on a mobile basis by January 1940; and although I received assurances that these would never be withdrawn from the Defence unless this could be done with safety, I know how much reliance to place on such assurances." He went on to say that the wastage of Hurricanes in the Field Force squadrons, once they began to operate against the Germans, would be greater than the output of that type at the time; and it seemed to him that "the despatch of 4 Field Force squadrons has opened a tap through which will run the total Hurricane output." He therefore suggested a scheme which would cut down the number of Hurricane squadrons in the Command and which, after a number of Gladiator squadrons had been re-armed with Spitfires and eight new Blenheim squadrons had been formed, would give him fifteen Blenheim, fifteen Spitfire and thirteen Hurricane squadrons.

This letter marked the beginning of an exchange of views between the Air Ministry and the Command which went on until the middle of October, and included a meeting of the Air Council on 26 September at which Air Chief Marshal Dowding was present. The chief points that emerge from the latter's contribution, in addition to those given so far, were that if he was given the force that the Air Council had approved for the defence of the country he was confident of success; that a 'knock-out blow' against France would almost certainly be attempted and great pressure would be put upon the Air Ministry to maintain the fighter squadrons already there as well as to send additional squadrons; that the requirements of the fighter force in particular, and those of the Air Force in general, were far in excess of aircraft production; and, finally, that in any clash of interests Fighter Command must be given priority.

S.2116, Encl.1A, Dowding - Air Council, 16 Sept.
Encl.5A, Air Council -Dowding, 21 Sept.
Encl.11A, Dowding-Air Council, 25 Sept.
Encl.15A, Air Council -Dowding, 9 Oct.
Encl.20A, Dowding - Air Council, 13 Oct.

D.P.M.Ctee. Minutes of 185th Mtg., 26 Sept.

As to this last point, it was made in reply to the Air Council's statement that immediate fighter expansion to the extent proposed by Air Chief Marshal Dowding could only be at the expense of the other operational Commands, all of which had "an essential part to play in the general strategical problem of air defence." Air Chief Marshal Dowding's answer is contained in his letters of 25 September and 13 October; it is worth quoting at length. "The best defence of the country is the Fear of the Fighter. If we were strong in fighters we should probably never be attacked in force. If we are moderately strong we shall probably be attacked and the attacks will gradually be brought to a standstill. During this period considerable damage will have been caused. If we are weak in fighter strength, the attacks will not be brought to a standstill and the productive capacity of the country will be virtually destroyed. The other components of the Metropolitan Air Force will then become a wasting asset and the preservation of their full numbers at the present time will prove to have been a fruitless sacrifice...I must put on record my point of view that the Home Defence Organisation must not be regarded as co-equal with other Commands, but that it should receive priority to all other claims until it is firmly secured, since the continued existence of the nation, and all its services, depends upon the Royal Navy and the Fighter Command." Beyond a general statement that they disagreed with this view the Air Council offered no comment; and it is difficult to see what could have been said without entering upon a long controvery on the nature and application of air power.

The other main points that Air Chief Marshal Dowding made were all of a piece with his conceptions of grand strategy. He was confident of securing the base if he was given adequate force (and he reminded the Air Council that an additional reason for strengthening the defences was the probable violation of the neutrality of Holland and Belgium): he was concerned about the potential drain of the forces in France upon fighter resources because the defences of the home-base might fall below the minimum necessary for its security: his interest in the paucity of aircraft production arose from his fear that unless the War Cabinet were made aware of what it meant to a fighting air force they might order reinforcements overseas without appreciating to what extent home defence was being weakened. It is not possible, on this question, to accuse the Commander-in-Chief of inconsistency.

iii. Replies of the Air Council.

The Air Council agreed with him on the vital importance of maintaining an efficient air defence in the United Kingdom; but they were also committed to assisting the Army in France and to building up, as their main contribution to winning the war, a powerful bomber force. This accounts for the stress that they laid upon the importance of maintaining a balance between the various operational Commands. As to the transfer of fighter squadrons to France, Air Chief Marshal Dowding was reminded that he himself had previously recognized the possibility that the four Field Force squadrons might be lost to his Command even before the outbreak of war.(1) The Air Council were aware that the reserves available for these squadrons, as for the Air Force as a whole, were far from adequate, but in the circumstances there was no practicable alternative but to dispatch them to France; and they claimed that it would be for them to decide whether the squadrons in France were to be kept up to strength or treated as wasting assets. The six squadrons that were being put on a mobile basis would only be sent after a War Cabinet decision to that effect. Air Chief Marshal Dowding was assured that such a decision would only be taken in the light of the air defence situation as a whole. However, since it was obviously desirable that both Fighter Command and the air forces in France should know what aircraft to expect it was decided that reserves of Hurricanes should be allocated between the Command and the Field Force squadrons in the ratio of three to one:(2) the Council agreed with the Commander-in-Chief "that the needs of fighter

1) The Air Council was referring to a survey of the air defences of the United Kingdom that was made by the A.D.G.B. Sub-committee, of which Air Chief Marshal Dowding was chairman, early in 1938. In this it was said that "the availability of the four squadrons allocated to the Field Force cannot be counted on. While it is possible that they would be retained in the country at the beginning of a war until such time as the Government were satisfied by experience that the defending forces were equal to their task, yet it is by no means impossible that these squadrons might have been sent abroad before the opening of hostilities", (A.D.G.B. Paper No.109, 26 March 1938).

2) The ratio of fighter squadrons in the United Kingdom to those in France was never lower than six to one until May 1940, but Fighter Command appear to have made no complaint against this allocation of reserves. It should be borne in mind that this correspondence took place before what has come to be called 'the phoney war' had settled in. It was not known that a long period of relative inactivity lay ahead in which reserves of aircraft could be created more adequate than those in being at the time. The prospect that had to be faced was that heavy fighting might begin on Germany's initiative which would inevitably mean a shrinkage in the fighter force.

squadrons in France must not be allowed to cause an unwarrantable drain upon the available resources."

iv. Resultant Expansion of Fighter Command.

But this exchange of views, though so patently important from the historical point of view, was not much more than incidental to the urgent question of how many new squadrons could be provided for Fighter Command. Here the pressure of events drove the Air Ministry within a matter of weeks to grant Air Chief Marshal Dowding practically everything for which he had asked.

When Air Vice-Marshal Welsh first examined the position he reported that only two squadrons could be formed; and the Air Council could promise no more when they replied to Air Chief Marshal Dowding on 21 September. The factors limiting expansion were a shortage of maintenance crews and, despite the fairly large numbers of Blenheims, of aircraft. The Commander-in-Chief then suggested that the formation of these two squadrons should be in stages: in the first place they should form as four half-squadrons and be built up to full strength as aircraft and personnel became available later. Secondly he suggested that the expansion of No.12 Group Pool should not take place and that the resources earmarked for that purpose should be utilised for two further half-squadrons. The Air Staff fell in with these proposals and in their letter of 9 October confirmed that six half-squadrons would be formed immediately on Blenheim aircraft.

A.C.A.S.(G) Branch Folder 98E, Encl.2A, Notes on Conference on Fighter Reinforcements, 2 October 1939.

v. Reinforcement of the Fighter Forces in France: further assurances to Fighter Command.

At the meeting between Air Chief Marshal Dowding and the Air Staff at which all this was agreed it was also decided that two Gladiator squadrons should be prepared for dispatch to France. This move appears to have been the result of a request for six fighter squadrons made by General Gamelin at a meeting with the C.A.S. on 21 September.(2) Before

(1) ibid. para.7.

1) See R.A.F. Narrative, 'The Campaign in France and the Low Countries', Part II, pp.

2) It is clear, however, that the Air Staff were contemplating a reinforcement of two squadrons before this meeting. Sir Hugh Dowding quotes the D.C.A.S. to this effect in his letter to the Air Council of 16 September. (S.2116,Encl. 1A).

the war Fighter Command had been instructed to put six squadrons on a mobile basis: these would remain in the United Kingdom as part of the Command but would be ready to move overseas if required. It was as part of this force that the two squadrons were to be sent. This still left four squadrons in this country which had to be prepared to move to France at short notice; for not only were the French unlikely to relax their pressure but the operational needs of the Air Force in France, particularly the Advanced Air Striking Force, were pointing that way. It is not surprising, therefore, that instructions were given on 2 October for two squadrons to be formed in Fighter Command to take the place of the two destined for France. On 17 October this was followed up by a much greater expansion, the C.A.S. ordering that ten more fighter squadrons must be in being by the middle of November.

ibid. para. 3.

S.2110, Encl. 19A, Minute A.M.S.O. - C.A.S.

This brought the number of fighter squadrons formed or forming in the United Kingdom and France to a total of fifty-seven, which was the extent of the current expansion programme. Originally no less than fifty-three of these squadrons had been earmarked for duties in the United Kingdom, and the need for them had not become less urgent since the outbreak of war. But it was also obvious that British fighter requirements in France could not be met by the four Field Force squadrons alone; and, as we have seen, steps were early taken to improve the position. By 16 November there were in all six fighter squadrons in France and preparations had been made for the possible reception of two more. It was clearly necessary to strike a balance between France and the United Kingdom, and the C.A.S. assured Air Chief Marshal Dowding that his Command would not be forgotten: "the assurance which I can give you is that so far as my policy is concerned, I could not accept a wastage in France which would be detrimental to the requisite degree of fighter efficiency of the Royal Air Force as a whole." The obvious qualification in this assurance was possibly due to a fear that, in the event, the pressure to send

3.2161, Encl. 15A, C.A.S. - Dowding, 7 October, 1939.

more squadrons might be too heavy to be withstood. This is indicated in a further letter dated 5 October in which the C.A.S. said:- "You may rely on me to resist to the utmost any pressure that may be exercised by the War Cabinet to send more fighters ..... But we must face facts one of which is that we could possibly lose the war in France just as much as in England. And we must therefore anticipate the possibility that we could not in fact refuse to come to their assistance any further if they really had their backs to the wall. If we had not done something in advance to enable us to come to their assistance in such a situation, the result would be, I am sure, that we should have to send over aircraft, but that they would be in no position to operate at all effectively when they got there." It was in the spirit of this statement that the C.A.S. henceforth met all requests for additional fighter squadrons for France, whether they came from the French themselves or from Air Marshal Barratt. He steadily refused to promise any squadrons over and above the six already there in the middle of November. On the other hand, from October to April an organisation was being prepared for the possible despatch of as many as eight reinforcing squadrons. This was to be done by means of Fighter Wing Servicing Units. (F.W.S.U.)

D. of Plans O.R.B. Appendix W.S. No.59.

The Fighter Wing Servicing Units: final plans for reinforcing France.

Each of these was intended to allow two Fighter Command squadrons to operate overseas at short notice without the need for transferring the whole of the squadron establishment. In the case of a Fighter Wing Servicing Unit being sent to France, it was located at a French airfield, its establishment being so designed that, with the personnel sent out with each squadron, operations could be commenced immediately. It contained an administrative and operations room staff and a small technical staff.[1] A three-day

S.D.160 -"Scheme for Increased mobility of Fighter Squadrons."

(1) Practically all the flight mechanics and fitters were brought by the squadrons. Out of a total establishment of 6 officers and 170 men the servicing unit contained 1 officer and 24 men for its equipment, signals and workshop branches.

stock of spare parts was held, and tools, oxygen equipment, domestic equipment and some M.T. were also maintained. The squadron's contribution was practically confined to aircraft and personnel. All the initial equipment aircraft (16) were flown out and the spare pilots and ground staff travelled in civil air transport. Altogether twenty pilots, one administrative and one engineering officer, and ninety N.C.O.'s and men, made up the squadron party.(1) The rest of the squadron was intended to stay at a Fighter Command station and be prepared to receive back the air party.

By the end of October two Fighter Wing Servicing Units had been established in France but no squadrons had been assigned to them. Then, on 15 November, when a German attack seemed imminent, two Gladiator squadrons flew out to No. 61 Fighter Wing Servicing Unit. No use was made of the other unit until the Low Countries were invaded, but plans were made in January 1940 for the formation of three more. At the first meeting of the Air Ministry Expansion and Re-equipment Policy Committee on 22 January it was agreed that an additional unit should be set up in France by 1 March, and two more between April and October. However, the formation of the last two was cancelled on 14 April owing to the opening of the Norwegian campaign. Instead, so Air Marshal Barratt was informed, if any reinforcements were necessary beyond the four squadrons that would go to the two existing Fighter Wing Servicing Units they would take the form of attachments to squadrons already in France. It is worth noting that although the number of fighter squadrons that the Air Ministry were committed to retain in France remained as low as six a total allotment of at least fourteen was contemplated.

'The Campaign in France and the Low Countries', Part II, p.

(1) The establishment of a single-seater fighter squadron in the United Kingdom included 13 officers and 132 men. (S.1898 War/PC/107)

Plans for Operating Fighter Command Squadrons over the Continent.

S.1338, D. of Plans - A.O.C., Air Component 24 November, 1939.

'The Campaign in France and the Low Countries', Part II, p.

A.H.B. IIH2/1, "Plan for Home Based British Fighter Patrols off Belgian Coast", 25 Jan. 1940.

Summary of Fighter Command's French Commitments.

In addition arrangements were made during these first quiet months of war for Fighter Command squadrons to intervene in operations over France from their bases in England. The earliest scheme was for two Hurricane squadrons to fly out from Manston on the Kent coast to Lille/Seclin, refuel there, assist the Air Component fighters to cover the reconnaissance area of the B.E.F., and return to Manston each evening. This was dropped when the third F.W.S.U. was sent out to France in March. During January, however, we agreed to provide air protection for the left flank of the French Seventh Army in its projected advance along the Belgian coast to the mouth of the Scheldt. For this purpose two Blenheim and two Hurricane squadrons of Fighter Command would operate from airfields in South-East England. Their maximum effort was expected to be a continuous patrol by one flight of Blenheims and six squadron patrols of Hurricanes in each day. The patrol area was seaward of the coastline between Dunkerque and Breskens.

Fighter Command's potential commitments in France if heavy fighting began there can thus be summarised. Two F.W.S.U.'s were established in France by March and were ready to receive four Hurricane squadrons from the Command. Additional reinforcements, which might amount to another four squadrons, might be attached to the squadrons already in France; but no Fighter Command squadrons appear to have been warned that they might have to move. Four more squadrons were to be used to assist the Seventh Army for at least as long as it took to advance to and deploy along the Scheldt.

Expansion of Fighter Command, November 1939 - May 1940.

At this stage, therefore, it is pertinent to see what progress was made in strengthening Fighter Command between October 1939 and May 1940, and whether any new tasks, actual or potential, had been assigned to it. The programme of expansion laid down by the C.A.S. in October at first made only slow progress. All the eighteen new squadrons had formed and had begun training by 18 December; the two Gladiator squadrons, No's 263 and 153 were actually in the line of battle. But none of them was equipped with modern fighter aircraft; three had to make do with Battles, the majority had Blenheims. This was due to the shortage of Spitfires and Hurricanes and was acquiesced in by Air Chief Marshal Dowding chiefly because he feared that heavy fighting in France would drain away what Hurricanes there were. Unfortunately there was no abundance even of Blenheims. When in September the Air Staff were considering utilising this type for the expansion of the fighter force, the head of the War Organisation branch of the Air Ministry, Group Captain Musgrave Whitham, called attention to the great demands that were being made on Blenheim production and recommended the formation of only two squadrons. Operational and political considerations overrode those of supply and altogether thirteen Blenheim fighter squadrons were formed between the middle of October and the middle of December. But on 27 October Group Captain Musgrave Whitham once more brought up the matter, pointing out that the original Blenheim programme had been based on a much smaller number of first-line squadrons than was now contemplated.

S.2110, Encl. 7A Minute D.D.W.O. - A.M.S.O.

ibid., Encl. 16B, Minute D.D.W.O. - D.C.A.S.

It was due to his representations that three of the new squadrons began their career equipped with Battles. Then in January it was no longer possible to evade the implications of the production position. At that time there were no less than thirty-eight Blenheim squadrons at home and in France, and Blenheim production amounted to only 83 aircraft a month. Obviously, in the event of intensive fighting, such a rate of supply could never have offset wastage. Nine of the Blenheim squadrons were therefore re-armed with Hurricanes and Spitfires, production of which had improved and was expected to improve still further.(1)

A.H.B. IIH/150.Minute A.M.S.O. - D.C.A.S., 5 January 1940.

With this decision the Air Ministry were committed to provide the following fighter force by the end of March:- twenty-five Hurricane, nineteen Spitfire, one Gladiator, two Defiant and two Blenheim squadrons. Of these, four Blenheim squadrons were transferred to Coastal Command by the end of February, one Defiant, one Hurricane and two Spitfire squadrons would not be fit for operations, and six Hurricane squadrons were expected to be in France. The War Cabinet was led to expect that the remaining forty-three squadrons would form the fighting strength of Fighter Command.

W.P.(40)7: Memo. by S. of S. for Air on 'The Air Strengths of Britain, France and Germany', para. 15(a).

This figure was not in fact reached until the beginning of May, chiefly owing to the shortage of aircraft fit for operations. On 15 April the Air Member for Supply and Organisation found it necessary to propose that there should

(1) Single-Engined Fighter Production in the U.K.

1939	September	93
	October	106
	November	126
	December	122
1940	January	157
	February	143
	March	177
	April	256

These figures are taken from statistics compiled by the Central Statistical Unit. They include 69 aircraft exported during this period.

be a fortnight's halt in the re-equipment of the whole Air Force in order to give his department time to build up a working reserve of aircraft. This was agreed to 'in principle' by the D.C.A.S. but the fortnight appears to have made little difference to the reserves of aircraft fully equipped for operations. On 23 February the Aircraft Storage Units had contained only 16 Hurricanes and Spitfires which were 'operationally serviceable', and no less than 297 'serviceable-flying only'. Two months later, on 27 April, out of 493 Spitfires, Hurricanes and Defiants in the A.S.U.'s, only 4 were immediately available for operations.(1) Nevertheless by the time that the campaign opened in the Low Countries there were forty-four fully equipped squadrons in the Fighter Command line of battle, consisting of nineteen Spitfire, eighteen Hurricane, one Defiant and six Blenheim squadrons. In addition, one squadron was re-equipped with Hurricanes, one was training on Defiants, and one squadron of Gladiators was refitting after being evacuated from Norway.

A.H.B. IIH/150, Encl. 88, Minute D.C.A.S. - A.M.S.O., 16 April, 1940.

Summary.

At the outbreak of war the Command, excluding the four Field Force squadrons, had contained twelve squadrons of Hurricanes, ten of Spitfires, seven of Blenheims, four of Gladiators and two, which were A.A.F. squadrons, armed with the obsolete Hind and Gauntlet. By May 1940 two more fighter squadrons had been added to the forces in France, four squadrons had been formed for

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(1) Aircraft held by the Aircraft Storage Units were classified at this date as follows:-

Class I	Aircraft ready in all respects for operations within two hours.	
Class II	" " " " " " " "	four days.
Class III	" serviceable for flying but not necessarily for operations	within four days.
Class IV-VI	" not issuable within any definite period.	

(A.H.B. V.D/44, 29 Jan. 1940).

The table on page 32 (footnote) illustrates how many fighters were held in each class at various dates between March and June 1940. It should be noted that there was a constant movement of aircraft through the A.S.U.s; and the table, therefore, also roughly shows how quickly aircraft were brought from Classes IV-VI to the state of efficiency required for issue within four days.

trade defence and transferred to Coastal Command, and twelve squadrons had been added to the strength of Fighter Command itself. In addition to this expansive effort a considerable programme of re-equipment had been executed, which had been complicated by the necessity for re-arming in the spring of 1940 with single-seater types the majority of the squadrons that had been formed on two-seater aircraft in the previous autumn. Including the trade defence squadrons the Metropolitan Air Force in May 1940 contained seven Hurricane squadrons more than in 1939 and nine more Spitfire squadrons, and only one squadron of biplane fighters [illegible]ned in Fighter Command. The supply services had not succeeded in effecting this extensive re-equipment without allowing reserves to fall to a dangerously low level, but the Command was better fitted for the intensive fighting that lay ahead.

The Need for a further Expansion of Fighter Command in the Spring of 1940.

By May 1940 Fighter Command contained one more than the forty-six squadrons with which, so it had been estimated, it could check the onslaught of the full weight of the German bomber force.

FIGHTER AIRCRAFT HELD IN AIRCRAFT STORAGE UNITS

DATE	HURRICANES				SPITFIRES				DEFIANTS			
	Class I	Class II	Class III	Classes IV - VI	Class I	Class II	Class III	Classes IV - VI	Class I	Class II	Class III	Classes IV - VI
16 March	10	5	22	228	-	16	6	119	-	-	-	8
6 April	5	1	33	243	4	1	13	88	1	1	2	12
27 April	4	2	52	305	-	5	10	92	-	-	-	13
10 May	1	-	48	366	11	6	10	83	-	-	-	15
24 May	2	-	50	194	3	1	15	34	1	-	-	19
8 June	18	4	20	215	4	-	2	15	-	-	1	11
22 June	54	29	11	144	45	-	9	35	7	-	1	9

Two aspects of the problem of reserves should be noted. First, reserves could only be built up if there was a margin between production and operational requirements, i.e. re-equipment, expansion and wastage, in favour of the former. Second, the production of aircraft equipment had to be kept in phase with that of airframes and engines. Of the two the second was the more important at this time. Fighter production, while still insufficient, steadily increased from December 1939 and considerable numbers of fighters went into store in the A.S.U.'s. It was there that the gap between airframe production and that of ancillary equipment became obvious, since it was at the A.S.U. that many items of equipment (70-80 in the case of single-seater fighters) were embodied in an aircraft in order to fit it for operations. Chief amongst such equipment were guns and gunsights, clocks, R/T sets and oxygen cylinders. It was the shortage of these important items that chiefly accounts for the difference between the number of aircraft in the A.S.U.'s and the number ready to be flown against the enemy.

But the Command had also to find squadrons for the defence of Scapa, for the protection of North Sea shipping and, as we shall see shortly, for certain other duties. During the early months of 1940 it became evident both to Air Chief Marshal Dowding and to those officers on the Air Staff who were particularly concerned with air defence, that a further expansion of the fighter force would soon be necessary. After his correspondence with the Air Council in the Autumn of 1939 the Commander-in-Chief made no further requests for reinforcements for some months. Indeed he obtained more than he expected, and almost as much as he hoped, by the expansion decided upon in October. But during the next few months the Fighter Command organisation was pushed north and east in order the better to protect shipping from air attack; and fighter detachments began regularly to operate from coastal airfields, some of which, notably Bircham Newton, North Coates, Dyce and Montrose, had never previously been used by fighters and were not fully equipped for fighter operations.

i. Extension in Scotland.

It was as a result of the extension of his Command up the East coast of Scotland that Air Chief Marshal Dowding was first prompted to ask for more squadrons. After discussing the matter with the Director of Home Operations, Air Commodore D.F. Stevenson, he wrote officially to the Air Ministry early in February, pointing out that the length of the defensive line for which his Command was responsible had been considerably increased by the need for protecting the Scottish coast north of the Tay. This need had been partially met by basing fighter flights at Montrose and Dyce; and the Commander-in-Chief assumed "that the Air Council will never be prepared to withdraw these detachments and to have the coast undefended." In his opinion further requests for the protection of the Scottish coasts were likely to arise, which as things were at the time, could only be met by improvisation at the expense of the squadrons further South. He therefore, suggested that the time had come for "a comprehensive examination of the

S.3553, Encl.1A, Dowding - U.K. of S., 2 February, 1940.

question of the defence of Scotland from the Tay to the Shetlands."

ii. Extension in the West of England.
ibid., Encl. 2A, Dowding - U.S. of S., 4 February 1940

Two days after this letter was written he again wrote to the Air Ministry asking that the defence of the shipping using South and West Coast ports might also be considered "as a matter of urgency". It seemed to him not unlikely that the Germans were developing a special long-range bomber which would reach the Western Approaches and the western end of the Channel either by outflanking the existing defences or by flying at altitudes at which detection by the existing R.D.F. system was unreliable.(1) The possibility of attacks in this part of England, though against targets on the mainland rather than at sea, had been realised before the war; and a new Group, No. 10., was projected to cover the country west of Portsmouth. Not much was done to bring it into operation until the end of 1939 and Fighter Command were then informed that the Air Ministry intended to complete the new Group Headquarters by March 1940. The Group was to contain sector stations at Filton, Middle Wallop and Tangmere. What Air Chief Marshal Dowding was asking for was an expansion of this scheme. He feared attacks on shipping in the Western Approaches and to counteract them as far as was in the power of his Command he wanted airfields to be organised in North Devon and Cornwall and the R.D.F. and Observer Corps system extended towards the exteme south-west.

S.59178, Letter D. of Organisation - Fighter Command, 9 January 1940.

In his reply on behalf of the C.A.S. Air Commodore Stevenson stated that both the problems raised by the Commander-in-Chief would be examined and a comprehensive review of the air defence situation would be carried out. But he did not allow Sir Hugh Dowding's assumption regarding the permanency of the fighters at Montrose and Dyce to go unchallenged; stating that "the desirability of maintaining them will be dependent upon the general air situation in this country."

S.3553, Encl. 4A, Stevenson - Dowding, 9 February 1940.

(1) This statement was based on information obtained from a prisoner early in February. The prisoner believed that the aircraft would be the He. 177 and that K.G. 40 would specialise in this type of operation.
(A.I.1 (K) Report, No. 5/1940).

iii. Attitude of the Air Staff.

Before ever Air Chief Marshal Dowding had raised the question Air Commodore Stevenson had been concerned about the extending activities of Fighter Command in relation to its resources. In January he had circulated a note on the position in which he had argued that in view of the estimated increase in the German long-range bomber force from 1,750 aircraft at the outbreak of war to 2,350 by April 1940 an increase of twenty-four squadrons was necessary if Fighter Command was to be certain of defeating the heaviest attacks that the Germans might make. Such an expansion was not practicable in the circumstances of the time and he did not recommend it; but until such time as further expansion was possible existing forces should be used as economically as possible. He suggested that arrangements should be made for reciprocal reinforcement between France and England, that no more fighter squadrons should be sent to France except to Fighter Wing Servicing Units, and that the whole air defence position should be examined in order that any additions deemed necessary should be allowed for in the production programme. The first of these recommendations implied the extended use of Fighter Wing Servicing Units, and this was accepted as was the suggested prohibition of any further permanent allotment of fighters to France. But nothing was done to facilitate the reinforcement of the air defences of Great Britain by squadrons of French fighters, as Air Commodore Stevenson had suggested. Air Chief Marshal Dowding was personally opposed to such a scheme on the ground that the Fighter Command interception system was so intricate that complete familiarity with it was necessary if it was to work successfully. What Air Commodore Stevenson had in mind, however, was that French fighters would be employed as standing patrols over target areas such as Coventry and Birmingham. The third suggestion was also accepted and the review was completed by the middle of March. In it the fighter strength of the United Kingdom was examined from four points of view, namely the fighting

A.H.B. IIH/119/1, Encl.3. 'Note on the Strategical Deployment of the Fighter Force on 1 April 1940', 18 January 1940.

A.H.B. VB/14/1, Minutes of 1st E.R.P. Ctee. Mtg., 22 January 1940.

S.3553, Encl.10A, 16 March 1940.

experience of Fighter Command since September 1939, the new areas requiring fighter defence, the roles, unforeseen before the war, that had fallen to the Command, and, lastly, the force necessary to offset the increase in strength of the German long-range bomber force.

Review of the Air Defence System, March 1940.

i. Wartime experience of Fighter Command.

When the last comprehensive review of fighter strength had been undertaken in the autumn of 1938 it had been assumed that no bomber force operating at maximum intensity could accept a casualty rate of 13% - 16%. The first six months of war did not furnish sufficient data for the validity of this assumption to be tested. From 9 September 1939 to 13 March 1940, so the Air Staff review states, 431 aircraft were reported over or near the coasts of Britain. Of these 296 were probably German, though only 101 were definitely identified as such. 30 were destroyed.(1) Thus the casualty rate inflicted on the enemy might have been as high as one-third or as low as one-tenth. If, as the Air Staff thought likely, it was in fact somewhere between the two there was good reason for confidence in the future, as it had been inflicted by fighters operating at the fringe of the interception system against bombers which were able to attack targets dispersed over a wide area of sea. It was therefore concluded that provided the fighter maintained its tactical advantage over the bomber Fighter Command could be expected to inflict heavier casualties than they had done so far, if the Germans began to attack inland targets in force.

ibid, para. 5.

ibid. para. 7.

ii. Extension of the Area requiring Fighter Defence.

But if no increase in the fighter force was considered necessary in order to inflict that rate of casualties which would eventually cripple the enemy it was not so in the case of the

(1) This claim was substantially correct. Fighter Command actually claimed 26 enemy aircraft destroyed during the period and precisely that number were identified by the Air Intelligence branch concerned with prisoners-of-war from interrogations, wreckage and inquiries from Germany. The Air Staff figure did not take account of enemy aircraft that were forced to land in Norway and Denmark nor, for obvious reasons, of aircraft that crashed when well on their way to Germany or on reaching their base by reason of damage inflicted by fighters.

ibid. paras. 8-21.

extent of the area to be defended by Fighter Command. Firstly, as a result of the attacks on shipping and on the base at Scapa fighter strength north of the Forth amounted in March to four Fighter Command and two Fleet Air Arm squadrons, compared to two squadrons allotted to Scapa in the immediate pre-war programme. Secondly, if Germany hoped to achieve decisive results by attacking British seaborne trade she would need to attack shipping in the Western Approaches and the West Coast ports. Such a course of action seemed a distinct possibility to some, at least, of the Air Staff, especially if the attack on the Low Countries remained no more than a threat; and the defences of South-West England needed to be strengthened on that account. Thirdly, there was a general requirement for long-range fighter squadrons to operate in support of the Fleet,(1) and of offensive action against objectives in Germany and the Heligoland Bight. The four fighter squadrons temporarily with Coastal Command were a possible nucleus for such a force. Lastly, the review pointed out that the war potential of the country was rapidly expanding. New base ports, depots and factories of all descriptions were coming into operation, some of them in parts of the country, such as Wales, Cumberland, Western Scotland and Northern Ireland, which could only be defended with difficulty by the existing fighter force. For all these reasons an increase in fighter strength seemed to be justified.

ibid., Encl. 6A, Minute A.C.A.S. (O. & I.)-D.C.A.S., 13 February 1940.

iii. Expansion of the German Bomber Force.
ibid. paras. 22-28.

But no specific recommendations were made until the implications of the expansion of the German bomber force had been considered. Before the war forty-six fighter squadrons had been reckoned a sufficient force to meet the scale of attack which could

(1) The review dealt with this question as follows:- "There is a general feeling in the Fleet that H.M. Ships cannot face the threat of bomb attack if operating within range ... of the German long-range bomber force. Though attacks have not yet been pushed home this may well prove to be true if a considerable portion of the German bomber force is directed against our Fleet at sea. This entails fighter operations being carried out at ranges of 450 miles from our coasts and is quite outside the commitments as disclosed by the Admiralty before the war. The Admiralty always held, and indeed pressed their view, that the Fleet was able to look after itself and had no fear of bomb attack from the air."

be exerted by a long-range bomber force of 1,750 aircraft. A forecast specially made by Air Intelligence in March 1940 gave the Germans a first-line strength of 2,300 long-range bombers by 1 September 1940 and 3,090 by 1 April 1941. In addition, the German Air Force was expected to contain 600 dive-bombers and 550 bomber-reconnaissance aircraft by the first of these dates, 750 and 600 respectively by the second. It was fully realised that a German descent into the Low Countries would bring the dive-bomber within range of this country, and bomber-reconnaissance aircraft had already attacked shipping off the East Coast. But, the review went on, "in our special position of:- a. the necessity rapidly to build up our counter-offensive force to strike a powerful blow, b. the growing air strength of France, c. the superiority of the British fighter over the German production bomber, we can, we suggest, discount the dive-bomber and bomber-reconnaissance units and continue to base our calculations for fighter strength on the first-line strength of the German long-range bomber force." Even though the enemy's forces were thus, and somewhat speciously, limited it was clear that an immediate and considerable expansion of Fighter Command was called for.

iv. Recommended Counter-Expansion of the Fighter Force.

The review therefore recommended that the fighter force should be increased to sixty squadrons at 16 I.E. by 1 September 1940, and to eighty squadrons at 16 I.E. by 1 April 1941, to bring the fighter defence into proper balance with the German long-range bomber force. This was described as "a staggering requirement primarily dictated by the tremendous and growing strength of the German bomber force." The review appreciated that the demands of other forces, especially Bomber Command, would have to be considered, but, it went on, "In any

event seven squadrons are immediately necessary (1) ...and their provision should be on the highest priority. The provision of the additional twenty squadrons between September 1940 and April 1941 should be reconsidered in three months time.....But we should remember that the fighter force at Home is the pool from which fighter squadrons are drawn for an Expeditionary Force or for the reinforcement of Overseas fighters. It would be wise, therefore, to have a number of Fighter Squadrons at Home on a mobile basis which could be spared without gravely threatening the security of these Islands."

V. Deployment of the Additional Squadrons. ibid. paras. 32-34.

The deployment that was suggested for the first seven new squadrons registers the prominence of the shipping problem. All seven squadrons were to be placed at stations close to important shipping lanes. Five of them were to go to the Shetlands, the Moray Firth and the Aberdeenshire coast; this would entail forming a new Fighter Group for the control of all operations between the Firth of Tay and the Shetlands. The

(1) The previous calculation that an addition of 24 squadrons was required, obviously needs some explanation. The answer appears to be that Air Commodore Stevenson took the figure of 53 squadrons, i.e. an original 46 plus 7 for Scapa Flow, Trade Defence and Northern Ireland, as the force required to defeat a German attack by 1,750 bombers, which meant that a 33% increase in the German force to 2,300 aircraft needed to be matched by 18 more fighter squadrons, bringing the target to 71 squadrons. At the time there were 47 squadrons in Fighter Command; thus an increase of 24 squadrons was required. In the calculations of the March review, which was also chiefly the work of Air Commodore Stevenson, a different basis was adopted. The 7 squadrons that had been added to the original recommendation of 46 squadrons were not included in the force required to defeat 1,750 bombers on the grounds that they had been added for specific duties separate from the main body of the fighter force. Thus the 33% increase in the German force was theoretically counterbalanced by a similar increase in a fighter force of 46 squadrons, making in all 60 squadrons. Against this was set the whole of the Metropolitan fighter strength, including the four trade defence squadrons with Coastal Command but excluding the four Field Force squadrons, a total of 53. Accordingly, an increase of only 7 squadrons was recommended. There was a slight miscalculation here, as Air Commodore Stevenson admitted later (S.3553, Minute 11, D.H.O.-D.C.A.S., 24 March 1940): he had included in the 53 Metropolitan squadrons the fifth and sixth squadrons that were already in France and were likely to stay there permanently. Therefore the recommendation should have been for 9, rather than 7, extra squadrons. However, the D.C.A.S. only asked the approval of Sir Cyril Newall to the lower figure.

The other two were to go into No. 10 Group at the other extremity of the fighter line; sectors being set up at Bodmin in Cornwall and near Hartland in North Devon, with satellite airfields available near Lands End and in Pembrokeshire. Air Chief Marshal Dowding quarrelled with this deployment. He preferred to have one of the two sector stations in South-West Wales, so that he could patrol not only the Bristol but also the St. George's Channel; and this amendment was accepted by the Air Staff. The suggested deployment in Scotland, however, was altered at the instance of the D.C.A.S., Air Vice-Marshal Peirse. In his opinion the main task of Fighter Command would always be the defence of London and the industrial areas, an opinion held also by the Commander-in-Chief; and at a meeting of these two officers it was decided to allot only three additional squadrons to North-East Scotland and to use the two squadrons thereby released to stiffen the defences in the Kirton-in-Lindsey and Duxford sectors.(1)

A.H.B., IIH/119/1, Encl. 6, Dowding-W/Cdr. J.W. Jones, 23 March 1940.

S.3553, Minute 12, D.C.A.S.-C.A.S., 18 April 1940.

vi. Conditional Approval of the Chief of the Air Staff.

The whole scheme was placed before the C.A.S. on 18 April 1940 by which time it had been given added urgency by the German attack on Norway. His minute reads as follows:- "We can go ahead preparing the necessary ground in accordance with the deployment recommended. I do not however, agree to the upsetting of the production programme already laid out until I know what extent of dislocation and loss of output will result." This question was referred to Air Marshal Sir Christopher Courtney, Air Member for Supply and Organisation, but he could give no precise answer. He pointed out that fighter production was being built up to support a force of seventy-three squadrons, fifty-three of which were specifically allotted to the United

Ibid., Minute 13, C.A.S.-D.C.A.S., 20 April 1940.

Ibid., Minute 15, A.M.S.O.-V.C.A.S., 26 April 1940.

(1) The final deployment as approved by the C.A.S. is shewn on Map No.

Kingdom, but that maximum production had not yet been reached: "the existing rate of fighter production would not maintain more than 30 squadrons at wastage rates calculated on sustained effort.....By September 1940 it should maintain about 44 squadrons working at sustained effort." He asked that the addition of seven fighter squadrons should only be approved after the whole Air Force situation, not forgetting Bomber Command, had been investigated; it is clear enough that he was concerned lest the first-line bomber strength, which was already three squadrons less than at the start of the war, should be further retarded by too great a concentration on fighter production.

In the circumstances, no decision was taken to translate the C.A.S.'s approval 'in principle' into an executive order to proceed with the actual formation of the seven approved squadrons until events forced the issue. When it was decided to send an expeditionary force to Northern Norway, for which three fighter squadrons were earmarked, the situation changed; and on 8 May instructions were given for three of the seven fighter squadrons to be formed immediately, and the formation of the remainder to be considered in two days time. The meeting at which this was to have been done was never held owing to the German invasion of the Low Countries, but on 16 May a conference was held at the Air Ministry, at which Sir Hugh Dowding was present, to decide how the seven fighter squadrons could best be formed. By that time the situation had once more changed and the decisions that were taken at the conference are to be considered more a part of the reaction to the campaign in the West than a reflection of the fighter policy agreed upon shortly before the campaign began.

ibid. Minute 19, V.C.A.S.-A.M.S.O., 8 May 1940.

A.H.B. IIH/119/1, Encl. 15.

Commentary.

The German attack on 10 May marks the end of a comparative lull of eight months in which a serious effort was made to use available fighter resources with the utmost

economy. In the first two months the most important problem was to maintain a sufficient force in the United Kingdom to meet a 'knock-out blow' by the Germans and yet provide the British forces in France with at least a minimum standard of protection in the air. It was further complicated from October onwards by the need for protecting the naval bases in Scotland and the shipping using the East Coast. A great expansion of production and a proportionate increase in the flow of trained pilots and ground crews would have overcome all difficulties; but in 1939 the production position was so bad that the eighteen fighter squadrons that were added to Fighter Command between October and December were formed in spite of, rather than because of it. With the formation of these squadrons the strength of the Command was brought more closely into relation with the duties which it had to perform. The Fighter Wing Servicing Unit was another means for equating the two. The intention here was to use some of the resources of Fighter Command to underwrite the position in France but, at the same time, to avoid specific promises to the French which might have to be met when the United Kingdom itself was being heavily attacked. By means of the Fighter Wing Servicing Unit the way was prepared for the speedy reinforcement of the fighter forces in France without breaking the connection between the reinforcing squadron and Fighter Command. Nevertheless, insofar as the number of squadrons for which Fighter Wing Servicing Units were prepared exceeded the number which had been allotted to France before the war, to that extent Fighter Command was potentially under strength. Added to that was the fact, registered by the Air Staff review of March 1940, that the responsibilities of the Command widened as the war developed.

To obtain the maximum degree of flexibility should be the aim of every military force; and for that reason a

a device such as the Fighter Wing Servicing Unit was well conceived. But it is difficult to escape the impression that the Air Ministry were labouring in vain to bridge the gap between commitments and resources which was so much widened, if it was not opened, by the decision of April 1939 to send a great army to France. Air Chief Marshal Dowding, indeed, went further than this and said, in effect, that the Air Ministry were in danger of betraying their prime responsibility for the air defence of Great Britain in an attempt to fulfil their lesser responsibility to the forces in France. Wisely he based his criticisms on actual production figures, pointing out, as we have seen, that the wastage suffered by the fighter squadrons in France was likely to be so great that the Command at home would be gravely weakened before ever it had to face the enemy. The Air Council's reply, as we have also seen, was that the decision to maintain these squadrons rested with them and would be reached in the light of the air defence situation as a whole. The C.A.S. was, of course, identified with this reply, but he also feared that the pressure to send more squadrons to France might be irresistible; and he approved the Fighter Wing Servicing Unit as an insurance that squadrons would operate efficiently in France no matter how short the notice given them. It is in the extent to which it reflects and substantiates these three points of view that the significance of the French campaign to Fighter Command chiefly lies.

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IX. FIGHTER COMMAND AND THE BATTLES IN THE LOW COUNTRIES AND FRANCE

Introduction.

It will have been apparent from the earlier sections of this narrative that the two prime factors affecting the fighter policy of the Air Staff during the first eight months of war were, first, the need to ensure an adequate air defence of Great Britain itself, second, the need to give adequate fighter protection to the British forces in France. At the outbreak of war the resources available for the two tasks were obviously inadequate; and the series of decisions of October 1939 by which the C.A.S. instituted a big programme of immediate fighter expansion, amounting in all to eighteen squadrons, is proof enough that the Air Staff, equally with Fighter Command, were aware of the position. It is almost impossible to exaggerate the importance of this measure of expansion. It allotted a proportion of the strength of the Royal Air Force to defence that was considerably in excess of what had been regarded previously as its due in a properly balanced air force. It brought forward by a year the formation of all the fighter squadrons that it had been planned to form in the financial year 1940-41: and in doing so it inevitably meant further delay in the already tardy expansion of Bomber Command. At the time the strength of Bomber Command amounted only to fifty-five squadrons; whereas as a result of the expansion Fighter Command was given a force of fifty-seven squadrons(1) (including the six already in France). But it was this force, with some small additions, that was eventually to fight the Battle of Britain.

That it was a wise decision to delay the expansion of the air offensive in the interests of defence is now clear enough(2). But it was more than wisdom: it was almost an act of faith; for at the time the output of both fighter pilots and fighter aircraft was insufficient to establish the additional squadrons at full strength or permit the maintenance of adequate reserves. As late as April 1940 four of the eighteen 'October' squadrons were still not fit to take their place in the line of battle of Fighter Command. In other words, the fighter forces available in the United Kingdom and France when the campaign in the west opened were more than the organisation of production and training could properly sustain in the event of heavy fighting.

Long before 10 May it had been appreciated that Fighter Command might not be able to play an effective part in any campaign in France without prejudicing its primary duty of defending Great Britain. The fears of Fighter Command are reflected in the correspondence between Air Chief Marshal Dowding and the Air Council in September 1939, those of the Air Staff (and indeed of the War Cabinet) in the refusal to promise more than a small number of squadrons to the French. For even after the October expansion there were still only as many fighter squadrons in Fighter Command and France as the Air

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(1) Four of these, it will be recalled, were transferred to Coastal Command early in 1940.

(2) In the words of a present member of the Air Staff: "We had to ensure that we didn't lose the war before we started to win it".

Staff had calculated were necessary for the successful defence of the United Kingdom alone in the situation that faced us at the outbreak of war. Moreover, this was a pre-war calculation. To it had to be added the squadrons required for meeting the additional commitments which the first months of war had saddled upon Fighter Command: notably the unexpectedly large burden of convoy protection and the defence of the regions west of Portsmouth. Altogether, during March 1940, the Air Staff reckoned that by September at the latest Fighter Command would need sixty squadrons for the defence solely of the United Kingdom against a German Air Force operating from the bases occupied in March. Small wonder, therefore, that up to 10 May the French had only been promised that four more fighter squadrons would be sent to France when heavy fighting developed; and even this was conditional on a favourable air defence situation at home.

On 10 May the fighter position in terms of squadrons 47 was as follows. There were forty-seven squadrons in Fighter Command, of which six could virtually be discounted for home defence, two because they were earmarked for Norway, four because they were to go to France when the German offensive opened. In 6 France itself there were six British fighter squadrons. We were, therefore, up to twenty squadrons short of the force required for the full insurance of the United Kingdom, with at the same time a prospect of heavy fighting in France which might further weaken our strength at home; for nobody pretended that six, or even ten, squadrons would be able to fulfil the tasks that would be required of them if the Germans threw all their strength in the air into the coming battle. In short, despite the considerable expansion of British fighter strength that had taken place since September 1939 there were still insufficient fighter squadrons at our disposal.

The Opening of the Campaign in the West: The Despatch of the First Fighter Reinforcements.

On the first day of the German offensive the agreed plan of fighter reinforcement was put into effect. Three of the four squadrons that had been promised were despatched on that day: they were Nos 3, 79 and 501 Squadrons, which were armed with Hurricanes. The arrangements that were being made to provide fighter support for the Narvik expedition delayed the despatch of the fourth squadron, but this was remedied on 12 May when No. 504 Squadron was sent to France. In addition, and in execution of the plan to protect the flank of the French Seventh Army as it advanced to the Scheldt, Fighter Command squadrons carried out patrols along the Dutch and Belgian coasts. Blenheims of the Command also took part in operations over Holland, carrying out attacks on the Hague beaches and on the airfield at Waalhaven.

During the next five days the direct participation of the Command in the battle was limited to similar operations over the Dutch and Belgian coasts. They revealed painfully the

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(1) The effect of the Norwegian campaign upon Fighter Command was that two of its squadrons were practically destroyed. No. 263 Squadron was withdrawn at the end of April after its gallant fight at Lesjeskogen only to be re-equipped and sent to the Narvik area with No. 46 Squadron during the last week in May. All the aircraft and most of the pilots were lost either in Norway or on 8 June when the aircraft carrier 'Glorious', which was evacuating the two squadrons, was sunk. For details, see A.H.B. narrative, "The Campaign in Norway".

deficiencies of the Blenheim and Defiant as day fighters but the Hurricanes and Spitfires did well. No great toll was taken of the Germans, and the operations were well within the capacity of the Command(1).

The Despatch of Further Reinforcements, 12-16 May; Appearance of Air Chief Marshal Dowding before the War Cabinet.

The campaign had nevertheless a considerable effect upon the strength of the Command. All the British fighter squadrons in France had been hard pressed since 10 May, in particular those operating with the R.A.F. Component of the B.E.F.; and it was a reflection of the gravity of the situation in Belgium that three of the four squadrons that came out from England between 10 and 12 May had been attached to the R.A.F. Component, instead of being equally divided, as had been intended, between the Component and the Advanced Air Striking Force. These reinforcements were far from sufficient. On the 13th Air Marshal Barratt, Air Vice-Marshal Blount, A.O.C., R.A.F. Component, and Lord Gort all pressed for more fighter squadrons; and their demands were met to the extent of thirty-two Hurricanes and their pilots, which were drawn from several squadrons of Fighter Command, sent out to France on the afternoon of the 13th and attached to the various R.A.F. Component fighter squadrons.

Pressure from France continued to be exerted on the following day, notably in a telephone message from M. Reynaud in which he acknowledged the squadrons that had already been despatched, but asked for ten more squadrons to be sent, if possible, that same day. The War Cabinet went some way to meet him and instructed the C.A.S. to take preparatory steps for the early despatch of ten fighter squadrons in case they were needed to cover a counter-attack (presumably against the German thrust at Sedan). It was no more than a coincidence that on the same day, 14 May, Air Chief Marshal Dowding should have written to Air Marshal Peirse, the V.C.A.S., stressing the importance of maintaining the strength of Fighter Command at home. It is clear from the letter(2) that he knew neither of M. Reynaud's request nor of the War Cabinet's decision. In fact his nominal purpose in writing was not to protest against the despatch of further reinforcements but to give his opinion on the advisability of beginning a bomber offensive against Germany proper. At the same time, he reiterated his well-known views on the importance of conserving the strength of Fighter Command to meet the attacks which would eventually be made against the United Kingdom. When these were made, he said, his forces would engage the enemy with much greater efficiency than when they fought over the Continent, whether from French or English bases; and this was his chief reason for recommending, as he did, that attacks on Germany should be made forthwith; for retaliation against Great Britain might thereby be provoked. However, some time on the 14th he must have heard that ten more of his squadrons might soon be leaving the Command for France. He therefore requested the privilege of being allowed to state his point of view before the War Cabinet. The request was granted and he was given a hearing on the following morning, 15 May.

S.46368, Encl. 56A, 14 May 1940.

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(1) The details of these operations are to be found in the Air Historical Branch narrative, "The Campaign in France and the Low Countries" Pt.III, pp.186-251.

(2) See Appendix 10.

At their meeting the War Cabinet considered not only fighter policy but also how Bomber Command could best be employed and two related decisions were taken: first, attacks on targets in the Ruhr were authorised, second, no further fighter squadrons were to be sent to France "for the present". Thus the proposal to send ten more squadrons to France was shelved; and Air Chief Marshal Dowding has recorded his "inexpressible relief" at the decision(1).

Battle of Britain Despatch, paras.40-41.

The Decision of 16 May: Representations by the C.A.S.

In view of all this it is at first sight surprising that the War Cabinet should have decided at their very next meeting, at half past eleven on the morning of the 16th, that the equivalent of four fighter squadrons should be sent to France immediately and that preparations should be made for the despatch of two more. The explanation appears to be that at their meeting on the morning of the 15th the War Cabinet were not aware of how serious was the situation in the Sedan area. Even at the meeting of the 16th it is doubtful whether the disaster was fully appreciated. According to the War Cabinet Conclusions, the Prime Minister left for France after the meeting in order to protest against the Allied withdrawal "on account of the penetration of the French line by a force of some 120 German A.F.V's"; and it is hard to believe that the calamity which had befallen the French Second and Ninth Armies would have been described in these terms if the situation had been accurately reported. However, the fact of penetration was known, if not the full extent of the French defeat; and this, coupled with the appeals for more fighters which had been pressed by Air Marshal Barratt, General Pulleine and Lord Gort before the War Cabinet met on the 16th, fully accounts for the volte-face(2).

W.M.(40)124.

Later in the day still more reinforcements were requested; for when Mr. Churchill had realised the true

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(1) On the afternoon of the 15th, in a letter to Air Vice-Marshal Park, he said: "We had a notable victory on the "Home Front" this morning and the orders to send more Hurricanes were cancelled. Appeals for help, however, will doubtless be renewed with increasing insistence and I do not known how this morning's work will stand the test of time".

(2) In the same way as the decision of the 15th not to send more fighters to France was paralleled by that to begin the offensive against the Ruhr, so the decision of the 16th reversing the fighter policy of the previous day had its bomber counterpart in that at the same meeting the War Cabinet decided that a considerable proportion of the heavy bomber effort of Bomber Command should be directed against the crossings which the Germans had forced across the Meuse. This change in bomber as in fighter policy is also explained by the deterioration in the position on land.

The parallel can be taken even further. Air Marshal Portal, A.O.C-in-C., Bomber Command protested against what he regarded as the misuse of his forces with just as much energy as did Air Chief Marshal Dowding on behalf of Fighter Command.

W.M. (40)125.

nature of the position he himself telegraphed from France to urge that six more fighter squadrons should be sent across in addition to the four that had been promised that morning. A special meeting of the War Cabinet, presided over by Mr. Chamberlain, was held at eleven p.m. to consider the request. The C.A.S. was opposed to it on two counts: first, the most the northern French bases could take for efficient handling was three additional squadrons(1); second, there were only six Hurricane squadrons in Fighter Command on which calls had not already been made, and one of these was preparing to join the Narvik expedition. He put forward the alternative suggestion that six Hurricane squadrons should be concentrated in south-east England: three would fly across to France in the morning and operate from airfields of the R.A.F. Component; the others would do the same in the afternoon; and all would return daily to England. The War Cabinet agreed to this and the scheme was put into effect on the 17th.

By nightfall on the 16th the earlier decision to despatch the equivalent of four squadrons had been largely executed. The C.A.S. had decided that the four squadrons should be made up of eight flights from separate squadrons(2); six of these left during the afternoon of the 16th and two the following morning. The contributing squadrons were Nos. 56, 111, 213, 229, 242, 245, 253 and 601. In every case the flights were attached to squadrons already based in France. In addition, arrangements were made for twenty experienced Hurricane pilots from Fighter Command to be exchanged on the 17th for an equal number of tired pilots from the R.A.F. Component.

Air Chief Marshal Dowding's letter of 16th May: Further Representations by the C.A.S.

S.4752 Encl.1A.

Now on the 16th, Air Chief Marshal Dowding had written officially to the Air Ministry, once more putting his point of view on the question of fighter reinforcements. The letter was not, it appears, written in protest against the volte-face of the 16th; for it said nothing of the fresh demands that had been made on that day. The probability is that Air Chief Marshal Dowding was formally repeating and expanding for the benefit of the Air Council the views that he had expressed the previous day before the War Cabinet. Nevertheless, the letter was, in effect, if unknowingly, a strong protest against the reversal of the decision of the 15th(3). It requested the

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(1) Earlier in the day the Senior Air Staff Officer of B.A.F.F., Air Vice-Marshal D.C.S.Evill, had advised that our bases in France could not take more than five more squadrons. The explanation of the difference between this estimate and that of the C.A.S. is that Air Vice-Marshal Evill was thinking of the areas occupied by both the R.A.F. Component and the A.A.S.F., the C.A.S. only of the R.A.F. Component.

(2) "This was done", says Air Chief Marshal Dowding, "under the /incorrect/ impression that the loss of 8 half-squadrons would affect me less than that of 4 entire Squadrons, because it was supposed that I should be able to rebuild on the nuclei left behind". (Despatch, para.33).

(3) For some indirect evidence that Air Chief Marshal Dowding was unaware when he wrote the letter that the War Cabinet had reversed their decision of the 15th, see Note 1 page 143.

Air Council to decide what size of force could be depended upon for the air defence of the country, and, once this minimum had been reached, not to send any more reinforcements to France however desperate the need. It concluded by saying: "If an adequate fighter force is kept in this country, if the fleet remains in being, and if Home Forces are suitably organised to resist invasion, we should be able to carry on the war single-handed for some time, if not indefinitely. But if the Home Defence Force is drained away in desperate attempts to remedy the situation in France, defeat in France will involve the final, complete and irremediable defeat of this country".(1).

From this point onwards the C.A.S. appears as the chief protagonist of what can be called the Fighter Command point of view. On 17 May he placed Air Chief Marshal Dowding's letter before the Chiefs of Staff Committee, accompanying it with a Note(2) in which he powerfully urged that no more fighter squadrons should be sent to France. Previously the C.A.S. had not taken so strong a line; and the explanation is simply that the question was no longer one of the requirements of two forces - Fighter Command in England and the forces in France - rather was it one of the survival of Great Britain itself. As the C.A.S. put it: "I do not believe that to throw in a few more squadrons whose loss might vitally weaken the fighter line at home would make the difference between victory and defeat in France".

W.P.(40)159.

It is true, of course, that Air Chief Marshal Dowding had been saying something tantamount to this even before the campaign in France had begun. But it would be an over-simplification to hold that the C.A.S. had only now perceived what Air Chief Marshal Dowding had proclaimed for so long. The fact was that until such time as there was a probability that the French would be beaten it was both the British interest and duty to sustain as powerful a force in France as possible. We had chosen to fight the war against Germany in alliance with France; and that alliance obviously demanded that large British forces crossed the Channel. It had always been recognised that available resources were insufficient for Great Britain to be defended and France to be adequately supported; and if France was beaten, and we were beaten in France, every component, not just the air defences, of the defences of Great Britain would be grievously strained. For all these reasons, while we had consistently withheld any promise to commit all our land and air forces to France, we were obliged to use much of our strength there so long as the Anglo-French alliance was militarily effective.

But by 17 May if it was not yet clear that France was beaten, it was clear that the Germans were winning, that the original dispositions of the Allied armies were shattered and that it would be criminal to compromise the air defence of Great Britain any further. By the 18th the B.E.F. had withdrawn to the Escaut: the Headquarters of the A.A.S.F. and the R.A.F. Component were withdrawing west; indeed the administrative staff of the latter had already reached Boulogne: and by nightfall the Germans had advanced so far that the chances of stopping them from reaching the Channel coast were very remote. In short, the Allied armies were being split into two groups and the B.E.F. were about to lose its lines of communication to its supply ports. Thus, as early as the 19th Lord Gort began to discuss with the War Office the advisability of withdrawing on Dunkirk; and preparations were made to withdraw most of the R.A.F. Component to England.

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(1) See Appendix 11.
(2) See Appendix 12.

The Prime Minister's Decision of 19 May: Its Significance.

It is against this background that the Prime Minister came to a decision on the C.A.S.'s Note and the letter from Air Chief Marshal Dowding that accompanied it. The decision, contained in a minute to General Ismay dated 19 May(1), was as follows: "No more squadrons of fighters will leave the country whatever the need in France. If it becomes necessary to evacuate the B.E.F. a very strong covering operation will be necessary from English bases against the German bombers who will most certainly do their best to prevent re-embarkation". This latter project would still entail the employment of Fighter Command aircraft over France; and it was probably to forestall objections that Mr. Churchill went on to say: "From the point of view of the future resistance it makes no difference whether we strike down German bombers here or in France. Indeed the latter is to be preferred so long as the home bases are not voided. A.O.C.-in-C.(2) should be told the above and make his plans accordingly".

S.4752, Encl. 44

But the Prime Minister was obviously aware that a fight for the defence of Great Britain proper was very likely, for which Fighter Command must be as strong as possible. He therefore directed that the aircraft industry should be protected by as many anti-aircraft guns as could be made available; and he also added this word of cheering advice: "It must be borne in mind that since the battle began the Germans have lost far more heavily in aircraft than we, and that the actual proportion of strength has moved in our favour. I see no reason why with these resources we should not fight it out with them on better terms than were possible at the beginning of the war".

Leaving aside the question of whether the German Air Force was better engaged over France than over Britain,(3) the decision registered two things: first, the position in northern France was lost, or nearly lost; second, Fighter Command was to be conserved for two probable tasks -- the protection of the evacuation of the B.E.F. and the defence of Great Britain itself. In other words, the trend of fighter reinforcement was reversed: instead of bolstering up the position in France, the fighter resources of the country were now to be used for filling the inroads that had been made upon Fighter Command.

Summary of Fighter Policy: 10-19th May.(4)

As we shall see, this decision remained effective for most of the remaining weeks of the French campaign. As early as the 19th arrangements were made for the return to England of what remained of the eight half-squadrons that had been sent out on the 16th and 17th; and in addition the six Hurricane squadrons that had been operating in France and returning to England daily were no longer employed in this way. On the 20th the rest of the fighters of the R.A.F. Component began to return

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(1) See Appendix 13.

(2) i.e. Air Chief Marshal Dowding.

(3) See Appendix 16, paras. 6-7, also Appendix 14.

(4) This section consists largely of extracts from the Air Historical Branch narrative on "The Campaign in France and the Low Countries" p.p.467-469.

to England. By the 21st only three British fighter squadrons - those with the A.A.S.F. - remained in France.

It will be convenient at this point, therefore, to review British fighter policy during these first ten days of the French campaign. First, it should not be forgotten that whereas the French had only been promised four fighter squadrons, and these conditionally, additional to the six already in France, during the first week of the campaign the equivalent of ten reinforcing squadrons was despatched, not including those squadrons that remained based at Fighter Command stations. Nor was it practicable to have sent more squadrons, even if this could have been done without dangerously weakening Fighter Command for effective administration and maintenance became increasingly difficult as the Germans advanced towards the Channel. There can be no question, therefore, of our not doing all that might have been done to support the armies in France, much less of breaking faith with the French.

What is debatable, however, is not whether too little, but too much was done. Air Chief Marshal Dowding consistently held that it was; and by the 17th the C.A.S. held the same view. Their communications, respectively to the Air Ministry and the Chiefs of Staff, and Air Chief Marshal Dowding's appearance before the War Cabinet, show plainly that Fighter Command was being weakened to the point at which it would be unable to defend Great Britain effectively. By 19th May there were only thirty seven squadrons in Fighter Command that were fit for operations compared with a minimum of sixty squadrons that would be required if the Germans were to attack the country in strength. There is no escaping the conclusion that, thinking only in terms of the air defence of Great Britain, too much fighter strength was certainly sent out of the country. But the defence of Great Britain was not the only consideration so long as the position in France was held. Thus it was not until the danger of complete collapse in France was appreciated that the flow of fighter reinforcements was stopped.

The point is important: for it helps us to place the responsibility, first for reinforcing, second for withholding reinforcement, where it properly belongs, which is with the War Cabinet, guided in the matter by the Chiefs of Staff and, in particular, the C.A.S. It is clear from his Despatch that the suspension of reinforcements appeared to Air Chief Marshal Dowding as the belated but welcome recognition of his arguments against weakening Fighter Command(1); and without doubt his consistent and powerfully presented point of view helped to keep the security of the country present always before those in higher authority. But the decision of 19 May was rather dictated by a military situation that had deteriorated with terrible rapidity since the German offensive began; so much so that the War Cabinet had to think more of what was required for Great Britain possibly isolated than for Great Britain still fighting in France with her ally there.

/Militarily,

(1) Paras.40 and 41 of the Despatch imply a direct relation between Air Chief Marshal Dowding's appearance before the War Cabinet on the 15th and the decision to stop further fighter reinforcements; and this is so in that a decision to that effect was certainly taken at that meeting. But this decision was not the one that mattered: as we have seen, it was reversed on the following day. The effective decision was that of the 19th, which so far as it was precipitated by an individual, was the result of the action taken by the C.A.S. on the letter written by Air Chief Marshal Dowding on the 18th. It was, therefore, the letter rather than the appearance before the War Cabinet that was the occasion for the final decision.

Militarily, after 18th May, there was no case for stripping England of fighters to send to France, though there was a political temptation to encourage the French by this means to remain faithful to the alliance. Fortunately, the temptation to adopt an unsound military measure in the interests of a political situation was firmly resisted.

Events from 19th May to the Completion of the Dunkerque Evacuation

The Prime Minister's instructions of 19th May had specifically drawn attention to the need for a plan of fighter protection for a possible evacuation; and it was in fact Dunkerque that was to prove the main influence upon Fighter Command during the rest of the French campaign. But the operations that the Command embarked upon until the evacuation began on 26th May were far from negligible(1). The withdrawal of the R.A.F. Component meant that from 21st May all British fighter operations over the shrinking area that the B.E.F. was occupying in northern France and Belgium, had to be carried out by Fighter Command squadrons from coastal airfields of No. 11 Group in Kent. Escorts were provided for Blenheims on reconnaissance and on bombing sorties; for transport aircraft, which were still using Merville airfield; and offensive patrols were also flown over the Arras-Cambrai-Lille-St. Omer area by Hurricanes and by Spitfires and Defiants along the coast from Boulogne-Dunkerque. The Spitfires were not used over France as Air Chief Marshal Dowding was anxious to avoid casualties amongst what he regarded as his best aircraft. In these operations, twenty-five fighter pilots were lost, against a claim of seventy-six enemy aircraft destroyed.

A measure of evacuation from Dunkerque had begun as early as 22nd May; but it was not until the evening of the 25th that orders were given for the complete evacuation of all Allied forces from the threatened area. On that day the operations of Fighter Command began to be devoted almost exclusively to patrols along the line Calais-Dunkerque, and some two hundred sorties were flown.

On the following day, sixteen Fighter Command squadrons were employed over France and the French coast, and nearly three hundred sorties were flown. During the first half of the day, however, requirements other than the protection of Dunkerque had also to be met, such as escort to bombers and patrols for the benefit of the Belgian front. But from the middle of the afternoon patrols were concentrated primarily on the line Gravelines-Furnes and, secondarily, on a more inland line, Dunkerque-St. Omer or Furnes-St. Omer. Only Hurricane squadrons were used inland.

The aim was to maintain continuous patrols during the daylight hours; and this was largely accomplished. But it

/meant

(1) It was an index of the continuing strain upon Fighter Command that on the 24th Air Chief Marshal Dowding requested that the possibility of withdrawing even the three fighter squadrons remaining in France should be examined. The letter was written in reply to one from the Air Ministry on the previous day in which the decision of the 19th was formally registered, see Appendices 14 and 15.

meant that most of the patrols were only at squadron strength; and on three occasions single squadrons were heavily outnumbered in combat. The claims of our pilots were nearly three times as big as their own losses - 38 to 14; but the fact remained that it was on this day that the port and town of Dunkerque received its heaviest damage from bombing. There were at least a dozen separate attacks; evacuation arrangements were most adversely affected; and only some four thousand troops were taken off during the day.

Nevertheless, the provision of continuous and strong patrols was still demanded for the 28th. At 0208 hours on that day the C.A.S. instructed Air Chief Marshal Dowding to "ensure the protection of the Dunkirk beaches (three miles on either side) from first light until darkness by continuous fighter patrols in strength", and, in addition, to "have due regard to the protection of bomber sorties and the provision of support in the B.E.F. area". Thus Fighter Command was required to meet two virtually conflicting requirements over Dunkerque - continuity and strength(1). To achieve this, all Fighter Command patrols, except an escort in the early morning to Blenheims operating near St. Omer, were concentrated over the Dunkerque area, at an average strength of over two squadrons, as opposed to an average strength of over one squadron the previous day. Twelve patrols were flown, involving thirty squadron sorties and three hundred and twenty-one aircraft sorties; and there were only short intervals when the area was not being covered. But to provide forces of this size almost continuously throughout the day and also ensure that the individual patrols were not excessively outnumbered was very difficult. It was the exception rather than the rule for the participating squadrons to employ a full formation of twelve aircraft: more often only eight, nine or ten aircraft could be put into the air. On two occasions on the 28th two very large enemy formations were encountered; and for the day as a whole the balance sheet of losses - thirteen British fighters to nineteen German fighters and four bombers - was not as much in our favour as usual.

So long, however, as the evacuation of troops continued throughout the day, as it did on the 28th, continuous patrolling was desirable; and the faster rate of loading that was ahieved that day was not least due to the efforts of the protecting fighters. Nevertheless, the policy of continuous patrols was modified on the 29th without any corresponding alteration in the methods of evacuation. The odds which our fighters had encountered on the 28th had led to this necessity; and on the evening of that day Fighter Command was given permission to organise its patrols as it thought best.

/From

(1) The C.A.S. is recorded as saying at the morning meeting of the War Cabinet on 28th May that, "He had just received a message from V.C.A.S. to the effect that C-in-C., Fighter Command, was deeply concerned at the effect of this order on A.D.G.B. Our fighter defences were almost at cracking point, and if this exceptional effort had to be repeated over Dunkirk on the following day, the situation would be serious. C.A.S. said that he could not accept the statement that our fighter defences were almost at cracking point, but he thought it only right to put forward C-in-C's views".

From the 29th, therefore, protection was so arranged that up to four squadrons (though often in two separate formations) were on the Dunkerque patrol line at the same time. This meant an absence of fighter cover for periods of an hour to an hour and a half at a time. Even so, Fighter Command still had difficulty in organising the patrols. Some of them, nominally four squadrons strong, mustered less than thirty aircraft; and out of the one hundred and nine squadron sorties that were despatched between 30th May and 4th June only twenty-seven were made at full strength. Towards the close of the evacuation V.C.A.S. reported to the Chiefs of Staff Committee that in order to patrol four squadrons strong, detachments from as many as eight squadrons were being used.

C.O.S. (40) 165th Meeting, 3rd June, 1940

The new methods enjoyed fair success. Only on 1st June were really damaging attacks made on Allied shipping; and partly on that account and partly because of increased German shelling, henceforth the loading of troops proceeded only at night. This simplified the task of Fighter Command; for strong fighter cover was then required only at dusk and dawn, when shipping was approaching and leaving Dunkerque. How far this explains the negligible casualties from bombing during the last three days and how far the hazy, foggy weather was responsible, it is difficult to say.

The Contribution of Fighter Command to the Success of the Evacuation. (1)

What part the Royal Air Force, and in particular Fighter Command, played in the evacuation has been a matter for debate. Undoubtedly thousands of soldiers and sailors came back to England believing that insofar as the R.A.F. had contributed at all, their contribution was ineffective; and the same opinion was advanced in the official report on the evacuation by Vice-Admiral Dover.

It is undeniable that on 27th May Dunkerque was severely and repeatedly bombed, and that evacuation arrangements were badly affected. At the close of the following day, however, Senior Naval Officer, Dunkerque, signalled, "Fighter protection has been invaluable ..... and bombing only sporadic". On the 29th, the Germans endeavoured to make five major attacks: twice they got through in the absence of our patrols, and three times they were intercepted, though once after they had bombed. On the 30th, the cloudy weather was much in our favour and bombing interfered little with the evacuation; but on the next day all four major attacks were engaged by our patrols, and only one vessel was sunk by bombing. 1st June was a bad day, and a great deal of damage was inflicted on our ships, mostly in the unavoidable intervals between patrols. On 2nd June our fighters intercepted successfully on the three occasions when enemy formations were reported. The 3rd and 4th were days of bad visibility that reduced the threat from the air almost to nothing. The general picture is thus of considerable German success on two days; otherwise the enemy was in the main decisively impeded by our patrols or by the bad visibility.

In any case, the "evidence of their eyes", while it explains, does not justify the views of those on the beaches...

/or

(1) A digest of p.p.470-473 of the Air Historical Branch narrative, "The Campaign in France and the Low Countries".

or the ships offshore. Such evidence is valid only for their own sufferings under bombing which were great and which were bravely endured, but it was no criterion of what the R.A.F. were doing on their behalf. It has often been pointed out that air action for the benefit of ground forces does not necessarily occur within sight of the troops. This was certainly the case at Dunkerque, where some of the fighter effort and all, or nearly all, of the bomber and reconnaissance effort of the R.A.F. for the support of the evacuation was exerted out of sight of the beaches. Moreover, both soldiers and sailors at this time seem to have been incapable of distinguishing British from enemy aircraft. Thus, Rear-Admiral Wake-Walker, S.N.O. Afloat off Dunkerque, records how, on 1st June, "as the mists and clouds dispersed many aircraft appeared on the scene and fighters constantly came low overseas. More often than not they were Spitfires(1), but our ships were not taking chances and nearly always opened fire indiscriminately on them". This type of incident could, in fact, be multiplied by the score; and one is left with a general impression that a more or less automatic assumption of hostility was usually made by both ships and ground forces in the case of all aircraft. Judged by this token, the more frequently the R.A.F. operated near Dunkerque, the more the Luftwaffe would appear to monopolise the skies.

The extreme view - that the R.A.F. did nothing - is, of course, absurd. Fighter Command, in fact, did all that it could and did it under unfavourable conditions, operating at the limit of the operational range of the fighters in service at the time, and over the sea. Between 26th May and 4th June 106 Fighter Command aircraft and between seventy-five and eighty pilots were lost in operations for the protection of the B.E.F. What precise losses were inflicted on the Germans is uncertain: but 258 enemy aircraft were claimed as certainly destroyed.

The view of the other extreme - that the R.A.F. alone made the evacuation possible - is no less untenable. Yet there is this much truth in it: that the main responsibility for prohibiting the evacuation seems to have been placed on certain units of the German Air Force, as most of the German troops in northern France were required for the forcing of the Allied line along the Somme and the Aisne. Thus, whenever the patrolling fighters beat off German formations, or inflicted losses upon them - as they often did - they were blunting the weapon with which the Germans hoped to complete the destruction of the B.E.F. That the R.A.F. contributed to the result is, therefore, certain. As the Prime Minister put it: "There was a victory inside this deliverance. It was gained by the Royal Air Force". To what extent, however, is a question that cannot yet be answered finally.

The Closing Weeks of the French Campaign(2)

With the end of the Dunkerque evacuation on 4th June Fighter Command's interest in the French campaign was switched to the situation on the Somme and the Aisne, where what was recognised as the last line on which the German advance could

/be

(1) One might add that as often as they were Spitfires they were Hurricanes.

(2) For fuller details, see P.P.350-378, "The Campaign in France and the Low Countries".

be checked, had been hurriedly organised. Up to that date, the Prime Minister's decision of 19th May had not been rescinded or in any way amended; and there were in France only the three fighter squadrons with the A.A.S.F.

On 31st May, however, at the meeting of the Supreme War Council, it had been agreed that the British Government would consider the question of military and air reinforcements, a decision that reflected the vital importance of holding the Allied positions. It was fighter reinforcements that the French were particularly anxious to obtain; appeals came in from General Vuillemin (on two occasions), M. Reynaud and also from the British air commander, Air Marshal Barratt, between 21st May and 4th June.

W.O.S.(40)421.

The British response was at first unfavourable. On 3rd June the Chiefs of Staff reported as follows: "We most strongly recommend that no additional fighters should be sent to France since even the three squadrons referred to above (i.e. those still in France) cannot be maintained in circumstances of heavy wastage, except at the expense of Home Defence squadrons.... ... Every fighter withdrawn from this country increases the risk of a decisive air attack on, or a successful invasion of, this country".

But on the same day that this recommendation was made Air Marshal Barratt was representing to the Air Ministry a contrary policy. Urging that the French were perhaps rallying, and that every measure must be taken to increase their resistance, he wrote: "To permit the British Air Forces in France to operate, it is essential that it should have a high proportion of fighter aircraft, organised and established in France with the utmost rapidity so that they are ready, when the attack comes, to inflict the heaviest possible losses on the German Air Forces in the most economical manner.....It is considered, therefore, essential to make B.A.F.F. a balanced force immediately by the provision of Fighter Squadrons in France fully organised to permit their aircraft to operate efficiently before the crisis arises. To wait, and throw the fighters in, after the crisis has arisen, can only lead to inefficiency and defeat in detail". Therefore, he went on, "the only alternatives were to withdraw B.A.F.F. altogether or provide it with a properly organised force of ten fighter squadrons".

If the first of these was impossible because it might well lead to the complete cessation of French resistance, the second was no less so because of the effect it would have had upon Fighter Command, now reorganising and bringing itself up to strength after the losses suffered over Dunkerque and in the earlier fighting. On this point all authorities at home were agreed.

Nevertheless, within two days of the re-opening of the German offensive on 5th June the War Cabinet went some way towards meeting the demands from France. From its beginning the offensive went well, which added point to the importance of doing everything possible to encourage the French to keep on fighting. Moreover, it indicated that the Germans were out to finish off France before turning against Great Britain, and therefore, that serious air attacks on this country would be delayed, at any

rate for a short time(1). Thus, on the 7th the War Cabinet decided to send two more fighter squadrons to join the two already with the A.A.S.F.: these flew out on the following day. In addition, arrangements were made for four Fighter Command squadrons to fly out daily from England, operate from French airfields and return to England the same day. In short, the continuous pressure from France had once more brought about a reversal of a previous decision not to send more fighter squadrons

But as events turned out, Fighter Command was saved from incurring wastage on the scale of its earlier efforts to support the B.E.F. By the evening of the 8th the leading German formations were only ten miles from Rouen, where the main airfield used for refuelling fighters from England was located: the remnants of the B.E.F. were being driven back, part towards the Seine, part towards Le Havre, and the French were in no better plight. The position both of our land and air forces was, in a word, precarious. Consequently, it was decided that same evening, despite a renewed appeal from M. Reynaud, that henceforth fighters operating from England should not land in France except in emergency. Moreover, as the Germans advanced to complete their victory and the British forces were driven to the coast, Fighter Command's effort was confined to comparatively uneventful patrols over St. Valery-en-Caux, where the 51st Division attempted to evacuate, and over Cherbourg. From 5th June, when the German offensive began, to 18th June, when the evacuation from Cherbourg ended, only twenty-seven Fighter Command aircraft and fifteen A.A.S.F. fighters were lost; the very speed of the enemy's advance, the confusion in the defensive organisation, and a more dispersed German air effort, forbad the bitter combats that had led to heavy losses in the earlier fighting.

Some effects of the French Campaign upon Fighter Command.

So by the night of 18th June the Battle of France was over for the British forces. The dilemma that had tormented the authorities at home for so long no longer applied, and Fighter Command was now free to concentrate on the task for which it had been organised, trained and equipped - the air defence of Great Britain. The strategic and tactical revolution in the air situation which was brought about by the collapse of France, and the British response to it, is considered elsewhere(2). But certain effects of the campaign have a place here, namely those which reflect what was the main problem facing Fighter Command - how to maintain a strong and efficient force at home.

In terms of squadron strength the Command lost nothing by reason of the French campaign; for although things came to such a pass during the Dunkerque operations that squadrons had to be amalgamated in order to maintain strong patrols, no squadrons were disbanded and all retained their identity. This was a matter of conscious policy. It was appreciated that

/squadrons

(1) During the first half of June there were no noteworthy operations by day against Great Britain. On the nights of the 5th and 6th aircraft from two Kampfgeschwadern that took no part in the French campaign, attacked scattered targets in eastern coastal counties. Otherwise our immunity from attack continued.

(2) 'Air Defence of Great Britain', Vol.II p.p. 1-22.

See p. 137 : 47 sqns

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Not mentioned on p. 137

squadrons would fall below strength; but this was accepted in order to maintain all squadrons, at least in nucleus, and build them up to full establishment when wastage diminished.

Indeed, the Command received three separate accretions of strength during May and June. First, on 16th May it was decided to form three new Spitfire squadrons to compensate for the squadrons that were despatched to France after 10th May. Then, when the squadrons of the R.A.F. Component returned to England, six fighter squadrons became available additional to those that had been in the Command on the day that the campaign had opened. Finally, the two fighter squadrons originally with the A.A.S.F. returned on 18th June as well as the reinforcing squadrons sent out on 8th June. There was, in sum, a gain of eleven squadrons, there being fifty-eight squadrons in Fighter Command on 20th June compared to forty-seven on 10th May.

But this was largely a nominal gain that had yet to be made into a real one; for no less than twelve of these squadrons were unfit for battle and few of the rest had escaped without serious losses. Altogether, 396 Hurricanes and 67 Spitfires were lost outright during the French campaign: and over the same period nearly two hundred and eighty fighter pilots were killed, missing or made prisoner, and sixty wounded. The result is reflected in the returns of operational strength in Hurricanes and Spitfires at the close of the campaign. On 24th June, for example, nineteen Spitfire squadrons, with an establishment of sixteen initial equipment aircraft and twenty-two pilots each, reported an average operational strength of thirteen aircraft; eighteen Hurricane squadrons, with the same establishment, reported an average of twelve aircraft. The non-operational Hurricane and Spitfire squadrons were in even worse case. It was to be well into July before all the Command's squadrons were reckoned fit for operations; and even then there was still a deficiency of pilots amounting to nearly twenty per cent. of establishment.

The price paid for intervention had thus been high. Looking back we can now see that the aircraft and pilots that were lost would have made no small difference to the force that was to fight the great battles of August and September; and so long as the events of 1940 arouse interest and study, so long will it be debated whether excessive risks were taken to support the forces in France. A strong case can be made out on military grounds that we did in fact go too far. But it is not an unanswerable case even on military grounds; and when the pre-eminent political consideration of maintaining the Anglo-French alliance is taken into account the arguments in favour of reinforcement are hardly to be denied.

THE 1923 PLAN FOR THE AIR DEFENCE OF GREAT BRITAIN(i)

LEGEND

- Areas of Restricted Flying
- London Inner Artillery Zone
- Fighter Stations
- Sector Boundaries of Aircraft Fighting Zone
- Boundaries of Observer Corps Area
- " " Coastal Gun Defended Areas
- Towns

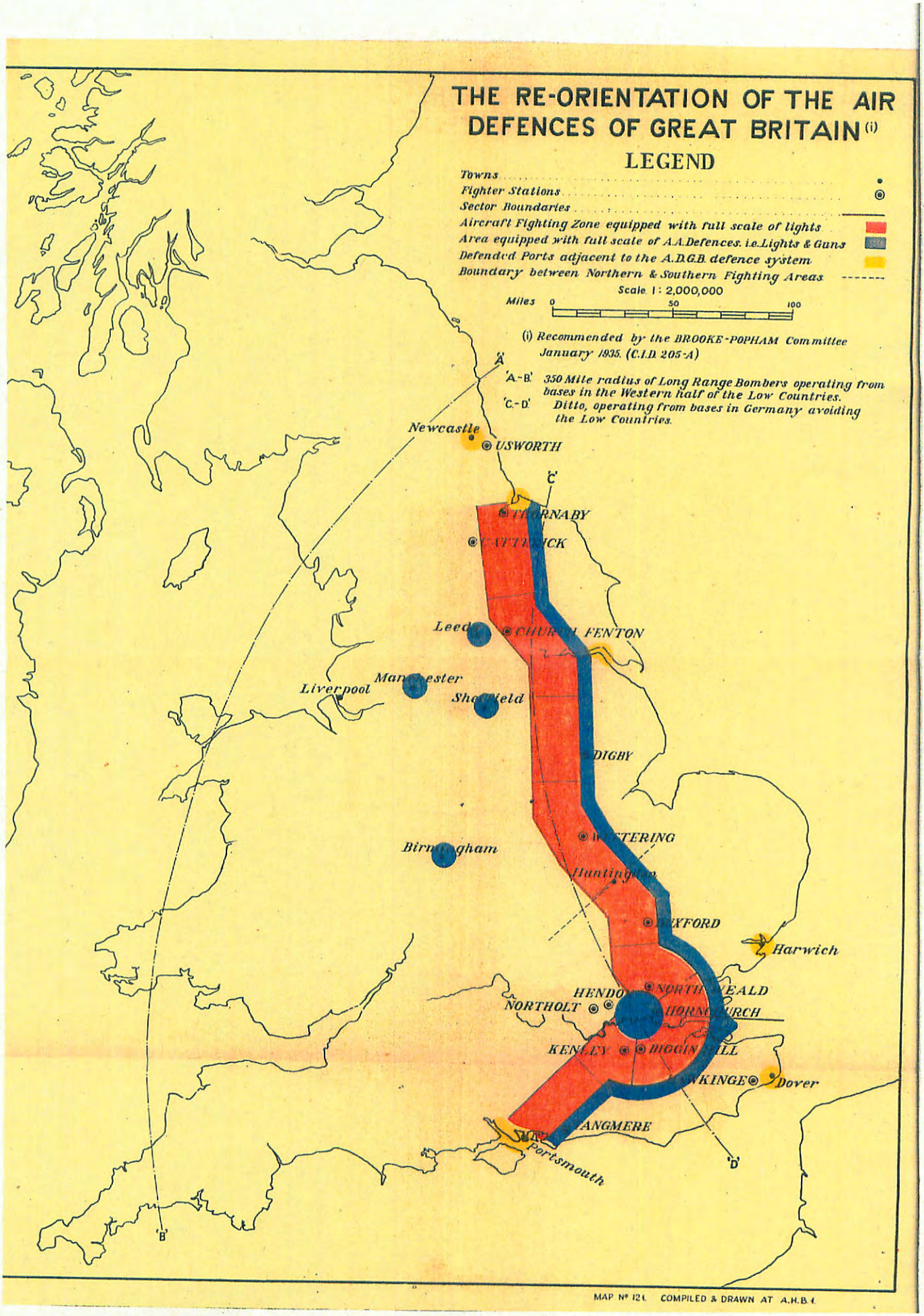
Scale
1:1,000,000

10 5 0 10 20 30 40 50 60
Miles

(i) Recommended by the STEEL-BARTHOLOMEW Committee, April 1923. (C.I.D. 118-A.)

Cambridge
HENLOW
DUXFORD
HARWICH DEFENCE
Harwich
COAST
ON
LOCATORS
SOUND
Chelmsford
Waltham Abbey
NORTH WEALD
SUTTONS FARM
NORTHOLT
SHOEBURYNESS & SHEPPEY DEFENCE
Greenwich
Devizes
BIGGIN HILL
Chatham
KENLEY
Maidstone
UPAVON
Aldershot
OUTER ARTILLERY ZONE
HAWKINGE
DOVER DEFENCE
Dover
Folkestone
Southampton
PORTSMOUTH DEFENCE
Portsmouth
SOUND LOCATORS ON COAST

MAP No 22 COMPILED & DRAWN AT A.H.B.1


THE RE-ORIENTATION OF THE AIR DEFENCES OF GREAT BRITAIN (i)
LEGEND
Towns
Fighter Stations
Sector Boundaries
Aircraft Fighting Zone equipped with full scale of lights
Area equipped with full scale of A.A.Defences. i.e.Lights & Guns
Defended Ports adjacent to the A.D.G.B. defence system
Boundary between Northern & Southern Fighting Areas
Scale 1 : 2,000,000
Miles 0 50 100
(i) Recommended by the BROOKE-POPHAM Committee January 1935. (C.I.D 205-A)
'A-B' 350 Mile radius of Long Range Bombers operating from bases in the Western half of the Low Countries.
'C-D' Ditto, operating from bases in Germany avoiding the Low Countries.
'A'
'C'
'B'
'D'
Newcastle
USWORTH
Liverpool
Manchester
Sheffield
Leeds
CHURCH FENTON
DIGBY
Birmingham
Harwich
NORTHOLT
KENLEY
Dover
Portsmouth
MAP Nº 121 COMPILED & DRAWN AT A.H.B.1

APPENDIX 1

"THE REPORT OF THE ROMER COMMITTEE" (1)

Terms of Reference: To examine and make recommendations respecting certain important principles concerning the Air Defence of Great Britain, namely (a) the higher War Organization required for the combined ground and air units to conform to the operational policy of the Air Staff; (b) the adaptation of the peace organization to meet those requirements; and (c) the system to be adopted for the issue of orders to units and civil warnings.

To consider and report on the system of Intelligence and communication essential to the success of the Air Defence scheme and the provision of such a system.

Section 1: Introductory.

1. In considering the various questions connected with the Air Defence of Great Britain the Sub-Committee adopt as a basis the Report of the Joint Sub-Committee appointed by the "Joint War Office and Air Ministry Committee on Air Defence of Great Britain" as set forth in Appendix (A) to C.I.D. Paper No.118-A, dated May 1923, and the decision of the Cabinet that the Air Ministry is responsible for the air defence of Great Britain.

Responsibilities of Army and Royal Air Force

2. On the Cabinet decision the Sub-Committee recommend that the responsibilities of the Army and Royal Air Force as regards the Air Defence of Great Britain should be defined as follows:-

(1) The Royal Air Force to be responsible -

(a) For the conduct of operations and combined training;
(b) For the provision and organization and training of all R.A.F. personnel employed in the air defence of Great Britain;
(c) For the provision of all apparatus and for provision and training of the personnel necessary for all signal communications required by the Royal Air Force;
(d) For the provision of all apparatus and for the provision and training of the personnel necessary for all wireless communications.

(2) The Army to be responsible -

(e) For the provision, organization and training of all ground defences employed in the air defence of Great Britain;
(f) For the provision of all apparatus and for the provision and training of the personnel required for the observation, organization and for all signal communications required by the Army, with the exception of the apparatus and personnel required for wireless communications.

/Section 5.

(1) Extracts from the Interim Report of the Sub-Committee of the Joint Air Ministry and War Office Committee on Air Defence dated 16 May 1924 (H.D.C. 89).

Section 5:

Chain of Command. 1. The Sub-Committee realise the importance of settling the Chain of Command before considering the details of the scheme of air defence and make the following recommendations:

(a) That the A.O.C. in C. Air Defence of Great Britain should be in supreme command and should be responsible for all decisions regarding the system of air defence both on the ground and in the air.

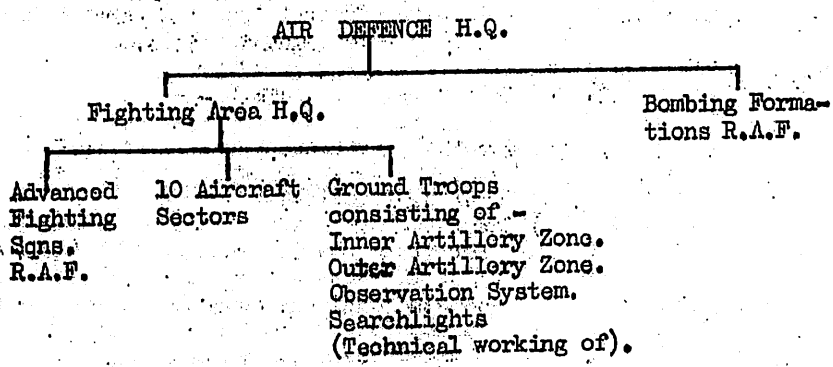
That he should be the officer with whom all Government Departments communicate on questions of the air defence of Great Britain.

(b) That the A.O.C. Fighting Area should be responsible for the immediate control of defensive operations. That he should therefore have under his orders the Fighting and Advanced Fighting Squadrons R.A.F. and all ground troops raised by the Army.

That he should, of necessity, have as few people to deal with as possible, and the G.O.C. Ground Troops should therefore be at his headquarters. That he should have no dealings with any Government Departments other than the Home Office, to which Department he is responsible for giving warning in case of hostile air attack.

(c) That the G.O.C. Ground Troops working under the direction of the A.O.C. Fighting Area is responsible during operations for the work of the Inner and Outer Artillery Zones, the Observation System and the Technical working of Searchlights in the Aircraft Zone.

2. The following table shows the chain of command down to and including the Aircraft and Artillery Zones:-



Inner and Outer Artillery Zones.

Chain of Command

The Sub-Committee agree that the A.O.C. Fighting Area should issue orders through the G.O.C. Ground Troops to the Artillery in the Inner and Outer Artillery Zones. Such orders will be passed direct to Os.C. Air Defence Brigades in the Inner Artillery Zone and to Os.C. A.A. Artillery Brigades in the Outer Artillery Zone.

/Further,

Further, that the Os.C. Air Defence Brigades and Os.C. A.A. Artillery Brigades respectively should control the gun groups, being in direct communication with each gun group. Os. C. A.A. Artillery Brigades can assist the Air Defence Brigade Commanders in the control of the guns of the Inner Artillery Zone.

Aircraft Sectors.

That the A.O.C. Fighting Area should issue orders direct to O.C. Aircraft Sectors regarding the work of the Fighting Squadrons Royal Air Force.

That the O.C. Aircraft Sector should issue orders to / the Searchlights in the Sector through the O.C. Searchlights of the Sector, who should be at Headquarters Aircraft Sector.

APPENDIX 2

THE RE-ORIENTATION OF THE AIR DEFENCE SYSTEM 1934

Memorandum by the Air Staff

1. The original air defence scheme envisaged in the Steel-Bartholomew and Romer Reports was drawn up to provide for the defence of London and South Eastern England against air attack from French territory. The direction from which attacks were expected, combined with the limited range of the aircraft which were at that time available, confined the problem to the defence of that part of England which lies to the South East of a line joining the Wash and the Bristol Channel. In fact it was originally decided to confine the defences to an even smaller area.

2. With the change in the direction of attack from the South East to the East, combined with the great increases which have recently been made in the ranges of bombing aircraft, a much larger part of this country has become exposed to air attack. Aircraft operating from the North Sea Coast of Germany can now deliver effective attacks on the industrial centres in the neighbourhood of the Tyne and the Tees, the big industrial areas in Lancashire and Western Yorkshire, the industrial centre in the Midlands in and around Birmingham. All these places fall within an arc of which the centre is on the North Sea Coast of Germany in the neighbourhood of Emden, and of which the radius is 375 miles. London, of course, falls well within this arc at a range of about 350 miles and Portsmouth and Southampton just outside it. Hence, whereas in the original scheme aircraft attacking from the South or South East could only reach the Midlands and the North, if they had the range to do so, by passing over air defences which were in any event necessary to cover London and its suburbs, aircraft operating from Germany can now attack the great industrial centres in the Midlands and in the North of England without coming within reach of the existing air defences. In fact, England now presents her longer instead of her shorter side to the enemy and it has, therefore, become necessary to extend the defences to cover the additional areas exposed to attack.

3. Moreover, the new orientation brings with it no relief in the existing requirements for the defence of London, since the possibility that Germany may operate from or directly across either of the Low Countries must be accepted, and aircraft operating from the Low Countries are quite as well placed to deliver effective attacks upon London as they would be if located in France. Consequently as no reduction can be made in the scale of the defences of London, the extension of the defences in a Northerly direction to cover the Midlands and Northern industrial areas must, unfortunately, be almost entirely additional to the existing air defences. The only alteration which it is necessary to make in the air defences in the South East of England is to swing the Western Arm of the air defence zone, which now extends beyond London Westwards as far as Bristol, Southwards to cover Portsmouth and Southampton.

4. It is still probable that, as in the situation envisaged in the previous reports referred to above, the important objectives in the London Area will remain the principal objective of the enemy air forces, particularly if the enemy aircraft are able to operate from the Low Countries, where they would be strategically very well placed to develop the maximum offensive against the capital. On the other hand, if for any reason their attacks on London prove difficult and costly it is open to them at any time to switch their main concentration towards the North. It is true that the gravity of the menace to London will be greatly alleviated if we can prevent the enemy operating from Belgian or Dutch territory. It will even be lessened to a considerable degree if we are able to deny to him only the Western half of these countries, but nothing we can do in this way will affect the scale of attack which he will be able to deliver on the Midlands and North of England from his own territory. In this connection it should be borne in mind that

/the integrity

the integrity of Holland is of almost equal importance to us as that of Belgium, since aircraft located in Holland are well situated to attack either London, Birmingham, Manchester or the other big towns in the North as the situation demands. There appears, therefore, to be no alternative to the provision of adequate air defences to cover the great centres of population in the Midlands and in Lancashire and Yorkshire in addition to the existing defences of London, even though this must admittedly entail a considerable increase in the size and cost of the air defence organisation.

5. There is a further important consideration which radically affects the organisation of the aircraft for the air defence service. Considerable advances are now being made in the speed of aircraft and in particular of night flying aircraft. Whereas in 1923 we had only to consider a speed of night bombers of about 80 m.p.h., they have already a speed of 160 m.p.h. and a further increase to 200 m.p.h. has already been realised and will soon become normal. These high speeds enable attacking aircraft to cross the existing illuminated zone, which is only 15 miles wide, so quickly as to render it impossible for fighting aircraft to make contact before the enemy aircraft has disappeared into the darkness beyond the range of the searchlights. It is, therefore, now necessary to increase the lighted zone from 15 miles to 20, which, with the additional lighted belt 5 miles wide provided by the outer artillery zone, will give a total width of 25 miles to the lighted area.

6. To summarize the above :-

> The changed direction and conditions of air attack now require the provision of defences for North-Western England and the Midlands as well as for London. The wider arc in which the attackers may now choose their objectives entails the lengthening of our defensive system by some 100 miles. The width of the lighted zone necessary to enable the fighters to intercept and engage the night bombers, will require to be increased by 5 - 10 miles.

7. In considering the form which these defences should take two alternative schemes have been examined :-

(a) a continuous aircraft and outer artillery zone,

(b) a discontinuous system covering the most important centres only.

8. The former (alternative (a)) comprises continuous aircraft and outer artillery zones.

The latter would provide local defence areas with aircraft guns and lights as follows :-

(a) The Tyne.

(b) The Tees.

(c) The Midlands, embracing Manchester, Leeds and Birmingham.

(d) London.

(e) Southampton and Portsmouth.

9. It is estimated provisionally that the latter or discontinuous scheme would allow of a saving of some 5% in the number of searchlights required but an increase in the number of guns would appear to be necessary. The speed of modern bombers, however, would necessitate extensive flank protection or all round defence in order to prevent bombers finding unopposed access to their objectives by passing round a flank of the defensive zones.

/10.

10. Furthermore, the discontinuous system of defence would have serious strategic, meteorological and topographical disadvantages. The gaps between the areas leave much of the country open to attack, particularly by night. The army camps at Aldershot and on Salisbury Plain, the depots at Didcot, Milton and Henlow, and the bomber aerodromes in South-Midlands and Southern England and the important lines of railway communication between the north of London would be exposed to direct attack as would also such centres of industry and communications as Lincoln, Peterborough, Northampton, Cambridge, Bedford, Oxford, Reading, Swindon and Bristol, many of which are of considerable importance.

11. The Yorkshire and Lancashire industrial areas, the Midlands and the country connecting these areas constitute an unfavourable theatre for fighter operations. They comprise the high ground of the West Riding, Derbyshire and Staffordshire where suitable aerodrome sites are few and rain and low cloud are prevalent, while the smoke from the big industrial areas would seriously interfere with the operation of fighters and practically prohibit the effective operation of searchlights at night.

12. It is also desirable that the enemy bombers should be met and engaged as early as possible after crossing the coast line. During the War (1914 - 18) the German night bombers soon developed a tendency to drop their bombs as soon as they were engaged by lights and guns. The defence zones should, therefore, be as close to the coast as possible and only so far from it as may be necessary to permit of the receipt of adequate notice of the enemy's approach.

13. In view of the above considerations, in order to provide effective defence for London, the Midlands and the North of England, there is, in the opinion of the Air Staff, no effective alternative to the establishment of a continuous defence zone from the Tees, around the Eastward of London to Southampton.

14. The scale of defence recommended for the approval of the Committee of Imperial Defence is as follows:-

(a) For the defence of London, a minimum of 16 fighter squadrons are required, operating in a lighted zone extending from Southampton to Huntingdon, 20 miles wide with an outer artillery zone 5 miles wide, the latter having a gun density of approximately one gun per mile of front between Dorking and Huntingdon and one gun per two miles from Dorking to Southampton.

(b) For the Northern area, a lower scale of defence must be accepted and a minimum of 9 fighter squadrons will be required to operate in a lighted zone 20 miles wide extending from Huntingdon to the Tees, with a gun density in the outer artillery zone of one gun per two miles of front.

(c) Details of the anti-aircraft defences required for these zones are shewn in Annexure 'C'.

(d) The Northern and Southern districts will each be organised under its own Commander.

(e) Anti-aircraft defences on a small scale should also be provided at the most important cities.

(Signed) E. R. LUDLOW-HEWITT.

Air Marshal,
Deputy Chief of the Air Staff.

S E C R E T.

ANNEXURE C.

		Searchlight Companies.	A.A. Batts.
1.	**Continuous Zone (See para. 7 (a)).**		
	(a) Aircraft Fighting Zone	55	-
	(b) Outer Artillery Zone	16	25
	(c) Local Defence (Lights):- Manchester (2), B'ham (2), Sheffield (1), Tyne(2).	7	-
	Local Defences (Guns):- Leeds (3), Manchester (3), B'ham (3), Sheffield (2), Tyne (3), Tees (2), Southampton & Portsmouth (3)	-	19
	(d) London Inner Artillery Zone.	6	12
		84	56
2.	**Discontinuous System (See para. 7 (b)).**		
	(a) Tyne	2	3
	(b) Tees	2	3
	(c) Midlands Aircraft & Outer Artillery Zones.	40	13
	Manchester (3) Leeds (3), B'ham (3), Sheffield (2).	-	11
	(d) London Aircraft & Outer Artillery zones.	26	19
	Inner Artillery Zone.	6	12
	(e) Southampton & Portsmouth.	3	4
		79	65

Notes: (i) With the exception of the forces for the London Inner Artillery Zone, the above are approximate and subject to reconnaissance.

(ii) Anti-aircraft defences on a small scale would under either scheme appear to be required for the more important cities.

Considerable nugatory expenditure would be involved if we resorted to -

AVOIDANCE OF NUGATORY EXPENDITURE.

(a) the formation of training establishments not subsequently required when normal conditions were again reached;

(b) the erection of temporary or uneconomical accommodation for personnel or equipment;

(c) a disregard of the possibilities of a deferment in the date of completion as occurred with the '52 Squadron' Scheme.

As far as possible we have avoided these expedients and it does not appear that we shall spend more than about £100,000 on measures which are of a purely temporary nature and likely not to be required on the completion of the scheme.

The personnel factors which affect the rate of expansion may be summarised as follows:-

PERSONNEL FACTORS.

(a) the necessity for the enlistment of high-grade entrants for the higher trades;

(b) the necessity to avoid dislocating the careers of personnel and to balance carefully the nature and number of recruits to ensure that the subsequent even flow is maintained;

(c) the fact that however great the increase in recruitment of apprentices they will not become available for units for 3 or 4 years;

(d) the fact that training establishments were designed to keep pace with the eventual completion of the 52 Squadron Scheme and not to deal with abnormal peace increases;

(e) the withdrawal of instructional personnel from units must not interfere with the efficient maintenance of aircraft and equipment.

The difficulties of rapid expansion from a works point of view fall mainly under the following:-

WORKS FACTORS.

(a) under normal conditions it takes from 4 to $4\frac{1}{2}$ years to complete an aerodrome ready for occupation - from the time the site is selected. In some cases this is being speeded up to 3 - $3\frac{1}{2}$ years.

(b) it is therefore normally necessary to keep the building programme about 4 years ahead of the new formation programme.

(c) owing to disarmament and financial stringency the provision of accommodation has been limited to the replacement of war-time buildings and no new works are in progress even for the 52 Squadron Scheme.

(d) the works staff is only sufficient to spend about £$1\frac{3}{4}$-millions annually and some time must elapse before increases in staff make themselves effective.

/(e)

[H] It frequently takes from 9 to 18 months to acquire a site - depending on the number and nature of the owners.

APPENDIX 3.

THE PROBLEMS OF EXPANSION

A memorandum prepared in the Directorate of Organisation, dated March 10th, 1935.

FACTORS GOVERNING RATE OF EXPANSION.

The main factors governing the actual rate of expansion from 1935 - 36 onwards were briefly as follows:-

(a) the financial desirability for a 'flat curve' of additional expenditure,

(b) the political desirability of adding as many additional squadrons as possible in the early stages of the expansion scheme,

(c) the necessity of avoiding 'window-dressing',

(d) the avoidance, as far as possible, of nugatory expenditure,

(e) the limitations set by personnel, works and equipment factors.

FORMATION BY TYPES.

An important consideration which affected both (a) and (b) above was the type of squadrons to be formed annually. Roughly speaking, a Medium or a Heavy Bomber Squadron costs twice as much to form and to maintain as a Light Bomber or a Fighter Squadron. The bulk of the early squadrons are therefore Light Bombers and Fighters, leaving the Medium Squadrons until the end.

AVOIDANCE OF 'WINDOW DRESSING'

With regard to the avoidance of 'window dressing' it was necessary to ensure that, in order to make the additions effective, the maintenance organisation, the training organisation and the necessary reserves to enable the force properly to function on the outbreak of war were provided concurrently with the 'first-line' increases. Without this provision - which takes a substantial portion of the money allotted - the first stage in war would be one of contraction owing to the inability to meet the expenditure in personnel and equipment.

FACTORS AFFECTING THE EXPANSION AS A WHOLE.

The avoidance of nugatory expenditure and the limitations set by personnel, works and equipment factors are principally governed by the facts that -

(a) the expansion has to be carried out under normal peace conditions - i.e. no emergency or special powers;

(b) being a peace expansion it must be regarded as a stage in the development of a peace time air force;

(c) the rate is liable to be advanced or retarded according to the demands of the international situation;

(d) the Chancellor cannot commit either himself or his successors to the definite provision of the money required over the four years and subsequently.

/Considerable

(e) labour difficulties owing to stations necessarily being located in remote districts.

(f) lack of surplus accommodation which could be used if temporarily reconditioned.

(g) retarding of work on certain stations owing to units having to remain in occupation during rebuilding and extensions for additional units.

The principal factors which fall under the equipment heading may be summarised as follows:-

EQUIPMENT FACTORS

(a) we do not wish to place abnormal orders for existing types when better types now in the design or development stage will be available in the next few years.

(b) the limited number of aircraft manufacturers in this country capable at the moment of producing service aircraft.

(c) the natural hesitancy on the part of manufacturers to carry out extensions of premises with consequent capital outlay in view of the possibility that the necessary increased earnings will not be maintained owing to changes in policy.

In summarising the factors which have to be contended with in expanding the Royal Air Force at the present time it may be said that the roots of our difficulties lie in the slowing down and then the stoppage of the 52 Squadron Scheme. Under normal conditions it is impracticable to lay down a carefully thought out programme of development, slow it up, stop it for a year or two, and then resume not only at a rate calculated to overtake the delay, but also to deal with a further expansion superimposed on the original scheme.

Assuming that we must continue to work to normal peace conditions, any speeding up in the scheme or the addition of more squadrons beyond those at present authorised will be extremely difficult during the next two years and cannot, in any case, be carried out without emergency powers or without a severe drop in the efficiency of the service. From the third year onwards (financial year 1937 - 38) additional units could be accepted provided a decision is taken now. If deferred, then the length of deferment must be added to the time before additional units can be created.

FURTHER EXPANSION DIFFICULTIES.

APPENDIX 4.

THE RE-ORGANISATION OF HOME COMMANDS.-

Extracts from an Air Council letter dated May 4th, 1936.

Sir,

.... In consequence of the Expansion Scheme it has become necessary to review the system of command and administration which prevailed in Home Commands in recent years. The existing system has been evolved in the special conditions obtaining since the war to meet the requirements of a comparatively small Force. The Council have decided that the time has now come to introduce certain fundamental changes with the object of providing an organisation for the enlarged Force which will function with speed and efficiency in peace and war. Though these changes are based in part on lessons from the past it is particularly desired that those responsible for implementing the new policy will not be unduly influenced by conceptions to which they have become accustomed under previous systems. Time and circumstance are changing and all concerned will appreciate that the overriding purpose of these changes is to enable the Service to reach the highest possible efficiency.

The first principle which has guided the Council in their examination of the problem has been the desire to frame a peace organisation which conforms as closely as possible with the organisation visualised for war. If an emergency occurs the Royal Air Force may be required to undertake active operations concurrently with mobilisation and any material changes in organization cannot be contemplated on the outbreak of war. As training and operations must be separated in war it is essential that the peacetime organization should give effect to this separation.

.... It will be seen that broadly there are to be three operational commands and one training command. Co-ordination between the operational commands will be exercised by the Air Ministry. The Commanders-in-Chief of these commands have been relieved as far as possible of responsibility for training units, whilst the Commander-in-Chief of the Training Command has no operational responsibilities. It must be explained that the separate grouping of the Squadrons of the Auxiliary Air Force is to meet an interim phase in their development and that it is the intention of the Air Council ultimately to divide these Squadrons functionally among the regular Groups which will be called upon to operate them in war. In the meantime squadrons of the Auxiliary Air Force will be allotted to regular Groups for all operational purposes.

One of the main objects of the new organization is to encourage decentralization, with particular reference to administrative duties. To this end Units have been grouped within homogeneous formations and it is intended that administrative work should be concentrated at Command Headquarters, the Groups being primarily concerned with the operational training of Units. Under this arrangement it should be possible to decentralise a considerable volume of administrative work from the Air Ministry to Commands and through them to Station Commanders whose powers will be extended.

The new scheme is based upon the principle of only one administrative filter between the Stations and the Air Ministry. This is necessary to accelerate that working of the administrative machine as unproductive links in the chain of command are an unnecessary source of weakness and delay. This revised organization will also afford the opportunity for Commanders, whether of Commands, Groups, Stations or Units, to exercise the full powers of their various ranks and appointments, and establishments will be based on this principle.

In the early years of the Royal Air Force it has been necessary to retain a considerable measure of control at the Air Ministry to ensure that a common doctrine and standardised system are applied throughout the Service. This procedure has tended to curb administrative initiative and Commanders and their staffs have become accustomed to rely on higher authority for decisions

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on matters which should properly be regarded as within their own competence and responsibility. The Council are anxious that this opportunity should be taken to rectify this situation and the new organization contemplates that all officers will in future exercise the full responsibility of their rank and appointment.

In accordance with the policy outlined above Command and Group Headquarters will retain full responsibility for operations and training, but the administration of stations will fall directly on Commanders-in-Chief and their staffs. The administration of personnel will, however, remain with Group Commanders so that they may keep in personal touch with the officers, warrant officers and airmen under their command. Group Commanders will be relieved of responsibility for administrative matter for which no staff is provided in their commands. In order however, that Group Commanders may keep themselves informed on such matters it is proposed to provide a special Staff Officer at each Headquarters for liaison duties. It is desired to emphasise that these officers should on no account be employed on administrative work, their function being confined to liaison duties for obtaining such information on technical and supply matters as the Group Commander may require from time to time in connection with operations and training.

One of the incidental advantages of the scheme referred to in the previous paragraph will be an appreciable reduction in the number of staff appointments. The increasing number of these appointments gives rise to difficulty in providing staff officers with periodical tours of duty at Units, which is an essential part of their training for higher Command. Though there is no desire to limit the number of Staff Officers unduly it is important from the point of view of the service and of the officers themselves that they should have adequate facilities for maintaining a practical contact with executive problems.

A memorandum is attached explaining briefly the division of responsibility between Commands and Groups, showing establishments, and defining in general terms the duties of the Staff Officers included in these establishments. It is appreciated that the proposed system involves a radical change in the method of administration and will require a considerable amendment of existing regulations. Some time must elapse before these amendments can be completed but the Council are confident that they can rely on Commanders to apply the system pending the issue of revised regulations and to exercise their initiative where the existing regulations appear to conflict with the requirements of the new system.

The Council desire me to explain that in reaching their decisions due consideration has been given to the views expressed by the Commander-in-Chief and Area Commanders at the Conference held at the Air Ministry on November 18th, 1935. The main point on which the new organization conflicts with the opinions expressed at the Conference relates to the omission of a full administrative staff at Group Headquarters. As explained above the Council have reached the conclusion that a full administrative staff at both Command and Group Headquarters would involve an excessive centralisation of control at the Air Ministry which it is one of the main objects of the new system to avoid. The Liaison Officers should provide Group Commanders with adequate facilities for maintaining contact with administrative matters affecting the Units under their Control. Radical alterations of traditional methods of administration must be accepted from time to time to meet the special requirements of a flying service and the Council are convinced that with the co-operation of all concerned the new organization will result in increased efficiency of the Royal Air Force.

STAFF ORGANISATION FOR R.A.F. AT HOME:

Extracts from Memorandum attached to Air Council Letter dated May4th, 1936.

General Principle.

The general principle adopted for the revised staff organization of headquarter formations of the R.A.F. at Home is to give full administrative control and staff to the Command Headquarters, leaving the Group Headquarters with operational control only. In consequence the Group Commander will be relieved of the administrative details of the units under his command and will be responsible for their operational efficiency only.

It may be argued that without administrative control of the units under his command a Group Commander will not be in a position effectively to command those units. This apparent disadvantage however has been overcome, as will be seen in subsequent paragraphs, by retaining the personnel and disciplinary control under the Group Commander and by providing a Maintenance Liaison Officer at each Group Headquarters to keep the Group Commander in touch with Equipment matters. At the same time the Equipment Staff and other administrative services at the Command Headquarters will keep Group Commanders informed generally and will be at their disposal should they be required to advise on any matters.

Personnel Staff.

The desirability that Group Commanders should keep in the closest touch with personnel has been recognised. In this respect the general principle has been departed from and the administration is left with the Group because on the discipline of the personnel the operational efficiency of the Group so much depends. Normally the Group will deal direct with the Air Ministry or the O. i/c. Records as regards personnel matters; the matters to be referred to the Command or dealt with by that formation will be those for the personal attention of the Commander-in-Chief. For this purpose the Commands are given a small and comparatively junior personnel staff only, as they are in reality personal staff officers of Commanders-in-Chief.

Maintenance Liaison Officer.

Although the main administrative control of units and stations is allocated to the Command, it is of course essential that a Group Commander should have some knowledge of administrative matters at his disposal. In consequence a 'Maintenance Liaison Officer' has been attached to the Air Staff of Group Headquarters. This officer will be a General Duties List officer of the rank of Squadron Leader, whose function will be to keep in general touch with any major maintenance and supply or works problems which may arise, to obtain for the Group Commander any administrative information which he may require, and to inform him of any matters other than normal routine or air and personnel staff matters, which may effect the efficiency of the units under his command. It must be emphasised, however, that particular care must be taken by Group Commanders to ensure that this officer does not in any way become an Equipment Staff Officer, but that his activities are confined to liaison duties only. This officer is a personal staff officer of the Group Commander in the same way as the personnel staff officer on the Command Headquarters Staff is a personal staff officer of the Commander-in-Chief. It will not be within his province to express opinions to the Command on technical, stores or any other administrative matters; this will be done direct between the Station and the Command. On the other hand however a Group Commander, on the information of the Maintenance Liaison Officer, may from time to time make representations to the Commander-in-Chief on administrative matters of importance.

/Equipment Staff.

Equipment Staff.

A strong Engineer and Stores Staff has been given to Commands in view of the large number of stations with whom they will be in direct touch and of the considerable amount of visiting which will have to be carried out. It is calculated that in order to ensure the speedy transaction of matters which may arise and that stations receive the greatest assistance from staff officers, approximately half the staff provided will normally be absent from their officer at the Command Headquarters visiting and advising station and group commanders. In no circumstances must Equipment Staff work be decentralised to Groups.

Specialist Officers.

Similarly, the bulk of the 'specialist' officers attached to the staff have been concentrated at the Command Headquarters where their specialist knowledge is required for maintenance and development of the equipment of their various branches and for advice to the air staff on matters of training policy. Group Commanders will, of course, be able to call upon the advice and assistance of these officers should they so desire but in operational groups particularly it is considered that the specialist knowledge of these officers is not normally required to carry out a training and operational policy laid down by higher authority. It is considered that the general service knowledge of the air staff officers should be sufficient for translating the policy into practice. Accountant and Medical Services are also concentrated at Command Headquarters.

Air Officer i/c Administration.

In order to relieve the Commanders-in-Chief of operational commands of as much administrative work as possible, the appointment of Air Officer i/c Administration has been created. This is intended to allow Commanders-in-Chief to devote more time to the strategical, operational and training aspects of their commands, to allow them to visit units to a greater extent than has hitherto been possible, and to attend to other matters which they are called upon to perform from time to time by virtue of their high rank and appointment. In addition it is obvious that, in view of the new system of administration whereby the stations deal direct with commands on most administrative matters, the administrative work at a Command Headquarters would be far greater than under the present system of administration, and a senior Air Officer is essential to relieve the Commander-in-Chief. The Air Officer i/c Administration will be senior in rank to the S.A.S.O. and will be responsible for the co-ordination of all matters of administration including those dealt with by the Air Staff. At the three operational commands therefore there will be no S.E.S.O. It is intended that the S.A.S.O. shall deal direct with the Commander-in-Chief on operational matters only .....

Fighter Command.

This Command will be called upon to co-ordinate the operations and training of two Fighter Groups and one Auxiliary Group, and to administer directly the stations of these Groups and of the Army Co-operation Group. (For operations and training the Army Co-operation Group will come directly under the Air Ministry.) It is not anticipated, however, that the Headquarters Staff will have to man an Operations Room such as is required by Fighting Area Headquarters at the present time. This will be the function of the Fighter Group staff.

The Air Staff will consist of a Senior Air Staff Officer and three other officers for operations, training and organisation. In comparison with the Bomber Command, the Fighter Command is not concerned with a diversity of weapons and equipment - operationally it will be concerned with one weapon only, with the result that maintenance of armament equipment can to a great extent be left to Station and Unit Commanders. In view of the fact, however, that Armament Officers are not usually allowed for Fighter Stations and of the intention to give no one with armament qualifications to Group Headquarters staffs, it is considered that the services of one such specialist, attached

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to the staff at Command Headquarters, will be required for training and maintenance policy matters. No other specialist officers are allowed as Attached to the Staff at Fighter Commander Headquarters. Two Signals Officers are allowed for the Command Headquarters Signal Services and for any co-ordination which may be required between the Groups. As the principle executive role will be in the hands of the Fighter Group Commanders the Command Signals Officer will be junior in rank to the Chief Signals Officers of the Groups.

With regard to the Equipment Staff, allowance has been made for a Group Captain and three officers for each of the Engineer and Stores Staff. This number is considered to be sufficient compared with the Bomber Command in view of the lesser number of stations to be administered and visited and also in view of the lesser number of types of aircraft with which the Squadrons of this Command will be equipped.

Fighter Groups.

In framing the establishment of the Fighter Group Headquarters Staff the necessity for sufficient officers to man one complete watch in the Operations Room for peace exercises, together with a bare nucleus for a second watch, has been borne in mind. The Air Staff consists therefore of a Senior Air Staff Officer and six other officers. Of these six officers, five are allowed for normal operations, training and organization duties, and one as a Maintenance Liaison Officer. Owing to the importance and the extent of communications in Fighter Groups two Signals Officers are Attached to the Staff .....

Appendix 5

PROPOSED ALLOTMENT OF ANTI-AIRCRAFT GUNS AND SEARCHLIGHTS, JUNE, 1936.

Location	A/A Guns					Searchlights.
	4.5-in. or heavier guns	3.7-in. guns.	Permanent Allotment.	Available for Pool.	Total.	
1. Aircraft Fighting Zone	-	-	-	-	-	1,848
2. Inner Artillery Zone	48	48	96	-	96	144
3. London Docks Area - Erith - Canvey Island ...	32	64	32	64	96	Included in A.F.Z.
4. Birmingham Area	16	24	16	24	40	168
5. Sheffield Area	16	24	16	24	40	
6. Leeds Area	16	24	16	24	40	
7. Manchester Area	16	24	16	24	40	
Total Inland Areas	144	208	192	160	352	2,160
8. Thames and Medway ...	24	16	40	-	40	Included in A.F.Z.
9. Portsmouth & Southampton	24	16	24	16	40	84
10. Humber	16	-	16	-	16	24
11. Tyne, Tees, Sunderland, Middlesbrough	32	32	32	32	64	96
12. Forth (Rosyth)	16	-	16	-	16	48
13. Mersey	16	8	24	-	24	48
14. Harwich	4	4	8	-	8	16
15. Dover	4	4	8	-	8	12
16. Plymouth ...	-	16	16	-	16	24
17. Scapa (Lyness)	8	-	8	-	8	-
18. Portland - Milford Haven (Bristol Area Reserve)	-	16	-	16	16	35
Total Ports	144	96	192	64	256	387
Grand Total	288	320	384	224	608	2,547
			48 btys.	28 btys.	76 btys.	108 Coys.

Note 1:- The following areas, Bedford, Northampton, Rugby, Leicester, Coventry, Derby, Nottingham, Bristol, and those commercial ports not mentioned above, while not receiving permanent allotments, were to be defended by units drawn from the pool.

APPENDIX 6.

AIR ATTACK ON GREAT BRITAIN[1]

1. In this Appendix we discuss the possible intensity, character and results of air attack on this country by Germany in 1939.

Scale of attack.

2. The Air Ministry has estimated the average weight of bombs which might be dropped on Great Britain per day by German aircraft during the first few weeks of a war. The estimates vary according to the political assumptions made and it is estimated that much greater weights could be dropped on selected occasions, but from the Air Ministry's data we have assumed that a scale of attack of 400 tons per day might well be directed by Germany against objectives in this country for a limited period.

Maintenance of scale of attack.

3. The rate of wastage probable in German aircraft delivering such an attack has been discussed very fully in connection with determining the ammunition requirements of A.D.G.B. The conclusion was that German aircraft attacking this country were likely to suffer 9 per cent. casualties from all causes in each raid.

4. The scale of 400 tons a day has been computed on the assumption that Germany could direct two-thirds of her air striking force against this country. It actually represents the carrying capacity of about half this strength. Casualties equivalent to 9 per cent. of the aircraft carrying the 400 tons would therefore represent 4½ per cent. of the aircraft available against this country.

We also assumed in our comparison of air forces that Germany would have 100 per cent. reserve of aircraft and pilots available at the outbreak of war, so that she could, in theory, on the above assumptions maintain a scale of attack of 400 tons for more than 40 days. The previous tendency was perhaps to assess the wastage rate on the low side but we ought not to assume that this scale of attack will necessarily be reduced before some 30 days have elapsed and even then it is probable that the bombing accuracy, rather than the weight of attack, will be reduced as the result of the gradual increase in comparatively untrained personnel.

There is, of course, a possibility that casualties on the scale mentioned may cause the abandonment of wholesale attacks on the original objectives and diversion to objectives less strongly defended after a comparatively short period. But we have not felt justified in basing our estimates on any such assumption.

Character of German attack.

5. We are convinced that if Germany directs her initial air attack against this country with the object of knocking us out rapidly her attacks will be quite ruthless. She will select the targets and will use the type of projectile which she considers most likely to achieve her object, without regard to humanity.

/6.

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(1) This note originally appeared as an appendix to an "Appreciation of the Situation in the event of War against Germany in 1939 by the Joint Planning Sub-Committee (C.O.S.513(J.P.))." It was circulated over the signatures of Captain T.S.V.Phillips, R.N., Colonel Sir R.F. Adam, Bart., and Group Captain A.T.Harris, and was dated 26th October, 1936.

6. The two most apparent means by which she might hope to achieve her ends are:-

(a) By so disorganizing the receipt and distribution of food supplies, as to produce conditions of starvation in the United Kingdom which would force our Government to discontinue the War.

(b) By creating such terror and havoc in large centres of population that the people of this country would be completely demoralized and would force our Government to discontinue the war.

7. The destruction of our industry is a form of attack which would in some circumstances be effective, but it seems unlikely that the Germans would select it as the means of bringing the most rapid possible results. The destruction of our Naval forces by an overwhelming surprise attack has been suggested as another decisive form of attack, but the mobility, armour and armament of our ships make it unlikely that the Germans would select this form of attack.

8. Aiming, as she inevitably must, at a rapid decision, Germany would therefore be likely to select and concentrate upon either food supply or demoralization as the means of achieving her end and to direct her attacks only upon targets which would further her selected plan, at least until she was satisfied that the weight of her attack was adequate and that she had resources to spare for other targets.

These two forms of attack are studied, in some detail, in the following paragraphs.

Attack on food supplies.

9. Advantages for Germany - Great Britain's dependence upon imported food is so well known, statistics are so complete and the serious straits to which we were brought by the German submarine campaign in 1917 have been so clearly established, that Germany might feel that by selecting this objective she would be able to base estimates of the probable results of her bombing upon tangible data. It would be a further advantage that Germany's naval forces could co-operate by attacking shipping at sea; and she might satisfy herself, and even persuade certain neutrals, that her attacks were legitimate, since it was by starvation that Great Britain forced German submission in 1918.

10. Disadvantages - Many of the targets, the destruction of which would be essential to success, would be those which would be most heavily protected by A.A. defences, and a heavy scale of casualties among attacking aircraft might therefore have to be accepted. Also, it might be judged that, in spite of the possibility that Great Britain food reserves would not last beyond a very few months, she could be forced to submit even more quickly by the second method of attack. In any case, if Germany should judge that her resources were more than sufficient to cause starvation, the balance of her attack would probable be devoted to spreading demoralization.

11. Objectives - Destruction of shipping at sea and approaching harbour, the prevention of discharge of cargo at ports by destroying ships, port machinery and warehouses, or by demoralizing dock labour, and the prevention of distribution by destroying railway facilities, and perhaps road approaches to ports, would be the chief aims of German attack.

Estimate of effect.

12. For the purpose of forming some estimate of the possible effect of German attack on food supplies we have assumed the whole of her attacks to be concentrated upon the ports of this country.

/In

In Annex A we explain how we have calculated the probable average fall of bombs to be expected if the Germans concentrated their attacks on London Docks for a period of 24 hours to the extent of a total of 400 tons of bombs.

These calculations convince us that after an attack on this scale we could not expect that the discharge of cargoes at London could proceed more quickly than would be possible if all cargoes were handled in the stream by means of lighters. We have assumed that this might represent between 25 per cent. and 50 per cent. of normal working, depending on the extent to which labour was organised and disciplined. We are further convinced that practically the whole of the stocks of all kinds which might be in the Port of London Authority warehouses and sheds at the time of the attack would be destroyed by fire. The effect which the attack might have on the dock labour is difficult to estimate. In the same Annex we explain how we have applied these conclusions in order to estimate the prospects of air attacks on other ports of the United Kingdom. On the basis on which we have worked we have concluded that if the Germans could maintain attacks on the scale of 400 tons a day, their progress in inflicting damage upon other ports of the United Kingdom, similar to the damage we have described in the Port of London, might be as follows:-

1st day:	Port of London.
2nd to 4th days:	All ports between Tyne and Southampton inclusive.
5th to 13th or 14th days:	Remaining ports of the United Kingdom.

Attack aiming at demoralizing the people.

13. Advantages - In a democratic country, particularly, the ability of the Government to wage war depends upon the will of the majority of the people. Germany's bombing aircraft could expose the people of this country to death, wounds and terror on a large scale. Our civilian population has never been exposed to the horrors of war and the Germans may believe that if our people, and particularly our women and children, were subjected to these horrors in the most intense forms that can be achieved through air attack, the majority would insist that surrender was preferable to continuation of the attacks. If this belief proved correct this form of attack would probably achieve a decision more quickly than any other. It is a form of attack in which the choice of targets is very wide, so that A.A. defences could not possibly cover them all, and consequently the losses suffered by the attack might be slighter. It is, moreover, a form of attack in which gas and incendiary bombs could be used, so that wide areas could be attacked by limited numbers of aircraft.

14. Disadvantages - The results of this form of attack are difficult to calculate, since they depend less upon the material damage done than on the psychological effect. This in turn would depend largely upon the extent of the pre-war preparation through which the people had been put. History and experience give Germany small grounds for expecting that the people of this country could easily be demoralized into submission.

15. Objectives - The thickest centres of population would probably be the first targets and H.E., gas and incendiary bombs the projectiles. Power stations, means of communication, centres of government, water supplies, gas works, and ports would all be targets whose destruction would add to the distress and horror caused by human casualties and damage to buildings.

16. Effect of attacks - Annex B contains certain data and opinions referring to the extent of the damage which might be expected from these forms of attack.

/These

These statements refer to a scale of attack upon London considerably lighter than that which we anticipate. On the basis of the scale of casualties anticipated by the Air Staff, some 20,000 casualties might occur in London during the first 24 hours.

17. A similar scale of attack could on subsequent days be delivered upon other centres of population, such as Bristol, Birmingham, Manchester, Sheffield, Leeds, and Glasgow, or upon a selected part of Outer London. Comparatively light attacks with gas and incendiary bombs upon areas which had already been subjected to an initial intense attack would interfere with the restoration of order.

18. Within a week attacks of this sort could have forced the partial evacuation of half a dozen of the centres of most dense population in England, forcing many millions of people to abandon their homes, caused casualties in the order of 150,000, completely disorganized telephone and telegraph communications throughout the country and to varying degrees dislocated railway, postal and electrical services and the distribution of food.

A very high standard of organization by local authorities and great fortitude on the part of the whole people would be essential if a degree of order was to be maintained and loyal support given to the Government.

19. During the second week we could expect no noticeable diminution in the scale of the attacks. Fresh centres of population, ports, railway centres and the seat of Government might be the targets and attacks might become less concentrated so that they might maintain over a wide area the demoralizing effects of the initial attacks. It seems to us likely that this second week would be a crucial period for national morale. The first frantic exodus would be over and it would be seen whether reorganization began to deal effectively with the problems of feeding and administering the scattered population.

20. If at the end of the second week demoralisation had not set in it seems improbable that further attacks upon centres of population as such would bring any success to the Germans. Quite possibly their attacks might then be diverted to our food supplies, but by then the intensity of attack might be on the wane and measures to meet attacks on our food supplies should have been fully organized.

Measures of Defence.

21. Measures of defence against German air attacks, whether directed against our food supplies or distributed more widely over centres of population, fall under the following headings:-

Air Raids Precautions.

Anti-aircraft guns and searchlights.

Balloon Barrages.

Fighter defence.

Air counter-offensive.

No attempt will be made to describe the detail of these various forms of defence. Each will contribute to our total defence, and it is not possible to indicate the exact value of each measure. There can, however, be no doubt that the danger from air attack upon this country is so great that each and every form of defence must be developed to the highest degree of efficiency possible.

/In

In air raid precautions we are still far behind Germany, at least in respect of publicity and practice. Our preparations under this heading cannot be considered satisfactory until detailed air raid practices have been carried out efficiently in all large centres of population in this country.

Even in 1939 our anti-aircraft guns and searchlights will under our present programme fall far short of perfection. Much yet remains to be done before we can be in possession of an adequate scale of guns and lights and have an organization under which personnel to man them can be provided, trained and held in immediate readiness for the outbreak of war.

Balloon barrages are primarily a moral deterrent. The possibility of developing their use on a large scale and giving that development full publicity throughout the world is worthy of consideration.

In 1939 we shall have sufficient fighter squadrons to operate in the Aircraft Fighting Zone laid down.

The air counter-offensive remains the one active means by which it might be within our power materially to reduce the scale of German air attack during the first phase of the war. We have explained in paragraph 98 of our appreciation why the bomber strength which this country aims at attaining in 1939 is likely to prove inadequate to ensure the material reduction in the German attack on which the security of this country may depend.

Conclusion.

22. Our study of the possible results if Germany, in 1939, attacks this country by air and finds our defence organisation developed only to the stage at present anticipated, has shown the intensity of the risks to which we should be exposed. Whether the objective of her attacks were the destruction of our food supply organisation or the demoralisation of the people, Germany might reasonably consider that she had good prospects of a rapid success.

Our ability to withstand German air attacks depends on fully preparing the people of this country, on the maintenance of our food supplies and on success in reducing the scale of attack within a few weeks of the outbreak of war.

We are convinced that the fullest publicity as to our air raid precautions, accompanied by large scale air raid practices, demonstrating that we are fully prepared, would go far towards influencing Germany against expecting to win the war by demoralizing the people of Great Britain.

Her air attacks might then be directed against our food supplies, for the protection of which much remains to be done. Apart from the acceleration of the A.A. gun programme, some particular points which have appeared to us of the greatest importance, as we studied this question, are the reduction of stocks of all kinds held in dock warehouses, which would be burnt if the docks were attacked, the organisation of dock labour in disciplined bodies, and the provision in really large quantities of a reserve of lighters. Unloading ships into lighters appears, of all dock work, to be the operation least vulnerable to air attack; stores, once distributed into lighters, offer small and scattered targets, and special forms of storage, such as is required for chilled meat, can easily be provided.

Whatever the objective of German air attack, however, our ability to reduce the intensity of the attack within a few weeks of the outbreak of war would remain the most important factor in our security. Without adequate bomber strength we cannot hope to reduce German attacks.

/ANNEXURE A

ANNEXURE A.

Estimate of Effect of Air Attack on Docks.

1. Scale of Attack - In the following paragraphs we estimate the results which the Germans might expect if they concentrated attacks aggregating 400 tons of bombs in 24 hours upon the London Docks.

2. Method of estimating - In order to simplify the problem we have considered only the King George V and Victoria and Albert Docks. The area of those docks is roughly one-third of the total area of all the docks controlled by the Port of London Authority. We have, therefore, considered the effect of 133 tons being aimed at the King George V and Victoria and Albert Docks and have taken the estimated results of this attack to represent the results to be expected from a 400 ton attack on the whole of the docks controlled by the Port of London Authority.

3. Type of projectile - No one can reasonably doubt the very grave consequences of extensive incendiarism in the warehouses, etc., of the Docks. If this is achieved, the attacker would gain little by using toxic gas in addition. We, therefore, assume that the attacker might use 25 per cent. incendiary bombs (i.e., 33 tons) and 75 per cent. of H.E. (i.e., 100 tons).

Although a few very heavy H.E. bombs might be used we consider that a fair impression of the possible damage will be obtained by assuming that 50 per cent. of the H.E. bombs would be 500 lb. and 50 per cent. 250 lb. weight, i.e., say, 225 of the larger and 450 of the smaller type.

4. Probable fall of H.E. bombs - The total area covered by the docks we are considering may, from the point of view of the attacker, be considered as a rectangle 1,500 yards by 5,500 yards.

It is improbable that any bomb aimed at a point towards the centre of this area would fall entirely outside so large an area. Consequently we assume that all bombs aimed at these particular docks would fall somewhere within this rectangle. Bombs would, however, fall more thickly towards the centre and more thinly towards the edges of the rectangle.

We should not be justified in assuming that any daylight raid would fail to find these particular docks. At night some raids might fail to find them, though on the other hand, other raids not intended for these docks might possibly attack them. Though we cannot foretell the proportion between day and night raids we have assumed that half the raids would be by night and that 25 per cent. of the night raids would fail to find their target. We, therefore, reduce the numbers of H.E. bombs to 200 and 400 respectively in round figures.

We have, after discussion, concluded that no more useful basis for the distribution of the fall of the bombs can be arrived at than a mathematical one, based on the estimate that the density of fall would be twice as great within a central rectangle 900 yards by 4,900 yards, as in the remainder of the area. On this basis in the inner rectangle one 500 and two 250 lb. bombs would fall on an average in every 31,560 square yards (a square with sides 178 yards) and in the remainder of the outer rectangle one 500 and two 250 lb. bombs would fall on an average in every 63,300 square yards (a square with sides 250 yards).

5. Incendiary bombs - In addition to H.E. bombs we have to consider the 33 tons of incendiary bombs. Incendiary bombs weigh anything from 2lb. to 50 or 60 lb. The use of the smaller sizes is more probable. If we allow for an average weight of 5 lb. the 33 tons would represent nearly 15,000 bombs, and on an average one incendiary bomb might drop in every 500 or 600 square yards of the Dock area.

6. Average number of hits - Calculation based on the average density of the fall of bombs and the area presented by various targets in the central area of the docks gives the following results:-

/Warehouses

Warehouses - Large, 80 feet by 500 feet, 1 in 4 hit by 250 lb. bomb.
1 in 8 hit by 500 lb. bomb.
Small, 45 feet by 200 feet, 1 in 16 hit by 250 lb. bomb.
1 in 32 hit by 500 lb. bomb.

Railway tracks - If we assume that a bomb falling within 5 yards of a track would break it we may expect a break in every 1,000 yards run of track.

Dry docks - Large, 110 feet by 760 feet, 7 to 4 against hit by 250 lb. bomb.
7 to 2 against hit by 500 lb. bomb.
Small, 75 feet by 500 feet, 4 to 1 against hit by 250 lb. bomb.
8 to 1 against hit by 500 lb. bomb.

Probably hits would do little damage unless they were direct on the caisson. The odds are about 25 to 1 against a direct hit being made on any given caisson during the 24 hours' attacks we are considering.

Locks - The eastern locks would presumably be put out of action by a direct hit upon any one of the nine lock gates or on the impounding station. The odds against any such hit are about 7 to 1.

Ships - For a ship of 9,000 square feet superficial area the odds would be about 10 to 1 against a single direct hit; for one of 36,000 square feet the odds would be 5 to 2.

Utility Services - After discussion with a representative of the Port of London Authority there can be little doubt that electricity and telephone services would be completely out of action throughout the dock area.

Incendiary bombs - Though 50 per cent. of the incendiary bombs might fall in water and a further large proportion on railway tracks, roads and concrete surfaces where they would do no harm, it would be certain that large numbers would penetrate into warehouses. On the data we have assumed the chances are that 7 or 8 would fall on each large warehouse. If inflammable goods are stored in the warehouses, as is the case to-day, fires on a scale with which the London Fire Brigade could not deal would be inevitable. A warehouse which caught fire burnt for 3 or 4 days, in spite of the continuous work of the London Fire Brigade.

7. Inferences as to bombing effect on docks other than London Docks - The foregoing conclusions apply to the whole of London Docks if attacked on a scale of 400 tons in 24 hours.

In order to judge the possibility of a similar intensity of attack being directed against other ports of the United Kingdom, we have adopted the total length of wharfage at each port as a basis of comparison. It is probable that the total length of wharfage is a fairly good yardstick by which to estimate the weight of air attack necessary to reduce the facilities of each port comparably to what has been described above as the probable result of one day's intense bombing on London Docks. The proportion of bombs which would fall outside the dock area when a small port was being attacked would, however, be higher than when very extensive docks are being attacked.

The total length of the quays in all the ports between the Tyne and Southampton inclusive is 177,222 yards, of which 66,864 yards represents the quays of London Docks. Making some allowance for some of these ports being small targets, it remains possible that in another 3 days all these ports could be damaged on the scale we have visualised in the case of London Docks.

The remaining ports of the United Kingdom are represented by 312,044 yards of quays. Attack upon them involves greater risk than attack upon east coast ports.

If we reckon that in comparison with attack on the London Docks attack on the more remote United Kingdom ports would need to be increased by 25 per cent. to allow for the smaller targets and again by 50 per cent. to allow for the greater risks entailed, we reach the conclusion that it would take a further 9 or 10 days to damage our remoter ports similarly.

ANNEXURE B.

Summary of Estimates of Effect of Air Attack on London.

1. London: Scale of attack.

100 tons first day, 75 tons second day, 50 tons each of four successive days. Total, for 6 days, 375 tons, 75 per cent. being dropped by day and 25 per cent. by night, and 50 per cent. directed towards specified objectives and 50 per cent. indiscriminate.

Results estimated.

Railways: Tubes and Underground out of action. Overground termini in London abandoned.

Gas supply: cut off.

Electricity supply: 50 per cent. of stations out of action,[H] besides Lots Road Power Station.

Water supply: Bulk supply available, but distribution interfered with locally.

Petrol: Depots at Thameshaven and Shellhaven destroyed.

London Docks: Damaged but functioning.

Coal: Distribution difficult.

2. London: Scale of attack.

50 tons a day for 5 days. Total 150 tons, indiscriminate over whole of London, assuming 70 per cent. of bombs to be capable of damaging mains and sewers, laid 4 feet below road surface, but that only 15 per cent. of bombs would drop in streets.

Results estimated -

Gas: Mains damaged in 75 places. Serious explosion possible owing to admission of air.

Telephone: Mains damaged in 77 places.

Electricity supply: Mains have cover of 5 feet to 6 feet and would be less damaged.

Water: Though mains would suffer, damage could better be overcome.

Sewers: Mains intact. House connections damaged.

3. London: Scale of attack.

100 tons first day, 75 tons second day, 50 tons each successive day for one month. Total for 30 days, 1,575 tons.

Results obtained.

There could be little possibility of effective maintenance of the public services covered in paragraph 2.

[H] If 3 or 4 out of 12 to 15 Power Stations were knocked out result not serious.

4. London: Scale of attack.

One week's bombing as in paragraph 3, assuming average weight of bombs 200 lbs., 50 per cent. H.E. and 50 per cent. gas.

Estimated result.

No building could be regarded as reasonably safe. Possibility of utilising London would be seriously prejudiced if not entirely upset.

5. Whitehall: Scale of attack.

One week's bombing and four weeks bombing as in paragraph 3.

Result estimated.

Probable that no protective measures would be of any value at all.

6. London: Scale of attack.

As in paragraph 3, concentrated on City of London.

Results estimated.

Telephone Services: One out of every 300 bombs might hit an exchange. A Telephone Service could only be maintained by using existing deep Tube Railways.

7. London: Scale of attack.

Six days as in paragraph 3, concentrated in a 5-mile circle.

Results estimated.

Telephone: 610 trunk cables damaged. Repairs would be impossible.

8. Port of London.

Result estimated.

Service could be carried on with 25 per cent. of facilities out of action.

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APPENDIX 7

EXTRACT FROM

AIR COUNCIL LETTER TO ALL COMMANDS,

APRIL 19th, 1937.

I am commanded by the Air Council to inform you that the question of the policy in regard to the direction and control of the operations of the Bomber, Fighter and Coastal Commands has recently been under review. It is the present intention of the Air Council to represent in due course to His Majesty's Government that in time of war an operational Command should be interposed between the Chief of the Air Staff and the three operational Commands of the Royal Air Force at home. In addition, should one of the Groups (or any detachment) of the Bomber Command proceed to the Continent, the operations of this force would also be controlled - through its Group Commander - by this same higher operational Commander.

2. This Command which would probably be formed from the Inspectorate General of the Royal Air Force would be located at or close to the Air Ministry. It would consist of the supreme operational Air Commander and a very small operational staff including liaison officers to work with the Commands.

3. The Chief of the Air Staff would, in time of war, be informed by the War Cabinet (or other controlling body) as to the part which is to be undertaken by the Air Force in carrying out the war plans of the Government. The necessary instructions based on the information thus received would be issued by the Chief of the Air Staff to the supreme operational Air Commander who would then supply 'directifs' to the various Air Commanders-in-Chief. These 'directifs' would include the aims to be achieved by each Command, and, in the case of the Bomber and Coastal Commands, would indicate any limitations to be placed on bombing operations.

4. The supreme operational Air Commander would also be responsible for any co-ordination not otherwise provided for which might be required between Commands.

5. A further communication on this subject will be forwarded to you at an early date. In the meantime the information should be communicated only to such senior officers of your Staff as require it for the purpose of preparing plans for operations.

APPENDIX 8.

NATURE OF GERMAN AIR ATTACK ON GREAT BRITAIN -

Extract from Air Staff Appreciation of March 1939.

GERMANY'S PROBABLE SELECTED COURSE.

The dislocation of our war industry would not produce the most rapid results, and assuming that Germany would be seeking the quickest possible decision it seems unlikely that she would concentrate her attack initially against our industry. It is more probable that Germany would consider that she could defeat us most quickly either by direct attacks on the morale of the civil population or by attacks on our seaborne supplies and distribution system. While it is impossible to say with any degree of certainty which of these two courses Germany would be likely to adopt, it is at least clear that if the latter course were selected (attacks aimed at our food and raw materials) Germany would feel able to base estimates of the probable results of her bombing upon calculable data, whereas the degree of success in ruthless attacks on large centres of population and the time within which such a course could be decisive would be more difficult to predict. On the whole, it seems that Germany's most probable course of action might be to concentrate her air offensive (in conjunction with her naval forces) in unrestricted attack upon our supply and distribution system, including our shipping on the high seas, in narrow waters and in port. It is, however, possible that, whilst retaining this as her main course, Germany might simultaneously employ a proportion of her air forces in attacks on industrial centres - particularly the aircraft industry - primarily as a means of complicating our defence and internal security problem, and incidentally as a contribution to ultimate success in the war should the knock-out blow fail.

So long as Germany was expecting success in her attempt to secure a quick decision, she would be unlikely to concentrate upon sustained attack against our naval forces and establishments. If, however, Germany saw that her attempt to gain a quick decision was failing, she might divert her air effort to deliberate attacks on our war industry as a whole to prevent us from developing our potential for a long war, and might also deliver surprise attacks at great intensity upon our naval forces, including their bases and oil supplies. A further objective, which might for a time receive the heaviest scale of attack if Germany believed the despatch of the Field Force to be imminent, might be the mobilization centres, communications and ports of embarkation of the Army. If, as might well be possible, Germany were able to replace without delay the casualties and wastage sustained during the opening phase, our naval forces might be attacked by 450 to 500 bombers, dropping about 600 tons of bombs each series of attacks, and on other occasions a similar weight of attack might be delivered on Army establishments and communications.

POSSIBLE DISTRIBUTION OF ATTACK

It is apparent that, since it is impossible to predict with any confidence which of the courses discussed above would be selected by Germany and also since, whatever course were selected, other attacks not in pursuance of that course, might well be carried out in strength on occasion as diversions, our defensive preparations must be designed to counter all the courses mentioned. It must also be remembered that, in addition to the part which our defences would play in direct interference with the procedure of bomb aiming, further inaccuracy in aim would result if the defences forced the attackers to fly high or to attack more by night. Moreover, effective defences would result in dispersion of the weight of attack over wide areas, not only because of inaccuracies of aim but also because bombers when heavily engaged might drop their bombs without relation to any given objective. Bombing would thus tend to become indiscriminate in effect if not in intention.

APPENDIX 9

ORDER OF BATTLE FIGHTING AREA, JULY 1926

Fighting Area Headquarters, Uxbridge

Station	Squadron	Aircraft
Upavon	3	Woodcock
Northolt	41	Siskin
Kenley	32	Grebe
Biggin Hill	Night Fighter Flight	
Hawkinge	25	Grebe
	17	Woodcock
Duxford	19	Grebe
	29	Grebe
	111	Siskin
Henlow	23	Gamecock
	43	Gamecock

ORDER OF BATTLE FIGHTING AREA, JULY 1934

Fighter Command Headquarters Uxbridge

Station	Squadron	Aircraft
Tangmere	1	Fury
	43	Fury
Northolt	41	Demon
	111	Bulldog
Kenley	3	Bulldog
	17	Bulldog
Biggin Hill	23	Demon
	32	Bulldog
Hawkinge	25	Fury
Hornchurch	54	Bulldog
North Weald	29	Bulldog
	56	Bulldog

ORDER OF BATTLE FIGHTER COMMAND, JULY 1936

Fighter Command Headquarters, Bentley Priory, Stanmore.

No.11 Group H.Q. Uxbridge

Station	Squadron	Aircraft
Tangmere	1	Fury
	43	Fury
Northolt	111	Gauntlet
Kenley	17	Bulldog
Biggin Hill	23	Demon
	32	Gauntlet
Hawkinge	25	Fury
Hendon	604	Demon
Hornchurch	54	Gauntlet
	65	Gauntlet
North Weald	56	Gauntlet
Duxford	19	Gauntlet
	66	Gauntlet

NOTE Squadrons 3, 29 and 41 were in Middle East where they had gone in 1935 at the beginning of the Abyssinian crisis. They returned to England in September 1936.

Appendix 10

MXED/S.315. 14th May, 1940.

My dear Peirse,

A short time ago you invited the Commanders-in-Chief to a conference to discuss the advisability of opening the air offensive against Germany.

You will remember that Portal and I said that we could not give a valuable opinion unless we were in possession of the facts which would enable us to appreciate the situation.

That was before the events of the past week; and I can now give you my opinion, for what it is worth, that we ought at once to institute an intensive attack on the enemy's oil resources. If this can be done by night, so much the better.

The advantages which might be expected to a crue would be as follows.

(i) It might serve to slow up the intensity of the enemy's air operations and the activity of his mechanised columns; thus making a really effective contribution to the fighting on the Continent.

(ii) We should hope to draw on to this country air attacks which would otherwise have been delivered on Continental targets, thus further relieving the pressure.

(iii) We should bring the German bombers to a position where the Fighter Command could operate with maximum effect instead of with minimum efficiency as is now the case.

(iv) If we are ever going to bomb their oil stores we should do it when they are full and not when their contents have been used in attacks on us.

(v) We might hope to whittle down the German air striking force.

I want the Fighter Command to pull its full weight in this battle; but I want it to do so by shooting down Germans in this country and not by being used as a reservoir for sending reinforcements to France.

/The ....

Air Marshal R.E.C. Peirse, CB, DSO, AFC.
Air Ministry,
Whitehall, S.W.1.

The "Hurricane tap" is now turned full on (if you remember my metaphor when I had an interview with the Air Council early last Autumn) and you will not be able to resist the pressure to send Hurricanes to France until I have been bled white and am in no condition to withstand the bombing attack which will inevitably be made on this country as soon as our powers of resistance fall below a level to which we are already perilously close.

I therefore recommend an immediate assumption of the air offensive against Germany, and particularly her oil supplies.

You may make what use you like of this letter but, in any case, I should like it to be on record with the minutes of or discussion in April 28th in C.A.S.'s room.

Yours sincerely,

H.C.T. Dowding.

Appendix 11

16th May, 1940.

FO/S.19044.

Sir,

I have the honour to refer to the very serious calls which have recently been made upon the Home Defence Fighter Unit in an attempt to stem the German invasion on the Continent.

2. I hope and believe that our Armies may yet be victorious in France and Belgium, but we have to face the possibility that they may be defeated.

3. In this case I presume that there is no-one who will deny that England should fight on, even though the remainder of the Continent of Europe is dominated by the Germans.

4. For this purpose it is necessary to retain some minimum of fighter strength in this country and I must request that the Air Council will inform me what they consider this minimum strength to be, in order that I may take my dispositions accordingly.

5. I would remind the Air Council that the last estimate which they made as to the force necessary to defend this country was 52 Squadrons, and my strength has now been reduced to the equivalent of 36 Squadrons.

6. Once a decision has been reached as to the limit on which the Air Council and the Cabinet are prepared to stake the existence of the country, it should be made clear to the Allied Commanders on the Continent that not a single aeroplane from Fighter Command beyond the limit will be sent across the Channel, no matter how desperate the situation may become.

7. It will, of course, be remembered that the estimate of 52 Squadrons was based on the assumption that the attack would come from the eastwards except in so far as the defences might be out-flanked in flight. We have now to face the possibility that attacks may come from Spain or even from the North coast of France. The result is that our line is very much extended at the same time as our resources are reduced.

8. I must point out that within the last few days the equivalent of 10 Squadrons have been sent to France, that the Hurricane Squadrons remaining in this country are seriously depleted, and that the more squadrons which are sent to France the higher will be the wastage and the more insistent the demands for reinforcements.

9. I must therefore request that as a matter of paramount urgency the Air Ministry will consider and decide what level of strength is to be left to the Fighter Command for the defence of this country, and will assure me that when this level has been reached, not one fighter will be sent across the Channel however urgent and insistent the appeals for help may be.

10. I believe that, if an adequate fighter force is kept in this country, if the fleet remains in being, and if Home Forces are suitably organised to resist invasion, we should be able to carry on the war single handed for some time, if not indefinitely. But if,

/this

the Home Defence Force is drained away in desperate attempts to remedy the situation in France, defeat in France will involve the final, complete and irremediable defeat of this country.

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

H.C.T. DOWDING,

Air Chief Marshal
Air Officer Commanding-in-Chief,
Fighter Command, Royal Air Force.

The Under Secretary of State,
Air Ministry,
LONDON, W.C.2.

Appendix 1.

W.P.(40)159

THE AIR DEFENCE OF GREAT BRITAIN

Note by the Chief of the Air Staff

1. I feel bound to draw the attention of my colleagues to the letter from the Commander-in-Chief, Fighter Command, attached as an Annex to this Note. This letter raises the final issue of a problem which must have been in the forefront of all our minds in the last few days, and which is of such vital importance to the security of this country and of the Empire that I ask the other Chiefs of Staff to support me in putting forward the following views to the War Cabinet.

2. In paragraph 4 of his letter the Commander-in-Chief asks to be informed of the minimum fighter strength which the Air Council consider might be retained for the defence of this country.

The calculations based on the strength of the German first line bomber strength before the War led us to the conclusion that this minimum was 53 squadrons with the necessary reserves to meet wastage. Even this was on the assumption that the bases for the enemy attack would be confined to Germany, and the requirements has obviously increased, not only with the occupation of Norway, but still more since the occupation of Holland with the consequent increased threat to this country and to our naval vessels and shipping in the narrow seas from short range bombers and fighter escorts.

Our strength in this country has now been reduced to 37 squadrons. Even these have already suffered losses in operations on the Continent, and six of them are now engaged in the battle in France, operating from their home bases. Our reserves of fully equipped fighters, however, are totally inadequate to meet the very high rate of wastage now being incurred in the battle in France.

3. I am sure the Chiefs of Staff will agree that, even if the worst occurs and our French Allies are overwhelmed, England will fight on.

4. If this situation should arise we shall still be faced with a very powerful enemy bomber force, that can be escorted by fighters, with bases stretching over 1,000 miles from Norway to the Western point of France.

5. In the light of the foregoing consideration I can reach no conclusion other than that we have already reached the absolute limit of the assistance that we can afford to France, if we are to have any chance of protecting the United Kingdom, the Fleet, our sea-borne trade, our aircraft industry, and all the vital centres throughout the country on which we must depend for our ability to continue the war.

6. This raises an issue which is grave to the last degree. If we decline to send any further fighter assistance to France or to continue the support which we are now affording with these squadrons in England for more than a few days at a time at most, then it is not beyond the bounds of possibility that the French Army may give up the struggle. If, on the other hand, we continue to accept this constant drain on the vital defences of this country in order to sustain French resistance, then a time will arrive when our ability to defend this country will disappear.

/I...

I do not believe that to throw in a few more squadrons whose loss might vitally weaken the fighter line at home, would make the difference between victory and defeat in France.

7. I do not propose to enter in this note into the implications of a collapse of French resistance because that is the subject of a report which is now being produced as a matter of urgency by the Joint Planning Committee. It can, however, be said with absolute certainty that while collapse of France would not necessarily mean the ultimate victory of Germany, the collapse of Great Britain would inevitably do so.

C.L.N. NEWALL.

18.5.1940.

Appendix 13

10, Downing Street,
Whitehall.

NOTE BY PRIME MINISTER ON W.P.(40) 159, 18TH MAY, 1940.

General Ismay,

Let me have an air state of the actual strength of the fighter squadrons in G.B. No more squadrons of fighters will leave the country whatever the need in France. If it becomes necessary to evacuate the B.E.F. a very strong covering operation will be necessary from English bases against the German bombers who will most certainly do their best to prevent re-embarkation. This should be studied to-day. From the point of view of the future resistance it makes no difference whether we strike down German bombers here or in France. Indeed the latter is to be preferred so long as the home bases are not voided. A.O.C. in C. should be told the above and make his plans accordingly.

2. But I also request that within a month from today at least ten squadrons of fighters for home defence shall be formed from the Schools from spare machines. Also that plans should be made to use the Battles etc. to bombard German factories if it is possible to reach them.

3. In the event of a withdrawal of the B.E.F. or a collapse in France we ought to get a good many of our aircraft, now fighting there, back. It must be borne in mind that since the battle began the Germans have lost far more heavily in aircraft than we, and that the actual proportion of strength has moved in our favour.

I see no reason why with these resources we should not fight it out with them on better terms than were possible at the beginning of the war. Once individual and unit superiority is established very great advantages will follow.

The utmost available A.A. strength should be concentrated on the aircraft factories. These are more important than anything else at the moment.

W.S.C.

19/5.

Appendix 14 (Dept.OA).

20th May, 1940.

Dear Ismay,

With regard to the Prime Minister's minute on W.P.(40)159 dated 18th May 1940, I have attached an estimate of the air strengths of the Fighter Squadrons in Great Britain as at May 20th, and note with satisfaction that no more Fighter Squadrons will leave this country whatever the need of France.

You may assure the Prime Minister that plans are now being made against the possibility of having to evacuate the B.E.F., and I sent my Director of Home Operations down to see the Air Officer Commanding-in-Chief, Fighter Command yesterday to explain the situation. As soon as the ports of embarkation have been chosen Sir Hugh Dowding will work out a plan to provide Fighter protection for the operation, so far as it is possible to do so having regard to the location of the ports chosen.

As you are aware, we are operating a force of six Hurricane Squadrons daily over France in the present phase. While to a certain extent it is true that there are advantages in shooting down German bombers in France, we should remember that fighters operating under the sector control of the Air Defence System are likely to be more economically and effectively employed than they are when fighting under the present conditions in France. For example, we have warning of approach and can put up fighters to meet enemy formations which we definitely know to be approaching as opposed to the rather wasteful patrols we carry out in France; some of which never make contact with the enemy. Our wastage from enemy bombing attacks on our aerodromes at Home will also, we hope, be less than it is in France. Moreover, it is a simpler and more rapid process to salvage aircraft which are damaged at Home and to return them and their pilots to the first line.

As regards the formation within the next month of ten new fighter squadrons, the Air Staff are convinced that to attempt any such policy would be quite unsound and would in fact defeat the object that the Prime Minister has in mind, which obviously is to build up the fighter defence of this country.

We are already raising three new fighter squadrons with all speed. Beyond this our next aim must be to bring up to strength the eight squadrons from which we have withdrawn a flight each to reinforce France. This is already in hand. This being done we must concentrate our efforts on replacing wastage in, and if possible building up a small working reserve, behind the existing squadrons to assist them to keep fighting at the high rate of effort which will be required of them. A mere increase in first line, whose effort we could not maintain, would weaken the structure rather than strengthen it, and to turn fighter training units into first line squadrons would merely be to spend capital and would fatally reduce our capacity to replace casualties in the fighter line.

In respect of the suggestion that we should use Battles to bombard factories I should point out that they are hardly suitable and have other roles.

Arrangements are being concerted in the event of the withdrawal of the B.E.F. to get all our aircraft now fighting there back.

As regards the protection of our own aircraft factories, the Air Officer Commanding-in-Chief, Fighter Command is carrying out a review of the defences with the object of providing the maximum protection practicable and he has already issued orders which will bring about the required re-deployment of our A.A. guns.

Yours ever,

C.L.N. NEWALL.

Major-General H.L. Ismay, C.B., D.S.O.,
Offices of the War Cabinet,
Richmond Terrace,
S.W.1.

Appendix 15

(DEPT. OA,)

S.4752/S.6. 23rd May, 1940.

Sir,

I am commanded by the Air Council to aquaint you that your letter FC/S.19048, dated 16th May, 1940, dealing with the minimum standard of fighter defence for the United Kingdom, has now been considered by the Chiefs of Staff Committee and the War Cabinet, and to inform you that the following decision was recorded:-

> "The War Cabinet agreed that no additional fighter squadrons should be withdrawn from the Air Defence of Great Britain for despatch to France, apart from such support as might be afforded in a crisis by aircraft operating from bases in the United Kingdom, if the situation so permitted."

2. It has also been decided:-

(i) that in the event of its becoming necessary to evacuate the British Expeditionary Force, a strong covering operation would be necessary from bases in the United Kingdom against German aircraft operating against the ports of embarkation. You are requested to develop the necessary plans for such an operation.

(ii) that the air defences of this country should be deployed in such a manner as to afford the maximum protection to the aircraft industry. I am to request that the necessary steps should be taken for this purposes.

3. I am also to refer to your letters dated 2nd and 4th Febraury, 1940, reference FC/S.18993, and to subsequent correspondence on the subject of the development of the fighter defence of the United Kingdom. This subject was discussed at a Meeting under the Chairmanship of the Deputy Chief of the Air Staff, and attended by yourself, on the 16th May. I am to enclose a copy of the Summary of Conclusions reached at this Meeting, which have been endorsed by the Air Council.

4. I am to say that instructions have already been given for the development of the deployment facilities necessary in the West and between the Firth of Forth and the Orkneys. The question of additional searchlights and anti-aircraft guns which may be required concurrently with the increase in fighter strength will be taken up in the Deputy Chiefs of Staff Committee (Anti-Aircraft Sub-Committee).

I am, Sir,
Your obedient Servant,

A.V. STREET.

The Air Officer Commanding-in-Chief,
Headquarters,
Fighter Command,
Royal Air Force.

Appendix 15.

FC/S.18993. 24th May 1940.

Sir,

I have the honour to acknowledge receipt of your letter S.4752/S.6 dated 23rd May, 1940, on the subject of the retention of the minimum fighter strength necessary for the defence of this country.

2. The withdrawal of seven squadrons from France has converted a desperate into a serious situation.

3. From 8.5.40 to 18.5.40 about 250 Hurricanes were expended by the ten squadrons in France, and, if that rate of loss (25 per diem) had been maintained, all Hurricanes in this country and in France would have been expended early in June.

4. Now the rate of loss in this country has been reduced to about eight aircraft per diem plus aircraft rendered temporarily unserviceable by enemy action, and, allowing a discount for exaggerated claims, three or four enemy aircraft are brought down for each one of ours lost. (I have no information as to the wastage figures for the three fighter squadrons remaining in France).

5. This is a great, but insufficient, improvement; if we continue to exchange casualties on this scale we shall eventually be worn down by the weight of superior numbers.

6. It has been said that a German brought down in France is as good as a German brought down in this country. This statement is only superficially correct; the important consideration is how many Germans each of our aircraft brings down before it is put out of action.

7. All Hurricanes are now armoured, and the process of armouring the Spitfires is progressing rapidly. When a fighter is shot down, the pilot is seldom killed and in many instances the damage to the aircraft is quite trivial and can be repaired quickly, provided that the machine descends in our own territory. In this case pilot and aircraft may be flying again in a day or two, whereas in other circumstances both are lost. Even when an aircraft is irreparably damaged in air combat the pilot may descend by parachute and be immediately available again if he descends in our own territory.

8. The present fighting is uneconomical in this respect because short-range Home Defence fighters are being used in an overseas fighting rôle. The result is that they have to be operated from two or three aerodromes in the South East of England. This restricts the effort, throws a very heavy burden on the units in the immediate neighbourhood, and provides from time to time admirable bombing objectives for the enemy on those aerodromes which are in intensive use.

9. I have hitherto made it almost an article of faith to preserve the Spitfire squadrons for Home Defence fighting, but the various rôles which I have been ordered to undertake during the last week have made this quite impossible and the Spitfire squadrons in No.11 Group are already heavily committed and are doing two or three sorties a day.

/10.

10. Some idea of the variety of tasks which have recently been allotted to me may be gathered from the following list:-

General protection of the Channel ports by continuous sterling patrol.
Specific protection of individual ports during a particular operation.
Providing fighter escorts for bomber formations operating by day.
Continuous sweeps throughout daylight hours of areas in which fighting is taking place.
Continuous night patrol over Boulogne.
Specified tasks of relieving troops from the attentions of enemy observation aircraft and dive bombers.
Escorting convoys of food for the Field Force.
Carrying distinguished personages under escort to various destinations by air.
Despatch of secret documents to the Expeditionary Force H.Q.
Convoying of block-ships to Ostend and Zeebrugge.
Escort of distinguished personage in motor boat during passage to Ostend.

Each special requirement comes through at short notice and is more urgent and immediate than the last.

11. On the other hand we have been operating from aerodromes which have not hitherto been bombed; and attacks on our own aerodromes will constitute a set off against the other advantages inherent in operating from and over this country.

12. With regard to para. 2(i) of your letter, I can continue my present practice of maintaining a coastal patrol over the Channel ports (assuming these to be "Ports of Embarkation"), and send out special reinforcing patrols at particularly critical moments.

13. With regard to para. 2(ii), the general deployment of the Fighter Command has been arranged largely with the view of protecting the aircraft industry: but the task will be rendered easier when the concentrated operations from the South East of England come to an end.

14. I note what you say with regard to my letters of the 2nd and 4th February, and am glad to hear that some action will be taken. Nothing which can be done, however, will now affect the immediate situation.

15. I realise, of course, that while the Expeditionary Force is still fighting in France it is impossible to ignore their requirements for air protection: but, as pointed out above, all such fighting militates against the maintenance of a force adequate to protect this country in the event of our having to carry on the war single-handed against a Power possessed of all the resources of Europe. I earnestly beg, therefore, that my commitments may be limited as far as possible unless it is the intention of the Government to surrender the country in the event of a decisive defeat in France.

16. The squadrons in the South of England are already beginning to tire, and every day I shall have to relieve one or two by fresh squadrons from the North and Midlands.

17. I must also draw attention to the situation which will arise if the Expeditionary Force succeeds in re-establishing its line and closing the gap which now exists on its right flank. In this case it will continue to fight and will tend to consume Fighters at the same rate as before. Unless therefore the Expeditionary Force and the Advanced Air Striking Force are content to exist on a

/liberal

liberal but strictly rationed proportion of the Hurricane output, they will be unable to continue the battle without again wrecking the Home Defence Units.

18. I have recently attended several meetings of the Home Defence Executive Committee, and it appears clear that air superiority must be maintained in this country if an invasion is to be prevented. The combined efforts of the Navy and Army alone will clearly not suffice.

19. In these circumstances I ask whether it would not be a wise policy to bring back the three remaining fighter squadrons from France. Their wastage would be saved and they themselves would constitute an appreciable reinforcement to the fighter defence.

20. In conclusion, I would ask that the efforts of the bomber force may be expended mainly or exclusively on objectives which will slow up the impetus of the German air attack. Damage done to crossroads or railway sidings is very quickly repaired, but damage done to enemy aerodromes and aircraft on the ground will have an immediate effect, while the destruction of industrial plant and oil stocks will have an effect which, though slower, may prove to be decisive.

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

(Sgd.) H.C.T. DOWDING.

Air Chief Marshal,
Air Officer Commanding-in-Chief,
Fighter Command, Royal Air Force.

The Under-Secretary of State,
Air Ministry (Dept.OA),
London, S.W.1.