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R.A.F. NARRATIVE  
(FIRST DRAFT)

THE R.A.F. IN THE BOMBING  
OFFENSIVE AGAINST GERMANY

VOLUME I

PREWAR EVOLUTION OF  
BOMBER COMMAND 1917-1939

AIR HISTORICAL BRANCH(1)  
AIR MINISTRY

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6. THE OIL SUPPLY PROBLEM IN GERMANY.

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## SOURCE ABBREVIATIONS

A.F.C.	Anglo-French Staff Conversations.
A.H.B.	Air Historical Branch, Air Ministry.
A.I.1(b)	Air Intelligence Branch, Air Ministry.
A.T.B.	Committee on Advice on Trade and Blockade.
A.T.B. (E.P.G.)	Sub-Committee on Economic Pressure on Germany.
A.T.I.	Air Targets Intelligence Section, Air Ministry.
B.C.	Bombing Committee.
B.N.	A.H.B. Bomber Narrative.
CAB.	Cabinet Resolution.
C.I.D.	Committee of Imperial Defence.
Conf. D.	Disarmament Conference, League of Nations.
C.O.S.	Chiefs of Staff Sub-Committee.
C.P.	Cabinet Paper.
D.C.	Disarmament Committee.
D.C.O.S.	Deputy Chiefs of Staff Sub-Committee.
F.C.I.	Committee on Intelligence in Foreign Countries.
F.C.I.(A.T.)	Sub-Committee on Air Targets.
F.C.I.(Sub.)	Special Sub-Committee of the F.C.I.
H.R.	Draft Hague Rules of Air Warfare.
I.I.C. or I.C.F.	Industrial Intelligence Centre.
J.I.C.	Joint Intelligence Sub-Committee.
J.P. or J.P.C.	Joint Planning Sub-Committee.
M.E.W. (O.C.)	Ministry of Economic Warfare Organisation Committee.
M.I.C.	Ministry of Information Committee.
S.	Air Ministry Secret Registered File.
W.A.	Western Air Plan.

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## PART ONE

1917 TO SEPTEMBER, 1938 (MUNICH CRISIS)

### CHAPTER I

#### INTRODUCTION

### CHAPTER 2

#### THE BACKGROUND TO BOMBER COMMAND

### CHAPTER 3

#### THE ORIGINS OF BOMBER COMMAND 1933 - 1936

### CHAPTER 4

#### PREPARATION FOR A WAR WITH GERMANY

### CHAPTER 5

#### THE MUNICH CRISIS AND THE LAST YEAR OF PEACE 1938 - 1939

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## I. INTRODUCTION

The operations of the home-based Bomber Command of the Royal Air Force during the German War of 1939-1945 owe their historical significance to the fact that they were an experiment in the use of air power as a principal and 'independent' weapon of offence. But, although they were an experiment, they were by no means an improvisation. The defeat of France in 1940 and the resultant inability of other British forces to strike directly at German power on the continent of Europe did, indeed, give to Bomber Command an unexpected impetus and did allow it to conduct its experiment in almost laboratory conditions of isolation. But the impetus merely accelerated an already prepared evolution, which the isolation magnified but did not distort.

For Bomber Command was the supreme expression, and its operations were the first serious test of an established British belief that, for an unmilitary island Power closely neighboured by great continental military states, an 'independent' Air Force is an essential weapon. It was thus the expression of a considered doctrine of aerial warfare. The doctrine, sceptical as to the possibility of aerial defence, required that in any major war the greatest possible part of the nation's strength in the air should be employed upon offensive operations aimed directly at the enemy's air power and war economy. This offensive must, of course, be subordinated to the general war plan, but in all other respects it should be a campaign on its own, quite distinct from the concurrent operations of the other Services. It might on occasion turn aside to assist those operations, but it would sacrifice most of the effectiveness with which the peculiar characteristics of aircraft endow it if it were consistently subordinated to the designs of the Army or the Navy. Only by striking on its own at the very roots of the enemy's belligerent power could it exploit to the full its special capabilities. Then it would prove at once the most decisive, the most prompt and the most economical, of all weapons.

This doctrine had its origins in the War of 1914-1918 and its growth was encouraged by the changes which the twentieth century brought in the art of war. Reduced to its simplest terms, to the terms in which it was popularly expounded, it was indeed logical enough. Modern science had converted war into a battle of machines and scientific instruments. It had thus made the capacity to wage war dependent upon the industry which manufactured and the transport system which distributed those machines and those instruments. It had at the same time produced, in the bombing aircraft, a means of striking directly at this industry and this transport system. Surely then, if a sufficiently large number of bombers could be directed against a sufficiently large number of vital industrial and transportation targets, the enemy's power to carry on a war must speedily be crippled at its source.

Expressed in these simple terms, it was a plausible and seductive theory. How far in the more complicated conditions of actual warfare defensive measures might after all diminish or even destroy its validity, could, before 1939, only be guessed at: how difficult an operation effective long-range bombing on the grand scale was in fact to prove, few people had yet realised. For the theory was, of necessity, rooted more in imagination than in experience. Indeed, when from 1934 onwards Britain's bomber squadrons had again to be prepared against a renewed challenge from Germany, the only reliable experience available, even to the Air Staff, was that gained in the War of 1914-1918, a War in which bombing had played a limited and subsidiary part and long-range bombing of industrial objectives had been a belated and stunted effort.

Now the operations of Bomber Command from 1939 to 1945 were governed to a quite remarkable degree by the plans, the organisation, and the equipment decided upon during the years 1934 to 1939, and those plans,

that organisation, and that equipment were in their turn no less clearly derived from the ambitious theories and the scanty experience of 1914-1918. Thus, the operations of 1939-1945 can be correctly understood only after a careful study of the decisions taken between 1934 and 1939, and those decisions can only be judged aright by taking into consideration the War of 1914-1918.

The aim of this narrative will, therefore, be, first, to outline the growth during the War of 1914-1918 of this doctrine of the 'independent' use of air power and to examine what little experience there was by which it could be tested; next, to consider briefly the effects of the following fifteen years of economy and disarmament; then to study the plans, organisation, and equipment decided upon between 1934 and 1939 in the light of this earlier history; and, finally, to describe in detail the conduct and the results of the experiment during the years of war from 1939 to 1945.

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## II. THE BACKGROUND TO BOMBER COMMAND: (i) THE WAR OF 1914-1918

New  
Weapons

The years 1914-1918 began a far-reaching change in the technique of war by introducing two weapons, the submarine and the aircraft, which could operate in three dimensions. Each of these weapons created a new and most serious defence problem for Great Britain. Of the two, the submarine was then the more present and the more deadly menace, for by 1914 it had reached a more mature stage of development than the aeroplane and during the last two years of the War it came near to cutting those sea communications upon which, since the Industrial Revolution, the British Isles have depended for the daily bread of their people and the raw materials of their industry.

Aircraft  
and British  
defence  
problems

Potentially, however, the aeroplane carried a yet deadlier menace. Unlike the submarine, it could attack targets on land as well as targets at sea. It was a weapon, and the only weapon, which might break through that immunity from direct attack which superior sea power had hitherto assured to an island nation. How far it could do so, depended of course largely upon its range and endurance, but already these were extending rapidly. Even by June 1917 London, as its inhabitants learned to their cost, was within reach of the Gothas from Ghent. Little more than a year later the Royal Air Force took delivery of the first three Handley Page four-engined bombers, which were capable of attacking Berlin from bases in East Anglia. Clearly, before long a fleet of bombers from airfields in, say, Western Germany might be able to reach not only London but also the industrial North and Midlands, perhaps even the western ports and the western sea-approaches of the United Kingdom. The time looked not far distant when bombing aeroplanes might be able to join the submarines in attacking the vital arteries of Britain's sea-borne trade and in addition to strike on their own at her industrial centres, her inland communications, and the morale of her civil population.

Air Supremacy In the future, then, as General Smuts predicted in August, as vital as 1917, "air supremacy may.....become as important a factor in the sea supremacy defence of the Empire as sea supremacy". (1) If Britain was to hold her place in the world, or even to preserve her independence, she must become a great Air Power as well as a great Sea Power. This lesson, burned into British memories by the German aeroplane raids of 1917, was never entirely forgotten even in the years of economy and disarmament which followed the Armistice of 11 November 1918.

It depends  
on offence  
not defence.  
Inadequacy  
of 1914-8  
experience

What exactly did this air supremacy imply? How was it secured and how retained? Here the teachings of 1914-1918 were far less clear and less emphatic. That it must be won and held by offence rather than by defence and by long-range bombers rather than by short-range fighters seemed reasonably certain. But as to what problems such bombing would encounter and what tactics and technique, what equipment and training, would be required to solve them, the experience of those years gave at best only partial, hesitant, and unproved answers.

1914-8  
"an Army  
Co-operation  
War".

For, from the air point of view, the War of 1914-18 was predominantly "an Army Co-operation War". (2) This was, indeed, almost inevitable. In 1914 aeroplanes had been in existence less than eleven years and they were as yet incapable of playing on their own an active part in war. Their carrying capacity was negligible and it was only in recent months that the first

/experiments

- (1) Sir W. Raleigh and H.A. Jones, The War in the Air (British Official History, Oxford, 1922-37, 6 vols. plus 1 vol. of appendices to vol. VI, VI, Appendix II.  
(2) J.C. Slessor, Air Power and Armies (London 1936) p.126.

experiments had been made in arming them with machine-guns and in dropping small bombs from them. They were, therefore, a means of observation, not a weapon of offence. Accordingly, they had to be given an ancillary role and even in England, where it had been intended originally that the air forces should form a single Service, the military and naval wings had drifted apart and become separate, subordinate, branches of the older Services, the Royal Flying Corps of the Army and the Royal Naval Air Service of the Navy.<sup>(1)</sup> Moreover, the range of aeroplanes was still too short for them to co-operate with the fleet, so that when the War broke out the R.N.A.S. was still experimenting to find some way in which it might usefully employ itself. On the other hand, the Army had one very definite use for the R.F.C. - reconnaissance. Hence, because it knew what it wanted and because what it wanted was within the present capacity of the aeroplane, the claims of the Army upon the slender supplies available were given priority over all others. This priority grew in the succeeding years to something approaching monopoly, for, while the R.N.A.S. was still experimenting, the Army was expanding rapidly and was, in addition, continually discovering new ways in which aircraft could assist it in the field. This ever-growing demand taxed to the utmost an aircraft industry and a training establishment as immature as the aeroplane itself. As a result, not only was the great majority of aircraft and of pilots absorbed by the work of Army Co-operation but also the policies, the techniques, the types of aircraft, suitable for other tasks were slow to develop and bombing, particularly long-range bombing, attracted only a belated attention.<sup>(2)</sup>

Observation  
and air  
fighting  
the primary  
duties

For this Army Co-operation War was an Army Co-operation War of a somewhat peculiar character. It was fought mainly on the Western Front, above a narrow belt of land where for four years the opposing armies were locked in static trench-warfare, where massed artillery dominated the earth, and the fighter aeroplane was queen of the skies. In it the first duty of the air forces was either to observe or to fight. The overwhelming majority of the aeroplanes were either 'Corps' machines, engaged in spotting and photographing for the guns and on contact patrols and ground attacks for the infantry, or else single-seat fighters employed to protect these 'Corps' machines and to shoot down those of the enemy.

Doctrine  
of the  
offensive

Now it is true that, out of this struggle between the fighters, the R.F.C. evolved a doctrine both of the nature of aerial warfare and of the methods by which air supremacy might be secured. The doctrine was expounded in September 1916 in a memorandum by Major-General Trenchard.<sup>(3)</sup> This began with the argument that even if "we had an unlimited number of machines for defensive purposes, it would still be impossible to prevent hostile machines from crossing the line if they were determined to do so, simply because the sky is too large to defend,.....the area of escape is practically unlimited, and... the aeroplane is fighting in three dimensions." Thus "the aeroplane is not a defence against the aeroplane": it is an offensive, not a defensive, weapon. It follows that, since the enemy's air forces cannot be warded off by defensive measures, they must be drawn off by "a relentless and incessant offensive". The true answer to enemy air attack is, then, "to increase our own offensive, to go farther afield", to fight the enemy well behind his own lines and compel him to divert his aircraft from offence to defence.

/Such

- (1) The War in the Air, I. c. 5.
- (2) See memorandum by Mr. Winston Churchill, 21 October 1917 - ibid., VI. Appendix IV.
- (3) Ibid., II. Appendix IX; see also, ibid., II. 251-9.



Implications of this doctrine

Such a doctrine was likely to make the bomber force the essential instrument in the struggle for air supremacy. If bombing could be made heavy and accurate enough to threaten vital damage, it would, better than anything else, compel the enemy to withdraw large forces to defend objectives, inside his territory. If it could then reach out farther afield to the industries and transport centres of the enemy's homeland, it might draw a large part of his air force altogether away from the land battles. Then it would be no longer a subsidiary adjunct to local military operations but a major campaign on its own, a separate offensive against the enemy's air power as a whole and against the ultimate sources from which all his fighting services derived their strength.

The R.F.C. unable to develop them

The R.F.C., however, could never begin to explore these wider possibilities. The demands of the Army for more observation machines and for more fighters were incessant and insatiable. To satisfy those demands and at the same time build up a powerful bombing force was more than the available resources would permit and so the R.F.C., being under the control of the Army, had to rest content to interpret its doctrine of the offensive in terms of the fighter rather than of the bomber.

Bombing by the R.F.C.

As a result, bombing in the R.F.C. was born late and never reached maturity. It was not until the Battle of Loos in September 1915 that any serious attempt was made at organised bombing carried out under a central direction by pilots trained for the work and by machines equipped with proper, though still rudimentary, bombsights and bomb-release gear. (1) Thence-

Size of the force

forward, although bombing became a normal feature of army co-operation, the bombing force grew but slowly. In March 1918, of the 1,209 serviceable British aeroplanes on the Western Front, only 189 were bombers as compared with 645 fighters and fighter-reconnaissance and 375 'Corps' machines. (2) Even at the Armistice there were no more than 401 out of 1,659. (3) Moreover, nearly all these bombers - 181 of the 189 and 371 of the 401 - were single-engined two-seaters of no great range, the best of them unable to carry more than two 230 lb. bombs. They were sent out in small numbers. Daylight attacks, which from January 1916 were made in formation, (4) very seldom brought more than a score of them together over the same target; whilst night attacks, which began to be made regularly in May 1916, (5) were always carried out by single machines flying at considerable intervals and attacking from low levels. Thus, although the weight of the bombing attacks increased steadily from 5½ tons of bombs dropped in six days at Loos in 1915 to 420 tons dropped in the month of March 1918 and to 948 tons in the following August, (6) it was never heavy enough to have more than a harassing value. The accuracy may be judged from the confession of the General Officer Commanding the R.A.F. in France in June 1918 that "material damage from day bombing is, I am afraid, very small and must remain so as long as it is necessary to bomb from great heights (7) at which an error of 1,000 yards is not at all excessive: material damage from night

Types and tactics

Weight and accuracy of attacks

/bombing

- (1) Ibid., II. 117-8, 131-4.
- (2) Ibid., IV. Appendix XVI. The figures quoted include the R.N.A.S. Squadrons at Dunkirk but exclude the 8th Brigade's 3 Squadrons at Ochev.
- (3) Ibid., VI. Appendix XXVI. (4) Ibid., II. 181-83 and Appendix VI.
- (5) Ibid., II. 183-4, 257, 302-33.
- (6) Ibid., II. 133; VI. 491. The greatest weight of bombs dropped within 24 hours was 50 tons.
- (7) By this time most day bombing was done from between 12,000 and 16,000 feet.

bombing is undoubtedly greater on suitable nights, but all experience in this war shows that it is very seldom vital". (1)

Range and targets

Such bombing, if it was to produce any appreciable results, had to be concentrated upon a few particularly sensitive objectives. And, since the bomber force was controlled by the Army, these had to be objectives close enough behind the enemy's lines for their destruction to influence the local land operations. So, throughout the War, the bombers working with the British armies very seldom penetrated as far as fifty miles behind the enemy's lines and in the great majority of their raids went no deeper than fifteen or twenty miles. At the same time, as the value of concentration was better appreciated, so their objectives grew steadily more limited and more stereotyped, narrowing down to certain vital railway centres and airfields, with dumps and billets to lend an occasional variety. These targets, too, were primarily Army targets, whose selection rested ultimately with the Army rather than with the air service.

Limited value of this experience

In these circumstances, army co-operation bombing was a very inadequate preparation for a 'strategical' air offensive. The air force commanders could gain little more experience in higher strategy than the commander of an Army Corps or a Battle Squadron. (2) Their planning was tactical and executive rather than strategical. They required no separate system of specifically air intelligence, for, their targets being Army targets, they could rely upon the Army intelligence organisation and the routine reconnaissances of the army co-operation squadrons to provide any information which their maps and the pilots' familiarity with the district could not supply. Their problems in tactical organisation were comparatively simple when aeroplanes only flew singly at night and when even in a heavy daylight raid no more than a couple of dozen bombers had to be placed simultaneously over the same target. In technical matters, too, the experience was distinctly limited. Short-distance raiding called for no special navigational training or equipment and raised no acute problems of meteorological forecasting. With the light machines employed, only a few different types of relatively light bombs could be used and the limited choice of targets did not encourage experiment. Even upon the comparative merits of various bombing techniques the evidence obtained was inconclusive and whether high level day bombing was more effective against railways than low level night bombing, or day bombing by formation than day bombing by individual aiming, were still open questions when the War ended. (3)

Bombing by the R.N.A.S.

While the R.F.C. had been getting more and more absorbed in the short-range work of army co-operation, the R.N.A.S. had become the champions of long-range, strategical, bombing. Their ambitions, however, were continually cramped and frustrated. Recurrent calls from the R.F.C. for assistance on the Western Front (4) combined with the Dardanelles campaign (5) to deplete the

/Admiralty's

- (1) Ibid., VI. Appendix XXI.
- (2) Compare on this, The Value of a Centralised Air Force, p. 2 (Part 12 of series of papers on the 'Role of the R.A.F. in War and the Strategical Use of Air Power', issued by the Department of the Air Member for Training: June 1943).
- (3) Ibid., VI. 411, quoting a report by the G.O.C., R.A.F. in France: see also ibid., VI. Appendix XXIII.
- (4) Ibid., I. 475-8; II. 447-8; III. 280-1.
- (5) Ibid., II. c.1.

Admiralty's aeroplane force; the tremendous demand for machines for short-range work with the Army delayed the production of heavier bombers with adequate endurance; (1) and early in 1915 the appearance of Zeppelins on Belgian airfields and of U-Boats in Belgian ports gave the naval airmen ample work to do nearer home. As a result, their bombing experience during the first years of the War did not differ very markedly from that of the R.F.C. Most of it was gained in small scale, short-range raiding from Dunkirk and, although the primary targets of these attacks were the Zeppelin sheds, shipyards, and U-Boat bases in western Belgium, a great part of the effort was in fact drawn off into the common round of bombing railways and airfields to assist the local armies (2)

Early  
raids on  
Germany

Nevertheless, these Dunkirk operations bore witness to the Admiralty's faith in the offensive possibilities of bombing and they had displayed even earlier a desire to carry the offensive 'farther afield'. In late September and early October 1914, just before Antwerp fell to the Germans, single naval aeroplanes had made three raids from that city against Zeppelin sheds in the Rhineland; (3) in November 1914 three naval aeroplanes, carrying twelve 20 lb. bombs between them, had raided Friedrichshafen from Belfort; (4) and between Christmas 1914 and Michaelmas 1916 eleven gallant but unfruitful attempts against Zeppelin sheds in north-western Germany were made by seaplanes taken in carriers to the Heligoland Bight. (5)

The Luxeuil  
Wing, 1916-7

Such enterprises were too ambitious for the primitive types and scanty numbers of naval aircraft available during the earlier years of the War. In 1916 however, the evacuation of the Dardanelles and the transference of home defence responsibilities to the War Office set free a certain number of machines, whilst the appearance of new types of aeroplanes brought within reach of air attack the ironworks of Lorraine, which manufactured much of the steel from which U-Boats were made. So, in the spring of 1916, the Admiralty arranged with the French for a Wing of these new machines - there were eventually to be a hundred of them - to be based at Luxeuil for operations against Lorraine and the Saar valley. (6) Nor was this the limit of their ambitions; In October they proposed "that the Navy should keep an effective force of at least 200 bombers in France (to include Dunkirk)".

Its  
operations

Once again, however, the Admiralty proposed and the War Office disposed. Aeroplanes and engines had to be transferred to the R.F.C. during the summer to assist in the Somme offensive and as a result the Luxeuil Wing was too weak to begin raiding before 12 October 1916, whilst even at the end of the year its strength was only 47 aircraft. A number of raids by escorted formations of from nine to fifteen bombers, supplemented by single aircraft at night, were made upon ironworks and factories in the Saar valley, some sixty or seventy miles across the German lines, but in these only the very fringe of the problems involved in a sustained, long-range offensive was touched upon. The results achieved were almost

/entirely

- (1) *Ibid.*, III. 254, 259, 266-7.
- (2) *Ibid.*, II. 340-1, 349-53, 426-51; IV. c. 3.
- (3) *Ibid.*, I. 389-90.
- (4) *Ibid.*, I. 395-401.
- (5) *Ibid.*, I. 402-5; II. 358-61, 396-9, 402-3, 420-1.
- (6) For the Luxeuil Wing, see *ibid.*, I. 487-8; II. 278-81, 353; VI. 118-22.

entirely unknown and the experience gained was inconclusive, interrupted, and fragmentary. Bad weather practically stopped all operations between November 1916 and March 1917 and by the latter date the Wing had barely a month to live.

Its dis-  
bandment

It was Sir Douglas Haig, the British Army commander, who delivered its death blow. Faced by a dangerous revival of German fighter strength on the Western Front, he regarded the Luxeuil Wing as an ineffective luxury which served only to divert resources from more vital tasks with the Army and which threatened "to compromise the success of my operations". After successfully opposing the Admiralty's 200 bomber plan in October, 1916, he put forward in November his own claim for twenty additional fighter squadrons as an essential minimum if air superiority over the Western Front was to be maintained in 1917. Finally he assured the Admiralty that no German squadrons had been withdrawn from the British section of the Front as a result of the Luxeuil operations and that it was "highly improbable that the output (of the Saar factories) has been seriously affected". This verdict, though honest, was certainly ill-informed, for the small and interrupted attacks of the naval bombers had actually caused a 30% drop in output at some works and had compelled the Germans "to divert aeroplanes, labour, and material to the beginnings of widespread schemes of home defence". Nevertheless, it was reinforced by the generalisation, drawn from the limited experience of the R.F.C., that "long-distance bombing as a means of defeating the enemy is entirely secondary to the above requirements (of the Army): its success is far more doubtful and, even when successful, both theory and practice go to show that usually its results are comparatively unimportant".<sup>(1)</sup> After this, the Admiralty could only abandon their enterprise. Apart from a 'reprisal' attack upon Freiburg on 14th April 1917, there were only one or two night raids by single aeroplanes after the end of March and in May the Wing was finally disbanded.

Obstacles  
to further  
development

The fate of the Luxeuil Wing showed yet again that the predominating influence of air fighting and army co-operation on the Western Front would not only prevent the R.F.C. from 'going further afield' but would also cut short any attempts of the R.N.A.S. So long as air policy and supply were controlled by the War Office and the Admiralty this state of affairs seemed likely to continue. The Army had little zeal for bombing outside its immediate areas. The Admiralty, though eager to bomb Germany, wished to do so chiefly in order to destroy objectives of importance to the Navy and this limitation of outlook weakened their case against the more urgent demands for the Western Front. There was no Ministry to voice the claim that air power might now be capable of effectively conducting "extensive operations far from, and independently of, both Army and Navy"<sup>(2)</sup> and it needed a shock from outside the Services, a shock which stirred into action an authority above their higher commands, to produce that wider use of air power towards which theory and imagination were beginning to point. The shock was given by the first daylight raid on London by German aeroplanes on 13 June 1917.

German air  
raids on  
Britain. The  
Zeppelins  
1915-6.

This was not by any means the first German air attack upon Great Britain, but until May 1917 all those attacks had been the work of Zeppelin airships<sup>(3)</sup> and all had

/occurred

(1) Ibid., VI. 122.

(2) The words quoted are from General Smuts' Report of 17 August 1917 - ibid., VI. Appendix II.

(3) Except for a few "tip and run" raids upon the Kentish and East Anglian coasts.



occurred by night. These Zeppelin raids, (1) the first long-range bombing offensive in history, had, despite the difficulties which they encountered in the weather, in navigation, and in locating their targets, made the British government and people nervously alive to the potentialities of aerial bombardment. During 1915 and 1916 in 42 raids, representing no more than some 160 individual airship sorties and dropping no more than 150 tons of bombs, 501 people had been killed, 1,224 injured, and material damage inflicted to the value of £1,410,409. (2) Work in factories and on the railways had been considerably interrupted, public confidence had several times been noticeably shaken, and 17,431 officers and men, with some 400 guns and as many searchlights, had been kept in England upon anti-aircraft duties. Moreover, at the very time when Sir Douglas Haig was pressing for his twenty additional fighter squadrons for the Western Front, the Zeppelins were tying down to home defence no less than fourteen such squadrons of the R.F.C. (3) It was an impressive demonstration of the diversionary value of a long-distance air offensive, even on a small scale. On the other hand, the peculiar vulnerability of these clumsy and gigantic gasbags made it possible to counter, and by the autumn of 1916 apparently to defeat, their attacks by defensive measures alone. The aeroplane was a defence against the Zeppelin and, long before Britain had bombers to spare for a counter-offensive, the defending fighters had taken the airship's measure.

The first  
daylight  
aeroplane  
raids,  
1917.

The daylight raids of the Englandgeschwader (Bombing Squadron No. 3) of twin-engined Gotha aeroplanes (4) were, however, a totally different matter. It was not only that in their first London raid on 13 June 1917 a mere fifteen of these machines caused material damage valued at £125,953, including direct hits on Liverpool Street station and the destruction of two trains; nor that in a few minutes, in broad daylight, and within sound of Downing Street and Whitehall, they inflicted heavier casualties (145 killed, 382 injured) in London than all the seven earlier raids by a total of nine Zeppelins. (5) \*

Failure  
of the  
defences

What was so peculiarly alarming was the complete failure of the defences. For the guns, the Gothas were too small and too elusive a target. For the fighters, interception was difficult. England being an island and the Gothas not having the Zeppelins' kindly habit of announcing their departure by wireless, the raiders could seldom be detected until they were already at the coast. This meant that, as London was so near to the Narrow Seas, the Gothas, coming from near Ghent and flying at 15,000 feet or more, were well on their way to the capital before the defending aeroplanes could take off and climb up to their level. Any increase in the bombers' range and speed - the Gothas could make little more than eighty miles an hour - would accentuate this problem by giving them a wider choice of objectives and by reducing the time between their approach to the coast and their arrival over their target. And, even when interception was achieved, the Gothas, each armed with three machine-guns and all flying in strict formation, were not unequal adversaries for the contemporary fighters and on June 13 they were little disturbed by the unco-ordinated assaults of individual pilots. The lesson of the Western Front, that the aeroplane is an offensive, not a defensive, weapon and that some

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- (1) Ibid., III cc 2, 3; V cc 1, 2.  
 (2) Ibid., III. Appendix III Table A; V. Appendix I Table A.  
 (3) Ibid., III. 100-3, 152-83, 244-7; V. 5, 11-2.  
 (4) Ibid., V. cc.1, 2. The Gothas were later reinforced by a few multi-engined Giants.

- (5) Ibid., V. Appendix II.

at least of an attacking force will always get through the defences, seemed to apply no less to home defence.

The later  
day raids  
and the  
night raids

In the light of later events this conclusion appears over-hasty and the alarm somewhat exaggerated. The Englandgeschwader was a small force, never very liberally supplied with reserves, and by the end of August 1917 the re-organised and strengthened British defences had taken such toll of its machines that it was forced to abandon daylight raiding and to resort to attacks by night. These night attacks in their turn met with much initial success, but early in the New Year, before the defences had again been fully reorganised, they too were suspended as the Germans began to husband their resources for their coming spring offensive on the Western Front. Only once did the night raiders measure themselves in strength against defences properly organised to meet them: and on this occasion, on the night of 19/20 May 1918, they lost eight of the forty-three bombers sent out upon the most ambitious of their attempts.

Effects of  
the early  
raids.

Thus, as so often in the history of bombing, the defenders' worst fears proved liars. In the summer of 1917, however, those fears were very present and the events which were to belie them still lay in an uncertain future. It could not be assumed that the Germans would not reinforce their bombing squadron to truly formidable strength and a second daylight raid on London on July 7 showed the defences to be as ineffective as on June 13. Britain, despite the established supremacy of the Royal Navy, was shown to possess an Achilles' heel in the vulnerability of London to air attack from across the Narrow Seas. London, as the capital city, as an administrative and business centre, as a port, and as the home of one-sixth of Britain's civil population, was of vital strategic importance. Besides, as aeroplanes of greater range were produced, the danger would spread to other ports and to the Midlands. Behind the menace to London there loomed the shadow of a threat to the great industrial machine upon which the Allies' war-effort very largely depended.

Home  
Defence  
becomes  
a major  
strategic  
problem.

Home Defence - the air defence of London and of Great Britain - thus ceased to be a 'side-show' and took rank alongside the U-Boat campaign and the Western Front as one of the major concerns of British strategy. It even outdid these in urgency, for, as Sir William Robertson later reflected, "when war is afoot, the requirements of Home Defence, whether on land, on sea, or in the air, will, except perhaps in the case of a great crisis such as that which occurred in March 1918, invariably have to be given precedence over requirements connected with operations abroad".<sup>(1)</sup> Something had to be done, therefore, to counter the menace of the Englandgeschwader. Something had to be done no less to provide an authority capable of supervising the air war as a whole, for in the crisis caused by the daylight raids the lack of such an authority had compelled the War Cabinet itself to assume detailed executive control.<sup>(2)</sup> Accordingly on July 11 a small committee, of which Lieutenant-General Smuts was the leading member, was set up to consider these two interlocked problems of Air Defence and Air Organisation.

/General

- (1) Soldiers and Statesmen, II. 18.
- (2) The War in the Air, IV. 134-5, 152-4; V. c.1; VI. c.1.

The Smuts' Report

General Smuts' first Report<sup>(1)</sup> dealt with Air Defence and is chiefly interesting to the present argument for its revelation of how great a diversion of forces to defence could be provoked by a single long-distance bombing squadron. His second Report, (2) dated 17 August 1917, dealt with Air Organisation and is one of the most important documents in the history of the R.A.F. The air service, it maintained, had now outgrown the ancillary and subordinate role of its infancy and was capable of acting extensively on its own. "As far as can at present be foreseen there is apparently no limit to the scale of its future independent war use. And the day may not be far off when aerial operations with their devastation of enemy lands and destruction of industrial and populous centres on a vast scale may become the principal operations of war, to which the older forms of military and naval operations may become secondary and subordinate". The primary purpose of an air offensive would no longer be to drive the enemy's air forces on to the defensive and to weaken or divert his attacks from the army co-operation machines at the front or from the towns and industries at home. It would rather be to destroy in his own homeland the industries and communications which nourished all his armed forces. The true offensive weapon of air power would be the long-range bomber not, as on the Western Front, the short-range fighter. But as Mr. Churchill afterwards emphasised, (3) the operations of the long-range bombers must, like those of fleets or armies, be related "to a definite War Plan for the air which again is combined with the general War Plan". They would therefore require, General Smuts considered, the creation of a separate Air Ministry and Air Staff, for only these could view the air war as a whole and "could properly handle this new instrument of offence". Only these could properly design its organisation, collect its intelligence, elaborate its war plans, train its personnel, specify its equipment, and guide its operations. Finally, with the creation of this central authority, logic suggested the fusion of the air services into a single unified and centralised Air Force.

Hopes for 1918

Here then, in its most uncompromising form, was the first clear statement of the theory of "independent" air power as a decisive weapon of war, of the theory upon which twenty years later the Bomber Command 'experiment' was to be based. But General Smuts did not regard this theory as a vision of a distant future. He believed that even in 1918 air power, by "its continuous and intense pressure against the chief industrial centres of the enemy as well as on his lines of communications, may form an important factor in bringing about peace". With the growing exhaustion of the belligerents' man power, the War would become more and more one of arms and machines and the influence of air attacks upon the industries producing those arms and machines would increase correspondingly. Moreover, thanks to the second Air Board, the problems of supply, which for so long had cramped the development of the air services, seemed within sight of solution. It was hoped that by the summer of 1918, after all Army and Navy requirements had been satisfied, there would remain "a great surplus available for independent operations." The War Cabinet on July 2 had already resolved to double the operational strength of the air forces and to employ no less than forty squadrons in bombing Germany. Clearly, then, both General Smuts and the Cabinet expected that the 'experiment' might be attempted in 1918.

/The

(1) Ibid., V. Appendix VI.(2) Ibid., VI. Appendix II.(3) Memorandum of 21 October, 1917, - ibid., VI. Appendix IV.

Delays and  
disappoint-  
ments

The expectation was doomed to disappointment. There was naturally some hesitation over introducing revolutionary changes at this most critical period of the War, and it was not until 1 January 1918 that the Air Ministry and Air Staff came into existence nor, owing to fresh difficulties and controversies, until the beginning of May that the Air Staff could settle undistracted to consider their bombing policy and the types of aircraft required to carry it out. (1) Thus, in any event, the bombing offensive could only have been launched in the summer of 1918 by a more or less improvised force. And in fact it was never possible to launch a large-scale offensive, even with an improvised force, at any time in 1918. For, as early as the autumn of 1917 it had become clear that the existing supply organisation, far from producing "a great surplus" of aircraft by the next summer, was unlikely even to complete the 86 squadrons authorised for the Western Front in December, 1916. The most that could be done in 1918 was to lay plans for 1919 and meanwhile very gradually to strengthen the small and makeshift force which had already begun to raid Germany on 17 October 1917. (2)

Bombing  
Germany  
1917-8:  
the 'In-  
dependent  
Force'

This Force (3) - known in the beginning as the 41st Wing, then from 1 February 1918 as the 8th Brigade under Brigadier-General C.L.N. Newall, and from June 6 as the 'Independent Force' under Major-General Trenchard - deserves some attention since its operations from Ochey were the best practical experience available to those who later planned the role of Bomber Command. From October 1917 until early May 1918 it consisted of only three squadrons - one squadron of D.H.4 day bombers, one of F.E.2b night bombers, and one of naval Handley Page night bombers. On May 3 two squadrons of D.H.9 day bombers were added. A sixth squadron, of Handley Pages, joined on August 9; a seventh, of Handley Pages, on August 19; an eighth, of Handley Pages, and a ninth, of D.H.9a's, on August 31; while in September the F.E.2b's were replaced by Handley Pages and a fighter squadron arrived, though its machines were too obsolescent ever to be used as an escort for the bombers.

Its small  
size

The nominal strength of the Force, even in September and October 1918, was thus never more than nine bomber squadrons four of day bombers (about 75 or 77 aircraft) and five of night bombers (49 aircraft) - or about 125 bombers in all. (4) Its effective strength for the longer-distance raids was even less than this, for the F.E.2b's could reach only the nearer targets in Lorraine and the two D.H.9 squadrons had to be taken off the more distant operations at the end of August owing to the poor performance and unreliability of their engines. So, for the longer raids no more than seven squadrons were ever available. Moreover, the night bombers were too slow and vulnerable to be used in daylight and the day bombers never operated by night, so that the concentration of force in any one raid was never very heavy. The night bombers, of course, made their raids singly at considerable intervals and "owing to the real or supposed danger of collisions" (5) no more than one squadron was ever employed on the same night against a single target.

/But

(1) Ibid., VI. cc.1, 2.

(2) Ibid., VI. 126.

(3) For its operations, see ibid., VI. c.4 and Appendix XIII.

(4) Ibid., VI. Appendix IV. The exact figures for the day bombers do not appear to be given in the Official History.

(5) Major-General Salmond, - ibid., VI. Appendix XXI.



Its small bomb-load

But the Force was not only small in numbers and weak in the concentration of its effort. Its bomb-load also was small. The single-engined F.E.2b's and D.H.4's, originally designed as two-seater fighter-reconnaissance machines for the Western Front, could carry only two 112 lb. bombs; the D.H.9's and D.H.9a's, modified versions of the D.H.4, only succeeded in doubling this bomb-load at the cost of a seriously impaired performance; and even the twin-engined Handley Pages took no more than twelve 112 lb. bombs or their equivalent.<sup>(1)</sup> This meant, too, that the bomb-load had to be made up largely of small bombs, 112 lb. and 230 lb. Their destructive effect upon extensive or solidly built industrial targets and railways was not great, unless they happened to score a direct hit upon a vital part, which in those days was by no means easy. It was only towards the end of the War that the Handley Pages began to use bombs of 500 lbs., even on a few occasions of 1,650 lbs., and then the experiment came too late and was on too small a scale for any clear lessons to be learned.<sup>(2)</sup>

Influence of the weather

Heavy and concentrated attacks were not, therefore, possible. Even a sustained and continuous offensive was difficult to maintain, for machines often set out to bomb the Rhineland only to find the Rhine valley hidden by mist or cloud, while on many days and nights the weather made it impossible to attempt any operations at all or else allowed only short-range operations. Raids upon targets other than airfields were, in fact, attempted on only 114 of the 391 days between 17 October 1917 and 11 November 1918 and on only 84 of the nights.<sup>(3)</sup> Furthermore, of the 3,181 sorties sent out during this period upon such raids, 24 per cent turned back without dropping their bombs, another 20½ per cent failed to reach any of their allotted targets, and only 55½ per cent claimed to have reached and bombed either their primary or their secondary targets. Of the 24 per cent which turned back without dropping their bombs, 14 per cent returned owing to engine trouble; almost all the other failures to bomb at all or to find the primary target were due to the weather.

Limitations of range

Finally, the Force had only a limited range. Even the better machines could not penetrate more than 150 miles from their base at Ochesy. They could not, that is to say, raid beyond the arc Cologne - Frankfurt - Stuttgart. The vital centre of German war industry, the Ruhr valley, thus lay beyond their reach. There was, it is true, a wealth of important objectives in the south-western corner of Germany which was open to their attack, but this very wealth of opportunities was a difficulty since few of the individual objectives were either sufficiently vital or sufficiently vulnerable to the sort of attacks this Force could make to justify the concentration of a sustained effort against them. The range, bomb-load, and size of the Force, and its dependence upon the weather, in fact, went far to determine its bombing policy.

Policy and plans

The framing of this policy revealed, even if it did not very thoroughly explore, an entirely new field of staff work and intelligence. For the bombing of Germany, an 'air targets intelligence' of quite a new kind was needed, an intelligence which could portray the strategic geography of the German war economy; point out its basic industries and the 'key' factories and communications upon which a whole chain of production depended; and provide detailed information by which particular

/targets

(1) For details of these aircraft, see *ibid.*, VI. Appendix XXVII.

(2) For example, as late as 1935 the Air Staff and the A.O.C.-in-C. of A.D.G.B. took exactly opposite views upon the value of heavy bombs against industrial targets - S.35247/11A and 12A.

(3) *The War in the Air*, VI. Appendix XIII. For the 195 days from May 1 to November 11 the figures were 86 days and 62 nights.

targets could be readily and certainly located and their most vital parts attacked. Here something had been done already by the French. They had collected much information and in the summer of 1917 had drawn up a bombing plan which was now communicated to their British allies. In this the supreme importance of the Ruhr industries, the Achilles' heel of the German war economy as London was of Britain's, was fully recognised and, although the Ruhr lay for the present out of reach, a means was suggested for starving it of its raw materials. For 80 per cent of the iron ore used in the Ruhr then came from Lorraine, which even in 1917 was well within striking distance, and the French plan was to cut off these supplies by continuous bombing of some eight key railway centres. A year later, on 13 September 1918, Marshal Foch elaborated this plan, (1) adding to its objectives the great chemical works at Ludwigshafen and the chief industrial, commercial, and communications centres of the middle and upper Rhine, and emphasising the importance of continuous, concentrated, large-scale attack, methodically directed to the destruction of each objective in turn.

Major-General  
Trenchard's  
bombing  
policy  
aimed  
primarily  
to harass  
enemy

It was against these additional, longer-distance, targets that the Independent Force was intended to operate, though in fact, since the F.E.2b's could not reach so far and the weather was often too unfavourable for the other squadrons to do so, a considerable part of the British effort was employed to supplement the attacks of the shorter-ranged French bombers upon the railway centres and factories of Lorraine. However, with so weak a force and in such conditions Major-General Trenchard recognised (2) that even in the summer and autumn of 1918 only a very limited amount of material damage could be inflicted and that it was useless to attempt "a sustained and continuous attack on one large centre after another until each centre was destroyed and the industrial population largely dispersed to other towns." "Even", he wrote, "had the Force been still larger, it would not have been practical to carry this out, unless the War had lasted for at least another four or five years, owing to the limitations imposed on long-range bombing by the weather". He decided, therefore, "to attack as many of the large industrial centres as it was possible to reach". Such attacks would need larger enemy forces to counter them and would have the greatest moral effect upon an already dispirited population - an important consideration since "at present the moral effect of bombing stands undoubtedly to the material effect in a proportion of 20 to 1".

Attacks on  
airfields

Such a policy, though undoubtedly the wisest in the circumstances, made an already light-weight attack still lighter by diffusing it over a wide area. This diffusion was yet further increased by the need to bomb German airfields and by the occasional diversion of forces to assist the Allied armies. Of these, the first was the more serious distraction. As the German defences and warning system improved, the British day bombers were more frequently intercepted and on a few raids suffered heavy losses. These losses were less than had been expected, (3) since the German fighters were reluctant to press home their attacks to close range. (4) Nevertheless, if the day bombing was to continue, some counter-measure was necessary and, as there were no British fighters to provide an escort, the only counter-measure possible was the not very effective one of bombing the airfields from which the German fighters worked. This bombing, even though it could often be carried out when longer-distance raids were impossible, must have entailed a further diversion of effort, for

/of

(1) Ibid., VI. Appendix X.

(2) See his final despatch on the work of the Independent Force, 1 January, 1919, quoted in ibid., VI. 136-7.

(3) Ibid., VI. 169-70.

(4) Statement by Air Vice-Marshal Joubert de la Ferte (A.O.C. Fighting Area) 26 October 1934 - S. 34572/29B.

of the 543 tons of bombs dropped by the Force between 6 June and 11 November 1918, 220 tons were aimed at these airfields.

Assistance  
to the  
armies:  
the French  
view.

The occasional assistance given to the Allied armies was much less of a distraction, but in 1918 it brought into debate fundamental questions of air policy and delicate matters of inter-Allied relations. (1) In face of the German offensive a unified command of the Allied armies on the Western Front had been set up with Marshal Foch as Generalissimo. To French logic it seemed unreasonable at this moment to divide the air command by creating the 'Independent Force', and the thought of that Force crowding the back areas of their lines around Nancy and Toul without assisting their armies was most unpalatable. Marshal Foch was as reluctant as Sir Douglas Haig had been to allow any of the air forces in France to escape from his control. He believed that only the land armies could win decisive victory and that "no more than the Artillery, the Armoured Cars, etc., can the Air Service by itself constitute an Army". He must therefore be able to order every available aircraft to help the land armies at critical moments. During quieter periods the bombing of Germany would be a useful form of attrition, but it must always be a secondary duty and should not be under independent control. (2) Such a view is natural to a continental country with land frontiers and powerful neighbours, for to such a nation nothing can compensate for the overwhelming of its army. The difference of opinion was thus fundamental and it is significant that the French in 1918, and apparently the Germans after 1934, both based their strategy upon this view of air power, while Great Britain and the United States, whose geographical situation shields them from invasion by land, have been the chief exponents of 'independent' long-range air operations.

The British  
view: plans  
to bomb  
Germany from  
England.

In 1918, then, the newly-established British Air Ministry was determined, in view of the difficulty with which even a small fraction of British air power had escaped from the Army's tutelage, that the Independent Force should remain independent and that its whole energy should be directed whenever possible to the bombing of Germany. It is true that on 3 October 1918 they did agree to place the Force under Marshal Foch's orders, but it seems clear that they did this only because decisive victory was then already in sight. For in May they had secured the Cabinet's agreement upon "the necessity of supporting the independence of this command to a similar degree as a naval command". (3) In June, after the expected French opposition had declared itself, they put forward a programme for 1919 which included, besides forty squadrons for the Independent Force in France, twenty night bombing squadrons to be based in England where they would be beyond the Marshal's control. Finally, in August the Air Staff went so far as to declare "that they are prepared, in the event of the control of the Independent Force in France being vested in the Generalissimo on the Western Front, to recommend the removal of the entire Force, as it stands, to England. The Independent Force would then be based in Norfolk and only emergency landing grounds maintained in France". (4) The home-based force, No. 27 Group, the direct ancestor of Bomber Command, actually began to form in September 1918. It was to be equipped with the four-engined Handley Page V.1500 night bombers,

/each

- (1) The War in the Air, VI. c.3.
- (2) Memorandum by Marshal Foch, 14 September 1918, *ibid.* VI. Appendix VIII.
- (3) Sir W. Weir's Memorandum of May 1918, approved by the War Cabinet: quoted at *ibid.*, VI. 104-5.
- (4) Quoted at *ibid.*, VI. 109.

each capable of carrying thirty 250 lb. bombs to Berlin. These machines, like the Vickers Vimy, owed their existence to the foresight of the second Air Board, which at the end of July 1917 had placed orders with the Handley Page and Vickers companies for three experimental heavy bombers. No less than 255 of them were on order at the Armistice but only three had been delivered. The machine had passed its trials early enough to make the creation of a home-based bomber striking force a practicable project, but too late for theory to be translated into practice.

An 'independent' air offensive never attempted

- From the foregoing sketch of the Independent Force, it will be clear that in the War of 1914-1918 the 'experiment' of a methodical, large-scale, 'independent' air offensive was never really attempted. What, then, could be learned from this War, either from the limited experience of the Independent Force or from other experiences of bombing or of being bombed?

Lessons of 1914-18  
Air supremacy and the bombing offensive

Need for 'independent' air power

It had, by demonstrating the vulnerability of London to air attack from across the Narrow Seas, shown that to Britain air supremacy might become as essential as sea supremacy. It had strongly suggested, although perhaps it had not conclusively proved, that this air supremacy must be won and held by offensive measures, by long-range bombers rather than short-range fighters, though these too would be required. It suggested no less strongly that, if this bombing offensive was to be held to its main task, the destruction of the enemy's air bases and war economy, the bombing force, and probably the Air Force as a whole, would have to be controlled by a separate Air Ministry, equal in status with the Admiralty and the War Office and 'independent' in the same sense that they were 'independent'. The need for this independence was all the greater now that Britain must be great in the air as well as on the seas, for she could now less than ever afford to maintain a great army on the continental scale. Hence in a European war her Army, being small, might again fall under the control of a continental ally and, if the Air Force were tied to the Army, it would share this subordination and its bomber force might well be used up in those tasks of army co-operation which to a continental country must always remain the primary tasks of air power. Indeed, the likelihood of a continental ally being reluctant to provide advanced airfields for squadrons whose objective would be the enemy's war economy rather than his army, made the independence of the bombing force desirable in another sense. It, or at least a major part of it, should have the range to carry on its offensive from home bases. It would then be freely at the disposal of the highest command for whatever tasks were the most urgent: it could be turned rapidly from one task to another and the fullest advantage could be taken of that 'flexibility' which is one of the chief characteristics of air power.

Need for preparatory planning

The experience of the Independent Force of 1918 also suggested what must be the nature and the objectives of this long-range bombing offensive. It must be concentrated, not diffused. It must select the essential links in the enemy's war economy and make methodical, heavy, concentrated, attacks upon each of these links in turn, continuing the attacks until each is broken and repeating them whenever a crippled objective shows signs of returning to activity. It must at the same time be able to crush or beat off or evade the attempts of the enemy to repel its raids, for success in this will compel him to divert an increasing proportion of his air resources and his production to defence, so reducing the weight of his offensive against Britain. Now this clearly implies the necessity for careful preparatory planning - another argument in favour of a separate Air Ministry and Air Staff. An effective bombing force, as 1918 had proved, cannot be improvised. Aircraft capable of reaching and destroying their objectives must be prepared before the offensive

has to be launched. But this implies that the strategic purpose which the bombing force is to serve must be clearly seen before its composition is settled. Planning, at least in the broad sense, must precede equipment.

Intelligence requirements This planning, it was also clear, would require a new species of intelligence. It would need an industrial, air target intelligence organisation to study the war economy and the air organisation of a potential enemy, to discover their weak links, to select the 'key' targets, and to provide the information, both topographical and technical, necessary for planning a successful air offensive against them.

Reconnaissance requirements In addition, once hostilities began, the bombers would need detailed reconnaissance, particularly photographic reconnaissance, to keep this information up-to-date and to assist their crews to locate their targets. In the Independent Force an organisation to provide this detailed intelligence had existed. "My Intelligence Department", Major-General Trenchard wrote, (1) "provided me with the most thorough information on all targets such as gas factories, aeroplane factories, engine factories, poison-gas factories, etc., each target having a complete, detailed, and illustrated plan, and maps were prepared of every target that was within reach. These were supplemented in a large way by aerial photographs taken by reconnaissance machines". Reconnaissance, however, was not yet a specialised function. So long as daylight attacks were made upon most of the targets, most of the reconnaissance requirements could be met by the bombers themselves and the aerial photographs referred to by Major-General Trenchard were, it seems, taken by the day bombers as a side-line during their ordinary bombing missions. The other incentive to specialised reconnaissance flights, the need for exact and detailed assessment of the damage caused by the bombing, was hardly felt when attacks were always made either in daylight or from low levels in moonlight and when they were intended to harass and depress the enemy over a wide area rather than to destroy and keep inactive certain definite objectives. Almost all that was needed could usually be obtained from Pilots' reports and from the 'strike attack' photographs taken by the day bombers as their bombs were bursting.

Inadequacy of the tactical and technical experience

Thus by November 1918 the general principles upon which an 'independent' bombing offensive should be conducted, and the nature of the objectives at which it should aim, had become reasonably clear. Here, however, certainty ended. The experience of 1914-1918 was much too limited to show how, in practice, bombers, and especially long-range bombers, could best make sure of finding their targets, of hitting them when they had found them, and of destroying them when they hit them. For the tactics and technique of bombing were still in their infancy and no truly long-range bombing had yet been attempted.

Day bombing tactics

Even the basic questions of tactics were still in debate. In day raiding, formation flying had been fairly well developed and the day bombers of the Independent Force had been able to raid up to the limit of their range by relying solely upon the all-round defensive fire-power which their close formation gave them. But then the German fighters had seldom pressed home their attacks and the brief British experience against the Gothas suggested that a combination of anti-aircraft barrage fire and determined, short-range, attacks by fighter formations might have produced a different result. On the other hand,

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(1) The War in the Air, VI. 136-7.

the idea of giving the day bombers a close fighter escort had not been seriously tested, while experience on the Western Front had hinted at the possibility of 'saturating' the ground defences by concentrating many bombers over a target in a very short space of time(1). No one could therefore say with certainty to what extent sustained day raiding would be possible in face of a determined and properly organised defence system, nor how deeply it might hope to penetrate. No one could say with certainty whether the day bombers would succeed best by relying upon an escort of supporting fighters; or by flying in close formation and depending upon their own combined fire-power; or perhaps even by abandoning the hope of fighting their way through in large formations, by sacrificing bomb-load and range, and by trusting to speed and evasion at very high or very low altitudes to enable them to penetrate a limited distance in ones or twos.

Night  
bombing  
tactics

Night raiding tactics were still less mature. Indeed, it was only in the last year of the War that the arguments of the R.N.A.S. (2) and the experience of the Independent Force secured its general recognition as a profitable method of attack. It was clear that it then had certain advantages over day bombing. The inaccuracy of gunfire at night allowed the night bombers to attack from low levels and the accuracy of their bombing in clear weather was as great as, or greater than, that obtainable in daylight from the altitudes at which the day bombers were forced to fly. Fighters, too, could rarely intercept them, so that they could sacrifice speed, performance, and defensive armament and carry a much greater bomb-load for considerably greater distances than the day bombers, and as they suffered fewer losses and less damage, there were usually more of them in serviceable condition. But there were disadvantages to offset these advantages. The night bombers could not yet fly in formation and owing to the fear of collisions so few of them could be concentrated against a given target during a single night that their attacks might not be heavy enough to achieve appreciable results. Moreover if inevitable improvements in gunnery and widespread use of balloon barrages forced them to fly at much greater altitudes, this would create new problems of navigation, target location, and bombing accuracy which might gravely impair their effectiveness.

Radio  
between  
night  
and day  
bombers

Thus at the end of 1918 the relative merits of day bombing and of night bombing were still undecided and it was still uncertain what proportion of the force available should be allotted to the one or to the other.

Meteor-  
ological  
problems

Questions of technique were equally unsettled. Nothing had yet been done to solve the problems set by the weather, which in most of western Europe could be depended on, as the Independent Force and the German raiders had both discovered, to hide a target under cloud or haze on at least half of the days and nights in any month. So long as this handicap remained unconquered, it would be the vagaries of the weather which decided what objectives, if any, could be attacked and no truly sustained, or even methodical, bombing offensive would be possible. At the least it was essential to mitigate this dependence upon chance by the development of a system of meteorological forecasting reliable enough to predict with fair certainty when there would be both adequate visibility over a target at the bombers' estimated time of arrival and suitable conditions for landing safely at base on their return.

Naviga-  
tional  
problems

But if full advantage was to be taken of such forecasts, a more elaborate technique of navigation would also be required. The bomber crews might sometimes have to fly, and perhaps to fly in company with other aircraft, through cloud - this, for the day bombers, might also become a necessary method of evading enemy fighters.

/Certainly,

Certainly, they would often have to fly long distances over cloud or haze which would make their maps useless; and, although on some nights they might, if properly trained and equipped, set a fairly accurate course by the stars, they would on other occasions have to steer by dead-reckoning. For this they would need, besides their compasses, accurate means of estimating the 'drift' of their aircraft and its true speed in relation to the ground. How adequate such methods would prove was doubtful and in long-distance navigation there was clearly a wide field for scientific research, a field in which the directional properties of wireless telegraphy held out some hope of progress. These navigational needs, of course, had not been very greatly felt by the Independent Force, for the limitations of its meteorological service had left the weather very much its master and night raiding, where the needs might have become most apparent, had been largely confined to low level attacks on clear or moonlight nights. Nevertheless, the dependence of long-range bombing upon the weather was one of the most obvious lessons of those operations and from that lesson most of these requirements could be deduced.

Target  
location

The methods of locating and identifying a target once its neighbourhood had been reached, were better developed. The use of maps, plans, and aerial photographs in briefing pilots was well understood. At night the technique of locating and illuminating a target by means of flares was also established, though considerable improvement in the flares was desirable and many new problems would arise if the night bombers were driven up to higher levels.

Bomb-  
aiming  
and bomb-  
dropping

It is, however, of no avail to be able to navigate to and identify a target unless the bombs can be aimed and dropped with reasonable accuracy. And here again, in 1918, technique was still in its infancy. As Mr. Winston Churchill wrote in October 1917, (1) "the dominating and immediate interests of the Army and the Navy have overlaid air warfare and prevented many promising lines of investigation from being pursued with the necessary science and authority." As a result, it remained true even at the end of the War "that aerial warfare has never yet been practised except in miniature; that bombing in particular has never been studied as a science; that the hitting of objectives from great heights by day or night is worthy of as intense a volume of scientific study as, for instance, is brought to bear upon perfecting the gunnery of the Fleet; that much of the unfavourable data accumulated showing the comparative ineffectiveness of bombing consists of results of unscientific action - for instance, dropping bombs singly without proper sighting apparatus or specially trained 'bomb droppers' (the equivalent of 'gun layers'); instead of dropping them in regulated salvos by specially trained men, so as to 'straddle' the targets properly. It is believed by the sanguine school that a very high degree of accuracy, similar to that which has been attained at sea under extraordinarily difficult circumstances, could be achieved if something like the same scientific knowledge and intense determination were brought to bear." There could be no doubt of the necessity for greatly improved methods and instruments. Without the accuracy which they could give, it was a matter of chance whether material damage was inflicted or not. And if bombing could not cause vital material damage, it could attack only the enemy's morale. That seemed to Mr. Churchill, judging from British experience, most unlikely to produce decisive results. He did not believe that "any terrorisation of the civil population which could be achieved by air attack would compel the Government of a great nation to surrender", provided the population had some familiarity with bombardment, adequate shelters, and strong police control.

/Types

(1) Ibid., VI. Appendix IV.



Types of  
Bombs

Finally, there was room for no less intense a volume of scientific study upon the size, shape, and nature of bombs, both to determine the ballistic properties which would give them an accurately knowable trajectory after leaving an aircraft and to decide the penetrating, blasting, or fragmentating qualities required to destroy various types of targets. "War-time experience (had) amply demonstrated that the problem of designing an adequate range of bombs for all purposes of air attacks had not been nearly solved". (1) This was largely because so few aircraft had been capable of carrying a bomb bigger than the 230 lb. The Handley Pages at Dunkirk and in the Independent Force had used light-cased 520 lb. bombs, and heavy-cased 550 lb. bombs with armour-piercing noses, and they had even dropped a few 1,650 lb., but, as already remarked, their experience was not sufficient to convince the authorities that heavy and powerful bombs might often be as necessary as accurate aiming. At the opposite end of the scale, too, the use of small incendiary bombs had been tried by both the British and the Germans, but the idea had been considerably discredited by the comparative innocuousness of the incendiary bombs used by the Germans in their experimental fire-raising raids on London on 31 October and 6 December 1917. (2)

Conclusions

At the end of the War of 1914-1918, then, clear answers had been given to only a very few of those questions of tactics and technique which must to a large extent determine, not only the types of aircraft and the numbers of each type that a bomber striking force would require to perform the strategical role allotted to it, but also the cost and practicability of the various operations which that role would necessitate. The idea that air power might overleap the land battle-fronts and deal decisive blows at the heart and arteries of the enemy's belligerent power was firmly established; preparations for making the experiment were well advanced and the general principles which should guide its conduct had been made clear; but the theory expounded by General Smuts and challenged by Marshal Foch and Sir Douglas Haig remained substantially untested by practical experience.

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- (1) Quoted from a paper on the history and methods of bomb development, by Mr. A.A. Appleby of the Air Armament School, 14 March 1934 - S. 35150/3A.
  - (2) The War in the Air, V. 104-5.

## II. THE BACKGROUND TO BOMBER COMMAND: (ii) ECONOMY AND DISARMAMENT, 1919-1933

### Creation of the home-based bomber force.

The home-based 'independent' bomber force, which had been conceived during the last months of the 1914-1918 War, was born in 1923. In that year the R.A.F., whose rapid withering after the Armistice had reminded Air Marshal Trenchard of the prophet Jonah's gourd,<sup>(1)</sup> began again to develop into an effective force. And the home-based bomber squadrons became the vital element in its effectiveness. For this development was based upon, and finally established, the principle that the primary duty of the R.A.F. was not to give close and direct support to the Army or the Navy but to ensure by its own 'independent' operations the air defence of Great Britain, and to ensure it principally by offensive bombing rather than by defensive fighting.

### Progress 1919-33

The broad strategical lessons of 1914-1918 were thus accepted and applied. On the other hand, during the fifteen peaceful years which followed the Armistice of 11 November 1918 comparatively slow progress was made in elucidating those more specialised problems of tactics and technique upon which the teachings of war-time experience were inconclusive, obscure, or altogether silent.

### British Defence policy 1919-33

The underlying cause of this slow progress in more detailed matters seems to have been the policy of economy and disarmament which from 1919 to 1933 governed the development of all the Fighting Services. This is not the place to probe the motives or to assess the wisdom of that policy, but some account of its evolution and effects will have to be given in order to explain the limitations of strength and capacity from which Britain's bomber force suffered in 1933, when the beginnings of German rearmament at length put an end to the expectation of an indefinitely enduring peace.

#### (a) 1919 - 1923

### The R.A.F. 1919-1923

This policy of economy and disarmament was first explicitly enunciated on 15 August 1919 when Mr. Lloyd George's War Cabinet, at the prompting of its Finance Committee,<sup>(2)</sup> directed the three Service Departments to revise their Estimates upon the assumption that the British Empire would "not be engaged in any great war during the next ten years".<sup>(3)</sup> This, the first and more restricted version of the notorious "Ten Years Rule", hit the R.A.F. particularly hard. Article 198 of the Treaty of Versailles had just forbidden Germany to build or possess any military aircraft and this encouraged all the other Powers, except France who was Britain's closest ally, virtually to abolish their air forces.<sup>(4)</sup> Accordingly the R.A.F.'s annual estimates were to be reduced to a mere £15,000,000<sup>(5)</sup>

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- (1) Memorandum by the C.A.S., 25 Nov. 1919 - Cmd. 467.
- (2) According to a "Note on the basis of the Service Estimates" by Sir Maurice Hankey (Secretary to this War Cabinet and afterwards to the Committee of Imperial Defence), 2 July 1928 - C.I.D. Paper 892-B.
- (3) Ibid. Also a later Note by Hankey on the same subject, 23 June 1931 - C.I.D. Paper 1055-B. For the history of the Ten Years Rule, see Appendix I, below.
- (4) This point is made in a paper by the C.A.S. (Sir J. Salmond), 27 April 1931 - C.I.D. Paper 1048-B.
- (5) They actually fluctuated between £15,000,000 and £20,000,000 in the next 4 years.

The 1919 establishment

With such straitened means, the Air Staff decided that the only course open to them was "to reduce service squadrons to the minimum considered essential for our garrisons overseas, with a very small number in the United Kingdom as a reserve, and to concentrate the whole of the remainder of our resources on perfecting the training of officers and men". In this way they might at least create "a sound framework on which to build a Service" when the need should arise. So, whilst the overseas garrisons were to be reduced to 18 squadrons, the home-based air force - apart from three aeroplane and two seaplane squadrons for co-operation with the Navy, and one squadron and a few flights for co-operation with the Army - was to be established at no more than four squadrons.<sup>(1)</sup> Moreover, it was not until the summer of 1921 that the first three of these squadrons - two of bombers and one of fighters - were fully formed. They were joined in March 1922 by a third bomber squadron withdrawn from Ireland but in November 1922 they were again weakened by the despatch of the fighter squadron and one of the bomber squadrons to Constantinople. Two flights of a fighter squadron were brought back from Egypt in December 1922, but even so at the close of that year the Air Force in the United Kingdom, excluding the four naval co-operation squadrons of the Coastal Area Command, amounted to no more than two fighter flights, two bomber squadrons, one army co-operation squadron, and one communications squadron. Of these, of course, the two fighter flights and the two bomber squadrons alone could be regarded as available or usable for home defence.<sup>(2)</sup>

Effects of the 1919 reductions

In such circumstances it had hardly been possible by 1923 even to begin any advanced specialist training or research. The schools to provide such training were only just opening and the intense scientific research which, as Air Marshal Trenchard believed,<sup>(3)</sup> they should both call for and inspire, lay still in the future. Even the new R.A.F. Staff College did not begin its first annual course until April 1922; and when in 1923 the Government decided to expand the home establishment from four squadrons to fifty-two, the Air Ministry had to suggest that the Admiralty and War Office might lend them some experienced staff officers to assist with the expansion.<sup>(4)</sup>

(b) The 52 Squadron Programme of 1923

The 1923 Expansion

It was this 1923 expansion which brought the home-based bomber force into existence. The expansion itself was due to a growing divergence between British and French policy, which became particularly acute after the French occupation of the Ruhr in January 1923. This dispute threw the shadow of a doubt across the prospect of a world permanently at peace. It compelled the British Government to reconsider their policy of aerial disarmament and it made at least some members of the British public realise their country's defencelessness in the air. That defencelessness was, indeed, extreme. According to the Air Staff, the French could place against Britain's three home defence squadrons a metropolitan air force of 956 first-line aircraft all manned by regular officers and men: of these, 596,

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- (1) Memorandum by S.ofS. for Air covering a memorandum by the C.A.S. (Trenchard) of 25 Nov.1919: approved by the Cabinet and laid before Parliament 11 Dec.1919 as Cmd.467. This establishment was not adhered to quite exactly during the next 3 or 4 years, but the differences were minor ones - see Appendix II, below.
- (2) See Appendix II, below.
- (3) Cmd.467.
- (4) Outline of the Expansion Scheme, by the S. of S. for Air, 1 June 1923 - A.M. File S.22846/I/2A, Para.10; also *ibid.*, enclosure 14A(5 or 6 such officers to be brought in, probably for 2 years).

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and possibly 866, were thought capable of operating against England<sup>(1)</sup> - a force fifteen or twenty times as numerous as the Englandgeschwader had ever been and based within an even shorter range of London.

The decision to expand

Such disparity of strength was no asset to British diplomacy and already, in December 1922, the Government had authorised an expansion of the home defence force to 18 squadrons, to be completed by April 1925.<sup>(2)</sup> This would provide the nucleus of an offensive organisation and of a proper zone of defence,<sup>(3)</sup> but it was still patently inadequate. Hence in the summer of 1923 the Cabinet resolved, in accordance with the recommendations of the specially appointed Salisbury Committee, to create a force "of sufficient strength adequately to protect us against attack by the strongest Air Force within striking distance of this country", as well as to meet essential Navy, Army, Indian, and overseas commitments. The expansion was to proceed by stages, the first stage aiming to provide a home defence force of 600 first-line aircraft, manned partly by regular officers and men, partly by reservists and volunteers.<sup>(4)</sup>

Outline of the 1923 Scheme

This cabinet decision was elaborated in an "Outline of the Proposed Expansion Scheme" presented by the Secretary of State for Air on 1 June 1923.<sup>(5)</sup> The aim of the scheme was there defined as to attain parity in strength with the French, parity being interpreted to mean the existence in the British home defence force of three regular squadrons and one Special Reserve or Auxiliary Air Force 'cadre' squadron for every four regular squadrons in the French metropolitan air force.

4 stages proposed

This aim was to be attained by stages. In the first stage the home defence force would be raised to 52 squadrons - 39 regular (464 aircraft), 7 Special Reserve (74 aircraft), and 6 A.A.F. (70 aircraft). In the second stage the 52 squadrons would be increased to 76 (866 aircraft), by the addition of 24 new squadrons - 18 regular (230 aircraft), 3 Special Reserve (30 aircraft), and 3 A.A.F. (32 aircraft). A third stage, of expansion to 1,400 aircraft, and a fourth, to 1,692 aircraft, were also envisaged in the event of the French augmenting their present numbers.

The 52 Squadron Programme and its importance

The first of these stages was, however, the most that could be accomplished during the next three or four years<sup>(6)</sup> and it was upon the composition and organisation of the 52 squadrons that Air Staff discussions centred in 1923.<sup>(7)</sup> The decisions which resulted from those discussions and which were embodied in the "First Revise of the Provisional Expansion Scheme" issued on 29 September 1923<sup>(8)</sup> mark a most important step towards the application of the lessons learned in 1914-1918.

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- (1) Ibid., enclosure 2A
- (2) This decision is quoted in A.M. File S.22846/I/2A, 5B.
- (3) As recommended by the C.I.D. sub-committee on the continental air menace - C.I.D. Paper 106-A.
- (4) This decision was communicated to the House of Commons by Mr. Baldwin on 26 June 1923 - Hansard (1923), Clxv.2142: it is quoted in A.M. File S.22846/I/9A (indexed on file as 13A).
- (5) A.M. File S.22846/I/2A.
- (6) Ibid., Para.13.
- (7) Most of the important correspondence and minutes of conferences are contained in two A.M. files, S.22846/I and S.22910.
- (8) A.M. File S.22846/I/21A.

(1) A One-Power Standard of Air Strength

They established the principle that British defence policy should aim at maintaining a One-Power standard of strength in the air no less than on the sea. In other words, they accepted the view that air power was already as vital as sea power for the defence of Great Britain.

(2) The 'Independence' of the RAF

Further, they accepted and established the doctrine of what was - rather unhappily - termed 'independent' air power; of a single, unified, Air Force under a centralised control, equal in status and independence with the Navy and Army, and designed to play its own distinct part in the general strategy of national defence. That part was clearly defined. It was, above all else, the air defence of Great Britain.<sup>(1)</sup> It was for this task that the greater part of the R.A.F. was from henceforth to be made ready. This in itself was no small step forward since it gave the R.A.F. a reasonable confidence in its future as a separate Service, as a Service able in considerable measure to shape its destiny to its own proper ends.

(a) Threats to this independence 1919-23

Hitherto, circumstances had scarcely justified such a confidence. From January 1919 until February 1921 the office of Secretary of State for Air had been combined with the office of Secretary of State for War. The Air Ministry had preserved its identity as a department separate from the War Office and the Air Staff which directed the R.A.F. had remained distinct from the General Staff which directed the Army, but both departments and both staffs had been under the same political head. It was, perhaps, partly because of this that the Admiralty had tried so hard to secure for itself full control over all shore-based and ship-borne aircraft working with the Navy; to revive, that is to say, the separate R.N.A.S. This campaign, in its turn, had encouraged the War Office to claim a similar control over all aircraft working with the Army. Now, had these claims been admitted before 1923 - and in 1919 the Chief of Air Staff had thought that eventually they might have to be admitted<sup>(2)</sup> - so little of the R.A.F. would have been left that its continued existence as a separate Service under a separate Ministry and Staff might have been in serious jeopardy.<sup>(3)</sup>

(b) The 1923 Expansion assures the R.A.F.'s Independence

After 1923 the worst of this danger was passed. The Cabinet's decision of March 1922, that the R.A.F. should continue its separate existence, was put beyond challenge by the 1923 Expansion. The R.A.F. was growing to a size worthy of a separate Service and had been allotted a primary function quite distinct from those of the Army and the Navy. Even if its ancillary branches - the Army Co-operation squadrons of the Inland Area Command; the Fleet Air Arm; and the Coastal Area Command - had eventually to be handed over, the home defence squadrons now made up too considerable a part of the whole for their 'independence' to be seriously challenged, especially now that they had been allotted a specifically air function over which neither the Admiralty nor the War Office would desire - or would be competent - to exercise a direct control.

(c) The A.D.G.B. Command: emphasis on offensive, bomber, side

Moreover, these 52 home defence squadrons were to be organised as a unified force under a centralised Command, the Air Defence of Great Britain, which was responsible directly to the Air Ministry.

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- (1) As Admiral Field later remarked - "Each of the three Service departments had a primary occupation of quite different character from the others. For example, the main naval plan was concerned with war in the Far East; the Air Staff's principal preoccupation was the air defence of Great Britain; while the General Staff concentrated on the defence of India". - C.O.S Minutes, 101st Meeting, 4 Feb. 1932.
- (2) Cmd. 467
- (3) This was all the more true since it was not until 1922 that the R.A.F. was given an opportunity to prove in Iraq its ability under suitable conditions to replace the Army as an Imperial police force.

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It is true that the bomber squadrons themselves were not to be organised as a separate command, but were to be divided eventually into the Wessex, Oxford, and East Anglia Bombing Areas, each made up of a geographically convenient group of bomber airfields, each containing a mixture of day bombing squadrons, each directly subordinate to the A.O.C.-in-C. of the A.D.G.B. Command in the same way that the single Fighting Area was subordinate. (1) Yet this was intended to increase rather than to diminish the 'independence of the bomber force. For the A.D.G.B. Command was meant to be, at root, a Bomber Command, a Bomber Command to which the defensive Fighting Area was appended and subordinated. In it the bomber squadrons were so to outnumber the fighter squadrons as to ensure that the interest of the A.O.C.-in-C. and the energies of the Command as a whole would be centred principally upon those offensive functions in which an air force can best display its power of independent action, centred, that is, upon strategical bombing rather than defensive fighting.

(3) The doctrine of the offensive embodied in the structure of A.D.G.B.

Indeed, these decisions of 1923 embodied in the very structure of the home defence air force that doctrine of the offensive which Air Chief Marshal Trenchard had formulated seven years before, in his Memorandum of September 1916. (2) What is more, they gave to that doctrine the wider interpretation, in terms of bombers rather than of fighters, which it had received in General Smuts' Report of 17 August, 1917. (3)

(a) This due to the C.A.S. Outline of his views

The emphasis now placed upon this wider interpretation was undoubtedly due to the personal insistence and authority of the Chief of Air Staff, who kept even the administrative details of expansion under his own direct control. (4) Air Chief Marshal Trenchard was no less sceptical in 1923 than he had been in 1916 about the value of the aeroplane as a defensive weapon. He was therefore convinced that it would "be best to have less fighters, and more bombers to bomb the enemy and trust to their people cracking before ours". He felt "that although there would be an outcry, the French in a bombing duel would probably squeal before we did. That was really the final thing. The nation that would stand being bombed longest would win in the end". (5) Of course, a defensive fighter force must be maintained to keep up the spirits of the masses, who were "unversed in the laws of strategy", and to lighten the weight of attack upon London, which was so much more vulnerable and so much more a nerve-centre than Paris. But "it must be clearly realised that home defence does not mean only the process of keeping attacking aircraft from flying over this country. In its broadest sense it means the winning of an air war against any Power which may decide to attack us. To win this war it will be necessary to pursue a relentless offensive by bombing the enemy's country, destroying his sources of supply of aircraft and engines, and breaking the morale of his people". (6) Besides, it was only by offensive action that the fullest advantage could be taken, in the most economical manner, of the peculiar capabilities of air power. By such an offensive, "instead of attacking a machine with 10 bombs, we would go straight to

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- (1) First Revision of the Expansion Scheme - A.M. File S.22846/I/21A.
  - (2) See above, Part II(i), p.5.
  - (3) See above, Part II(i), p.11.
  - (4) A.M. File S.22846/I/14A.
  - (5) Minutes of a conference held by the C.A.S., 19 July, 1923 - A.M. File S.22846/I/14D.
  - (6) Air Staff memorandum sent to A.O.C. Coastal Area and A.O.C. Inland Area, 19 July 1923 - A.M. File S.22910/12B.

the source of supply of the bombs and demolish it, and the same with the source of production of the machines. It was a quicker process than allowing the output to go on. The Army policy was to defeat the enemy Army - ours to defeat the enemy nation. The Army only defeated the enemy Army because they could not get at the enemy nation". (1)

(b) Views of the Air Staff and others

With the main argument of this doctrine the Air Staff, most R.A.F. commanders, and even the other Services, seem to have been in general agreement. For example, in February 1923 the inter-departmental sub-committee of an Air Ministry and War Office joint committee on the air defence of Great Britain agreed in its report "that offensive action by aircraft in the enemy's country is the best form of defence; but a defensive system, combined with an active offensive, is a necessity". They had also laid down as accepted principles that "however powerful the air forces of a country may be, they cannot ensure complete immunity from hostile air attacks; that in consequence, although a proportion of the available air forces must be allocated to home defence, the forces for this purpose should be limited to the lowest possible minimum"(2).

(c) Discussion on the proportion of fighters to bombers

Nevertheless, there were considerable differences of opinion when it came to translating these principles into actual figures. The Secretary of State's Outline, which presumably reflected the original ideas of the C.A.S., suggested that the 52 squadrons should be made up of 39 bomber and only 13 fighter squadrons.(3) The Staff College recommended 38 and 14;(4) the A.O.G. Coastal Area (Air Vice-Marshal Vyvyan) 36 and 16;(5); the A.O.C. Inland Area (Air Vice-Marshal J.F.A. Higgins) 33 and 19;(6) and the Deputy Chief of Air Staff (Air Commodore J.M. Steel) and his subordinate the Deputy Director of Operations and Intelligence (Group Captain C.S. Burnett) 32 and 20.(7)

That, in the end, the doctrine of the offensive was laid down in its most uncompromising form and that the final allotment of bombers and fighters in the 52 squadron programme was weighted so heavily in favour of the bombers, seems to have been due principally to the insistence of the C.A.S., in face of a certain misgiving among some of his subordinates. He overruled the idea, put forward by the D.D.O.I., that the minimum of fighters required should first be calculated and then the remaining squadrons allotted to bombing.(8) He insisted, on the contrary, that the fighters should get only what was left over after the needs of the attack had been satisfied.(9) Again, he nipped in the bud Squadron Leader Portal's suggestion that it should be possible to discover an ideal proportion between offence and defence; it was never in his mind, he said, to have a proportion at all.(10)

(d) Specialised night fighter and day fighter squadrons ruled out

Further, the C.A.S. refused to countenance the earmarking of any squadrons as specialised day fighters or night fighters: all fighters must so far as possible be available for operations by day or by night. The D.C.A.S., the Director of Training and Staff

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- (1) Minutes of a conference held by the C.A.S., 19 July 1923 - A.M. File S. 22846/I/14D.
- (2) Report of sub-committee of the Air Ministry and War Office joint committee on the air defence of Great Britain, Feb. 1923, appended to and approved in the report of the joint committee, 9 April 1923 - A.M. File S. 22846/I/1A, 1B.
- (3) A.M. File S. 22846/I/2A.
- (4) A.M. File S. 22910/5A.
- (5) A.M. File S. 22910/14A.
- (6) A.M. File S. 22910/16A.
- (7) A.M. Files S. 22910/1A; S. 22846/I/5B.
- (8) Minute by D.D.O.I., 13 June 1923 - A.M. File S. 22846/I/5A: and compare 4A, 4B.
- (9) Minutes of a conference held by the C.A.S., 10 July 1923 - A.M. File S. 22846/I/14B.
- (10) Ibid.



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Duties (Air Commodore T.C.R. Higgins), and the Air Member for Supply and Research (Air Vice-Marshal Sir W.G.A. Salmon) objected that in continuous operations this might impose too great a strain upon the pilots; they maintained that different kinds of training and different types of machines would be needed for night fighting from those required for day fighting; and they claimed that during the War the home defence squadrons, which had tried to perform both functions, had done neither efficiently, whereas those in France, which had specialised in one or the other, had been highly efficient. Supported, however, by the opinion of the Commandant of the Staff College (Air Commodore Brooke-Popham) that in time it would be possible to train pilots to be equally skilled in both roles, the C.A.S. ruled that the aim must be to have only one type of fighter squadron, manned by pilots trained to operate equally by day or by night. In this way they would avoid 'double-banking' the fighter squadrons and would be able to allot a yet larger part of their total power to the bombing offensive. (1)

(e) The  
bombers not  
to be es-  
corted

With the same object in view the C.A.S. also ruled "that no special long-distance fighter squadrons can be raised to escort our bombing squadrons"; (2) "we ought to rely on bombers to defend themselves". (3)

(f) Propor-  
tion of  
fighters to  
bombers  
fixed at  
17 to 35

In the end, it is true, the proportion of bombers to fighters in the 52 squadrons, which had been put at 3 to 1 in the first Outline, had to be reduced to 2 to 1 (35 bomber to 17 fighter squadrons) in the C.A.S. final ruling of July 31. (4) Yet even this gave a very marked preponderance to the offensive element in the A.D.G.B. Command, a considerably greater preponderance than could have been given if fighter escorts and specialised night fighting squadrons had not been ruled out. So, the home-based bomber striking force was not merely brought into existence by the 1923 Expansion: it was made the very core and essence of the Air Defence of Great Britain and of the R.A.F. as a whole.

(4) Composi-  
tion of the  
bomber force  
day or night  
bombing?

It was, moreover, this search for the maximum or offensive power which dominated all the discussions about the composition of the bomber force itself. Here the central problem was to decide how many squadrons should be allotted to day bombing and how many to night bombing. The decision was an important one, because it would settle the tactical character of the force in peace-time and dictate its bombing policy in at least the earlier stages of a war. Yet experience of bombing under war conditions had been so limited and "data is (sic) so scanty and opinions are so varied as to the relative accuracy and moral effect of day and night bombing", (5) that any decision was bound to be very largely a leap in the dark.

(a) Doubts  
about the  
future prac-  
ticability  
of day  
bombing.

In the first place, there were some who doubted whether the inevitable improvement of defensive technique would not eventually make raiding in daylight prohibitively costly, perhaps altogether impossible, especially if the bombers were allowed no fighter escort. It was also suggested that improvements in anti-aircraft gunfire might force the day bombers to fly at heights from which accurate bombing would be impossible, although Squadron Leader

/Portal

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- (1) Minutes of conferences held by the C.A.S. on 10 and 19 July 1923 - A.M. File S.22846/I/14B, 14D.
  - (2) A.M. File S.22846/I/5A.
  - (3) Ibid. Encl. 4B.
  - (4) C.A.S. ruling, 31 July 1923 - A.M. File S.22910/19; 1st Revise of the Expansion Scheme, 29 Sept. 1923 - S.22846/I/21A.
  - (5) Commandant of Staff College to C.A.S., 20 July 1923 - A.M. File S.22910/11A.

Portal argued against this that the gunners' aim might be confused by the large formations which could be employed in daylight. (1) Curiously enough, the possibility that more accurate or intense gunfire might also force the night bombers up to greater heights, or that improved methods of fighter interception might appreciably increase their losses, appears not to have been seriously considered. Yet even without this further complication, the problem, if approached in this way, contained so many variable and uncertain factors that the advocates of night bombing differed considerably among themselves when they came to suggest actual proportions. The D.C.A.S. and the D.D.O.I. proposed that there should be 15 night and 17 day bomber squadrons; (2) the D.T.S.D. favoured a ratio of 3 to 1; (3) whilst the A.O.C. Inland Area thought that 4 to 1 would be nearer the mark. (4)

(b) The appeal to experience

It was clearly impossible to arrive at any convincing and agreed decision by these more or less academic conjectures about the probable practicability of either day or night bombing at some future date. Accordingly, the C.A.S. brought the discussion back to the firmer, though narrower, ground of war-time experience. He pointed out that the Independent Force's day bombers had been rather more successful than its night bombers in getting to their target areas, but that they had been forced to fly so high that it had been no easier for them in daylight to locate a target exactly and bomb it with precision than it had been for the night bombers to do so on a clear night from the low levels at which they had been able to fly. (5) Experience, in fact, seemed to show that, for the present, both night bombers and day bombers could be expected to penetrate to their target areas repeatedly and in effective strength. Equally, experience suggested that, at this date, there was little to choose between the two methods in point of accuracy - a suggestion which ruled out any idea, such as the D.T.S.D. seems to have had in his mind, (6) of a functional division between day bombers for 'precision' attacks upon smaller targets and night bombers for 'area' bombing.

(c) Advantages of night Bombing

This brought the discussions on to yet another line, for, if the two methods were equally practicable and equally accurate (or inaccurate), clearly the choice must lie with whichever would most hurt the enemy. Yet, here again, there was much to be said on both sides. (7) The night bombers, at that time, certainly had less to fear than the day bombers from either fighters or gunfire. Their standard of service-ability would therefore be higher, since they would suffer fewer casualties and less damage during their raids. Also they could sacrifice speed, performance, and armament to range and bomb-load - ten Vickers Vimys could carry almost twice the weight of bombs that could be taken by eighteen D.H.9a day bombers, and they could carry it 70 to 100 miles deeper into enemy territory. (8) Each night bomber would therefore, it was argued, cause a correspondingly greater amount of material damage and produce a correspondingly greater moral effect - for, although most of the Air Staff still seem to have regarded the spirit of the enemy's people as the bombers' primary target, they all

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- (1) A.M. File S. 22846/I/14E.
- (2) Ibid., Encl. 5A, 5B; S. 22910/1A.
- (3) A.M. File S. 22846/I/14B, 14E.
- (4) Ibid., Encl. 14E.
- (5) Minutes of a conference held by the C.A.S., 10 July 1923 - A.M. File S. 22846/I/14B.
- (6) A.M. File S. 22846/I/14B.
- (7) The arguments here summarised are those which were put forward in the C.A.S. conferences of 10, 19 and 25 July 1923 (Minutes in A.M. File S. 22846/I/14B, 14D, 14E) and in the replies sent to the Air Staff by the various Area Commanders and the directors of the Staff College (in A.M. File S. 22910/5A, 5B, 11A, 14A, 16A).
- (8) The exact figures, as given by the Staff College Commandant in a letter to the C.A.S. on July 20 are - 10 Vimys carry 140 x 112 lb bombs, 18 D.H.9a's carry 72 x 112lb - A.M. File S. 22846/I/4C.

recognised that terror proceeds from devastation and that "in order to obtain moral effect, which is the ultimate object, a certain amount of material damage must be caused".<sup>(1)</sup> Moreover, it was believed by many officers that night bomber crews could be trained more quickly and easily than day bomber crews, since they were not expected to fly in formation and were seldom likely to be involved in prolonged actions with hostile fighters.

(d) Advantages of day bombing

On the other hand, the day bombers also had certain obvious advantages. They were rather less handicapped by bad weather; they could see more clearly where they were going and could find their way more easily to the target area; their bombs, though smaller, might cause a greater interruption in the enemy's war economy and dispirit his people more by catching them at work in crowded places and killing them in larger numbers; while the large formations which could be used by day might make up for the small bomb-loads of the individual machines.

(e) The need for continuous bombing

Strong arguments were thus advanced both for day bombing and for night bombing and there was at present, it seemed, little to choose between the two methods in practicability or in accuracy. It was, therefore, hardly possible to decide wholly in favour of either, for so to decide would be to sacrifice much of that 'flexibility' - flexibility in choice of time as well as in choice of place - which gives to the air weapon those possibilities of surprise and initiative which are among its greatest assets. Besides, as the C.A.S. and the D.C.A.S. emphasised<sup>(2)</sup>, wartime experience had shown that the effectiveness of bombing depended largely upon its being continuous, upon its allowing the enemy no regular and recurrent periods of respite wherein he might repair the damage already done, go about his work, and rest his defences unperturbed by fear of further interruption. Both methods, then, were needed, and it was generally agreed that the aim should be to provide a force which could hit the enemy equally hard either by day or by night. It was also agreed fairly generally that, to achieve this 'equal effect', a proportion of two day to one night bomber squadrons would be required.<sup>(3)</sup>

(f) Proposal for a day-and night bomber

There were some, however, who wished to emphasise still more strongly the offensive flexibility of the bomber force. Air Commodore Brooke-Popham and other members of the Staff College wanted a force capable, not only of striking with equal effect by day and by night, but also of striking with practically its full strength at any hour in the twenty-four. They suggested that all, or nearly all, the bomber squadrons should be equipped with a single type of machine suitable for both day and night operations and that the crews should be trained for both kinds of raiding.<sup>(4)</sup>

(g) This not yet possible

This proposal was debated at some length and, although criticised by one group of Staff College students,<sup>(5)</sup> found considerable favour. It had already been recognised that, if 'equal effect' was to be achieved all the year round, it would be necessary, owing to the seasonal variations in the number of hours of darkness, to use some of the day bombers by night during

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- (1) Quoted from Exercise No.13 set to Staff College students in July 1923 - A.M. File S.22910/5B. Compare the C.A.S. remarks at the conference on July 10 - S.22846/I/14B.
- (2) A.M. File S.22846/I/14B, 14E.
- (3) A.M. File S.22846/I/14B. The A.O.C. Inland Area, thought 4 to 1 a better proportion owing to the heavy losses which he expected the day bombers to suffer - A.M. Files S.22910/16A; S.22846/I/14E.
- (4) Letters from Staff College Commandant to C.A.S., 13 and 20 July 1923 - A.M. File S.22910/5A, 11A.
- (5) A.M. File S.22910/5B.

the winter and some of the night bombers by day during the summer. (1) And if some, why not all? The debate, however, soon revealed a general agreement that it was not at the moment practicable to use a single type of machine for both day and night bombing. (2) It also showed a considerable agreement upon the desirability of having a few specialised day bomber squadrons of exceptionally high performance and a few specialised night bomber squadrons capable of carrying exceptionally heavy bomb loads and exceptionally heavy bombs. (3)

(h) The C.A.S.  
ruling of  
31 July 1923

This was as much progress as the circumstances of the time would allow and on 31 July 1923 the C.A.S. gave his ruling. (4) A clear-cut and final decision was hardly possible and would certainly not have been wise, so the ruling was frankly provisional. Of the first twenty-four bomber squadrons to be formed, twelve were to be day and twelve night bombers, this being recognised by everyone as the minimum requirement for each class. The composition of the remaining eleven squadrons was to be decided later, but it was suggested that the final proportion might be 22 day to 13 night bomber squadrons. At the same time the C.A.S. put on record his idea "that ultimately the majority of bombing squadrons would be equipped with a machine suitable for operations by day and night. A minority of squadrons, however, would be equipped, one set with aircraft of particularly high performance for day bombing only, the other set with aircraft capable of carrying a big load of bombs for night work only. He realised the impracticability of this at present but thought that it should be our aim" and he envisaged a force made up of 6 special day squadrons, 3 night squadrons carrying the largest possible bombs, and 26 day-and-night squadrons.

Limitations  
of the 1923  
programme

Thus the decisions taken in the summer of 1923 brought the home-based bomber force into existence, gave it a standard of strength, defined its strategical role, and went far towards settling its tactical composition. They suffered, nevertheless, from certain very marked limitations.

(1) It gave  
numerical  
parity only  
with the  
French  
striking  
force

They accepted in principle the necessity for a One-Power standard of air strength, yet in practice they made no attempt to attain full parity with the French Air Force, which was then "the strongest Air Force within striking distance of this country". Expenditure on Armaments was still too unpopular and war with France too unlikely, for the Government to commit itself to more than the first stage of the original scheme, especially as this was the most that could be achieved during the next three or four years. Yet the 52 squadrons of 594 aircraft would give a numerical parity only with the 596 aircraft which the French could use as an 'independent' striking force; it took no account of the 270 army co-operation machines which might also be employed in an air offensive against southern England.

(2) The 13  
'cadre'  
squadrons  
only 2nd  
line units

Furthermore, the parity aimed at was, even in this limited sense, only nominal, for the 13 A.A.F. and Special Reserve squadrons were in reality not first - but second-line units. They were manned by part-time volunteers and reservists, who came to practise flying at week-ends and for a fortnight in camp during the summer.

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- (1) Minutes of conference, 10 July 1923 - A.M. File S.22846/I14B.
- (2) Ibid., Enc., 14D.
- (3) Ibid., also, S.22910/I6A, 18.
- (4) A.M. Files S.22846/I14G; S.22910/19. Also 1st Revise of the Provisional Expansion Scheme, 29 Sept. 1923 - S.22846/I/21A.

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They were distributed upon a territorial, not an operational, plan, near to the great centres of population where they would be most readily accessible. In peacetime each A.A.F. squadron would normally have in use only two training and two Service type aircraft, the rest being held in store on its peace station until mobilisation should be ordered; and proper training as a squadron was possible only during the summer camp. Each Special Reserve squadron was kept upon the same basis, except that one of its three flight was manned by regular R.A.F. officers and men and provided with full Service equipment. (1) Thus, none of these thirteen squadrons, despite their members' zeal, could be more than cadre units; none would be completed, or fully manned and equipped, or moved to their war stations, until mobilisation had been ordered; none could be looked upon as a fully effective first-line unit during the crucial opening weeks of an air war. They were, in short, the Air Force equivalent of the Territorial Army.

(3) Real  
1st line  
strength  
of the bomber  
force

The effective ratio of immediately available first-line strength between the British home defence air force and the French 'independent' striking force was, then, not 4 to 4 but 3 to 4. Moreover, since all the thirteen cadre squadrons were bombers, the true first-line strength of the British bomber striking force - which according to accepted Air Staff doctrine was the vital element in the air defence of Great Britain - was not 35 squadrons, but only 22.

(4) The  
force not  
to be ready  
till 1930

Even this force would not be operationally effective at its full strength until 1930 at the earliest. The last of the 52 squadrons were, it is true, to be formed in 1928, but it would be another two years before they would all be adequately trained and fully equipped with reserves. The provision of reserves was not to begin until 1925 and would not be completed before 1930. (2) Without all the reserves allowed - the scale was no more than 100% of first-line strength in airframes and 150% in engines - the force would in war be a very rapidly wasting asset if it attempted to operate at full first-line strength from the outset.

(5) Ab  
initio  
training in  
squadrons

A similar delay resulted from the adoption, as an experiment and in order to avoid the expense of opening new Flying Training Schools, of the system of training officers and men ab initio in their squadrons. (3) So long as this experiment lasted, it meant that a squadron would be wholly occupied during the first year after its formation in giving its pilots their initial flying lessons on Avro trainer aircraft, and that the next year at least would be taken up by individual instruction in handling Service-type machines and by the first collective training of the squadron as a squadron. Hence, it would at the best be two years before the squadron began to be an effective first-line unit; before it could indulge in any advanced, specialised, activities; before it could take part in any operational defence exercises; before it could use its full Service equipment or be manned by fully competent military pilots.

(6) Effects  
upon the  
bomber  
squadrons

The first 18 of the 39 regular squadrons, which were to be formed by April 1925, were exempted from this training experiment. They were to be given their full initial establishment of Service aircraft as soon as they were formed, and they were to be manned from the first by pilots who had already received at least their initial flying training at the Flying Training Schools. But of those 18 squadrons only 9 were

/bombers,

(1) 1st Revise of the Provisional Expansion Scheme, 29 Sept. 1923 - A.M. File S.22846/I/21A.

(2) 2nd Revise of the Expansion Scheme, 12 June 1924 - A.M. File S.22846/I/24A.

(3) 1st Revise of the Expansion Scheme, 29 Sept. 1923 - A.M. File S.22846/I/21A.

bombers, so that once again it was the bomber force which suffered most from this experiment. Of the 35 bomber squadrons, 26 - as against only 8 of the 17 fighter squadrons - would be subjected to the delays which the experiment imposed, and 13 of those 26 would never in peace time be more than cadre squadrons.

(a) Defence Policy and the R.A.F.  
1923-1933

The limitations emphasised

Such were the nature, importance, and limitations of the 52 squadron programme of 1923. During the next ten years, although the nature of that programme, and the principles upon which it was founded, remained substantially unaltered, it was the limitations which were chiefly emphasised. That this was so was due primarily to the political and economic circumstances of the time and to the policy of economy and disarmament pursued by successive British Governments.

Political optimism

Until at least the end of 1931 there was little to justify or encourage preparedness for war. The appeasement of Franco-German differences, the signing of the Locarno Pact (October, 1925), the pacific temper of Japan, the friendliness of Italy, the growing preoccupation of Russia with internal problems, all made the possibility of war between the great Powers appear more remote than ever. (1) The co-operation at Geneva of Sir Austen Chamberlain, Briand, and Stresemann lent to the League of Nations an air of authority such as it had never previously possessed. And preparations for a great conference to produce international security through national disarmament were slowly ripening from 1925 onwards.

Economic anxiety

This confidence that peace among the great Powers was unlikely to be broken in the foreseeable future, was accompanied by a growing anxiety about Britain's economic and financial position. As soon as the Franco-German quarrel began to subside in 1924 the Chancellor of the Exchequer (Mr. Winston Churchill) had renewed the Treasury's pressure for defence economies. (2) In 1927 he again emphasised that "in existing financial circumstances it was absolutely necessary to pick and choose between matters that must be dealt with and those that could wait until times were more favourable." (3)

The 1931 Crisis

After the Wall Street collapse of October 1929, and especially after the resulting economic crisis had spread to Britain in September 1931, this anxiety grew still more urgent. For the economic crisis had also undermined confidence in international peace by fostering in Germany, Italy, and Japan an aggressive temper that first found vent in action in the Japanese seizure of Manchuria after the Mukden incident of September 1931. There arose the spectre of an international armaments race which might unbalance Britain's precariously balanced budget and perhaps lead to the disaster of a major war between the great Powers. For this reason the early 1930s witnessed a particularly determined effort by British governments to secure peace and economy through a general disarmament; and in the later years of the period 1923-1933 preparedness for war was encouraged even less than it had been in the earlier.

Basis of British Policy

All through those ten years, then, British defence policy aimed at economy and disarmament. The attendant risks were accepted

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- (1) Such was the tenor of Sir Austen Chamberlain's survey in the C.I.D. on 5 July 1928 - C.I.D. Minutes, 236th Meeting.
  - (2) See below, Appendix I.
  - (3) His statement was made in justification of his opposition to the immediate building of an airfield at Hong Kong - C.I.D. Minutes 225th Meeting, 6 April 1927.

with open eyes, (1) in reliance upon the system of international security embodied in the League of Nations and in the Locarno and other pacts. As a Cabinet Committee remarked in 1932, the League of Nations provided "the safeguard of peace that for many years has been held by successive Governments to justify the assumption underlying our defensive preparations, that there will be no war for ten years from any given date, (2) and the consequential low scale of armaments to which the three Defence Services have been reduced". (3) It was this which made the Government so acutely anxious to do nothing to discourage a general disarmament. For, as the Committee also pointed out, if the Disarmament Conference failed, the League of Nations would receive so shattering a blow that Britain "may then be faced with a situation in which the choice will lie between the rehabilitation of our armaments at a cost which we cannot afford and which British public opinion might be slow to authorise, and the acceptance of a situation in which France, fully armed, exercises hegemony in Europe". And behind this prospect of a French hegemony was the likelihood, far more alarming, of German rearmament. (4).

Effects of  
this Policy  
on the RAF

It was inevitable that the R.A.F., and especially the A.D.G.B. force, should suffer from the rigours of this policy. The only air force of any size "within striking distance of this country" before 1934 was the air force of France, and the Government was convinced that war with France "was inconceivable". (5) Other large air forces were, it is true, being built up after 1923 in the U.S.A., Italy, Japan, and Russia; but, except for "the one outstanding uncertainty" about Russian policy, war with any of these Powers, although perhaps not inconceivable except in the case of the U.S.A., was until 1931 extremely improbable. (6) Moreover, none of these air forces were within striking distance of England, so that none impinged upon the R.A.F.'s main strategical concern, the safeguarding of Great Britain in a European, home defence, war. Even if there were war with any of

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- (1) For example, the C.O.S. laid the position clearly before the Government in their 1928 Report (C.I.D. Paper 900-B), which was expressly designed "to leave the Government under no illusions as to the extent to which the Fighting Services are or are not in a position to discharge the responsibilities which might devolve upon them". Again, in 1931 the true situation must have been known to the leaders of all three political parties as well as to the Government, for the Three Party Committee, which sat during that summer to consider preparations for the coming Disarmament Conference, had before it very candid appreciations from each Chief of Staff (1st Sea Lord, C.I.D. Paper 1047-B; C.I.G.S., 1046-B; C.A.S., 1048-B). These give a most valuable account of Britain's defence position two years before Hitler came to power in Germany.
- (2) This version of the Ten Years Rule dated, in fact, only from July 1928 - see below, p. 34, and Appendix I.
- (3) Report on a proposal for a Mediterranean Locarno, 18 Jan. 1932 (C.I.D. Paper 1080-B, enclosure 1 = C.P. 27/32). This Committee consisted of the Prime Minister (Mr. Ramsey MacDonald), the Chancellor of the Exchequer (Mr. Neville Chamberlain) and the members of the earlier Cabinet Committee on preparations for the Disarmament Conference, i.e., the Secretaries of State for Foreign Affairs (Sir J. Simon), for the Dominions (Mr. J.H. Thomas), for War (Lord Hailsham) and for Air (Lord Londonderry), and the 1st Lord of the Admiralty (Sir B. Eyres-Monsell). It had been appointed on January 13.
- (4) Ibid.
- (5) Statement by Sir A. Chamberlain (Secretary of State for Foreign Affairs) to C.I.D., 5 July 1928 - C.I.D. Minutes, 236th Meeting.
- (6) Ibid.



these Powers, the R.A.F.'s share must for geographical reasons be a restricted and ancillary one: against Japan or Italy the main responsibility must rest upon the Navy, against Russia upon the Army. (1)

Retarding  
of the 52  
Squadron  
Programme

The R.A.F.'s 52 Squadron programme, therefore, had to suffer limitations and checks to its development no less than had the programme of the other Services. Originally the 52 squadrons were to have been completed by April 1928. On 3 December 1925, however, the Cabinet postponed the date of that completion until 1935. (2) This brought the air programme into line with the naval programme, with the Cabinet's ruling earlier in the year that the Admiralty, who were taking the Japanese navy as their yardstick, should work to the assumption that there would be no war with Japan during the next ten years. Four years later, on 11 December 1929, the date for completing the 52 squadrons was again postponed, this time until 1938. This was a natural outcome of the Cabinet's adoption in July 1928 of a suggestion made by the Chancellor of the Exchequer (Mr. Churchill) that, subject to annual review, "it should be assumed for the purpose of framing the Estimates of the Fighting Services that at any given date there will be no major war for ten years". This final and most extended version of the Ten Years Rule was confirmed in 1929, 1930, and 1931, and although the Chiefs of Staff in February 1932 recommended its withdrawal, the Cabinet did not effectively accept their recommendation until February 1933. (3) The continuance of this ruling and the fear of doing anything to spoil the prospects of the Disarmament Conference, which met in February 1932, caused a further slowing down of the 52 squadron programme. In the autumn of 1931 the Government accepted an armaments' truce and during that truce, which began on 1 November 1931 and was eventually prolonged until 31 March 1933, no new squadrons could be formed. (4)

Proposals  
to abolish  
bombing  
aircraft

Moreover, during these later years the whole future of the bomber force, indeed of the R.A.F., was brought into debate. The Disarmament Conference was seeking to abolish all offensive weapons - tanks and heavy guns as well as aircraft - and proposals for abolishing that most obviously offensive weapon, the bomber, reached the advanced stage of detailed discussion between the Foreign Office and Staffs of the Powers. Nor was this all. The technical peculiarities which made an aeroplane of any type "an offensive, not a defensive, weapon" led to the still more sweeping suggestion that all military aircraft should be abolished. These proposals unfortunately all came to nothing, but they delayed for seventeen months the development of Britain's metropolitan air force, seventeen months whose loss was to be acutely felt some seven or eight years later.

Effects  
in the  
bomber  
force

The ten years from 1923 to 1933 were, then, a discouraging period for all the Fighting Services, and particularly for the R.A.F.'s home-based bomber force. It can have been none too easy to maintain a high standard of preparedness and to produce that intense volume of technical and scientific research which preparedness implied, when war was not going to break out for at least another ten years and when the only standard of comparison was an air force against which hostilities were 'inconceivable'. The Ten Years Rule at least took away all sense of urgency, even though it did not, as Sir Charles Madden had feared it might do in the Navy, so lower zest and efficiency that "paint and polish came before gunnery." (5) To

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- (1) and see below p. 41, footnote (4)
- (2) Cabinet 57(25), quoted by Sir M. Hankey in C.I.D. Paper 892-B.
- (3) For these successive developments of the Ten Years Rule, see below Appendix I.
- (4) A.M. File S. 22846/II/66B, 79A.
- (5) C.I.D. Minutes, 236th Meeting, 5 July, 1928.

the bomber squadrons the later years must have been particularly testing, for what inducement was there to improve bombing technique and tactics when every morrow might bring news of an agreement for the total abolition of bombing aircraft?(1)

Emphasis on  
mere numbers  
and on the  
"all-rounder"

Besides producing so discouraging an atmosphere, the circumstances of those times had more positive results. By repeatedly delaying the formation of squadrons, they kept the bomber force throughout most of the period so small that it could not train and exercise upon a scale large enough to reveal more than the comparatively elementary problems of its task. They encouraged, indeed they almost compelled, the R.A.F. to place all its resources "in the shop window". The combination of a publicly declared One-Power Standard of strength with a rigidly enforced economy meant that a first-line facade had to be built up at the expense of reserves, of research and experiment, and of advanced training. The need to show the greatest possible return for the money so sparingly provided also fostered what, from the bombers' point of view, was an unfortunate exaggeration of the desire that aircraft and aircrews should so far as possible both be made up of "all-rounders". It led to a desire that nearly all the bomber squadrons should be equally capable of operating by day or by night and even that most of them should be equipped with the same light, single-engined, machines as the two-seater fighter squadrons.(2) This helped to concentrate attention upon light bombers of no great range or hitting power and to delay the development of more powerful aero-engines and of adequate heavy (and even medium) bombers. It helped to narrow instead of extending the selection of bombs available. It also meant that the large proportion of R.A.F. officers who held only short-service commissions had little time or opportunity to acquire a special competence in any one particular type of duty.

Research  
concentra-  
ted upon  
defensive  
measures

There was another feature of those times which helped to retard the development of the bomber force. This was, that the Air Ministry devoted most of the scanty sums available for scientific and technical research to experiments designed to improve the defensive rather than the offensive power of the A.D.G.B. forces. This may appear a curious policy to pursue at a time when the doctrine of the offensive was still the accepted gospel. Yet events were to prove that it was the highest wisdom. For two courses were open, and lack of money made it impossible to pursue both. One course was to assume that nothing was likely to occur to alter the pessimistic premises upon which the doctrine of the offensive rested; to assume that the bombers would always get through and therefore to concentrate upon perfecting counter-offensive measures and weapons. The other course was to concentrate upon research and experiments designed to invalidate those premises and to produce effective means of stopping the bombers from getting through except at a price which they would not long be willing to pay. Had war been imminent, the first course must have been given priority; but the Ten Years Rule, with all its faults, justified the choice of the second.

It was this second course which the Committee of Imperial Defence and the Air Staff had followed. By 1933

- (1) Lord Londonderry records that, when he was Secretary of State for Air, "there was ill-disguised discontent in the Air Ministry. Everybody was dissatisfied and many were positively apprehensive of the future....By no means the least of my difficulties was maintaining the spirit of the R.A.F., both active and administrative, when proposals for the abolition of Air Forces were continually appearing in the newspapers and it was natural that parents should wonder whether the R.A.F. could provide a career for their sons" - Wings of Destiny, p.65.
- (2) This was proposed by the A.O.C.-in-C., A.D.G.B. (Sir W.G. Salmond) in 1932, though the proposal was eventually rejected - A.M. File S.31937.

1933 experiments in improved methods of aircraft detection had already reached a point from which a faint possibility of the beginnings of radiolocation could be discerned. Directional wireless telegraphy, though its range was as yet too short to be of much help to long-range bombers, was being investigated for defensive purposes. Ground-to-air and aircraft-to-aircraft radio-telephony was beginning to develop, with its attendant possibilities of more exact and systematic "fighter control" and of improved accuracy and better tactics in bomber interception. (1) Specifications were already being prepared which were to produce, in the eight-gun Hurricane and Spitfire, fighter aircraft with the fire power to achieve decisive results in a single attack and a margin of speed that would enable them to regain position and repeatedly renew those attacks. (2) Even one of the few offensive inventions of those days, the wireless-controlled pilotless aircraft, was, partly owing to its still limited range, being studied as a possible ramming weapon for breaking up bomber formations. (3) In addition, some consideration had been given to the use of balloon barrages; (4) and the Observer Corps had been organised upon a skeleton basis.

Its justification

In 1933 most of these researches were still too much in their infancy to justify any reconsideration of the premises underlying the doctrine of the offensive. But they were already beginning to bear fruit. Their growth had sucked away money and energy from the study of the offensive, of bombing, and the effect of this starving of research on the offensive side was to be felt for another ten years. Yet in enumerating the deficiencies of the bomber force, it must not be forgotten that those deficiencies were but a small price to pay for victory in the Battle of Britain.

(d) The Bomber Force in 1933.

Only 28 of the 35 squadrons formed

On 31 March 1933, when the armaments truce expired, Britain's home-based air force was still a very long way from even a nominal, first-line, parity with the strongest air force within reach of the United Kingdom. No more than 41 of the 52 squadrons existed, even on paper. (5) And it was in the offensive arm that the deficiencies were most marked. The doctrine of the offensive was as valid as ever - indeed, its premises had been strengthened rather than weakened since 1923 (6) - yet only 28 of the proposed 35 bomber squadrons had so far been formed and 12 of these were Auxiliary and Special Reserve units which, by definition, were the least thoroughly trained.

The day bombers: regular squadrons

Even these figures give an exaggerated idea of the true position. Of the 28 bomber squadrons so far formed, 21 were day bombers. Of these 21, only 10 were Regular units. Of these 10, two (Nos. 15 and 22) were engaged on experimental work at the Martlesham Aircraft and Armament Experimental Establishment, had no proper equipment, and were "skeleton units merely recorded as squadrons in the Air Force List"; (7) and two more were earmarked for the first air

/ contingent

- (1) The beginnings of these researches and their early progress are described in the Report of the Anti-Aircraft Research Sub-Committee of the C.I.D., 24 March 1928 - C.I.D. Paper 866-A. This sub-committee was the successor to the Haldane Committee of 1925 - C.I.D. Minutes, 234th Meeting, 29 March 1928.
- (2) A.M. Files S.30635, S.32445 (especially enclosures 1A and 19A) illustrate the Air Staff's efforts to secure these two advantages.
- (3) C.I.D. Paper 866-A.
- (4) Ibid.
- (5) For details of the dates of formation and of the equipment of the home-based bomber squadrons, see below, Appendix II.
- (6) This was largely due to the increase in day bomber speeds, which had outpaced the increase in fighter speeds. As late as 1 May 1934 the C.A.S. remarked that "owing to the relatively high increase in the performance of the bomber, the effectiveness of fighter defence is getting less" - A.M. File S.35237/6.
- (7) D.O.S.D. to C.A.S., 5 Jan. 1933 - A.M. File S.22846/II/72.

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contingent of the Field (or Expeditionary) Force, would probably go overseas immediately after the outbreak of war, and had not been counted among the 52 squadrons until January 1930. (1) So there were no more than six Regular day bomber squadrons fully formed and clearly available for home defence: and of these six, three were only just becoming operationally efficient; for two of them had been formed as recently as October 1931 and the other in April 1931. (2)

Non-regular day bombers

The remaining eleven day bomber squadrons belonged to the A.A.F. and the Special Reserve. One of them (No. 607) was not yet an effective unit, for until October 1932 it had existed only on paper. (3) Two more were considerably under strength in aircraft. (4) So no more than eight of these eleven squadrons were fully formed, and even those eight, of course, could not be regarded as full first-line units during the first weeks of war.

The night bombers

The position of the seven night bomber squadrons was in one way somewhat better. Five were Regular units, and these five and one of the two Special Reserve squadrons had all been in existence for some years. Yet the night bomber force was very small. The original intention, formulated in 1925, was that it should consist of 15 squadrons, as against the day bombers' 20 squadrons. (5) Changes of policy about the duties of the non-regular squadrons had, however, completely upset this ratio. Early in 1929 it had been decided that A.A.F. units were not suitable for night work, (6) and as eight A.A.F. and only five Special Reserve squadrons had been formed instead of six A.A.F. and seven Special Reserve, this weighted the balance heavily in favour of the day bombers. (7) So, instead of a force of twelve night and sixteen day bomber squadrons which the 15:20 ratio would have required, there were only seven night as against twenty-one day squadrons.

Effective strength, March 1933

At the end of March 1933, then, Britain's fully effective and clearly available first-line home defence bomber force consisted of six day and five night bomber squadrons - and a year earlier the figure would have been only three and five. (8) Behind these, there were eight day and two night bomber squadrons of the A.A.F. and Special Reserve. These squadrons, by their annual fortnight in camp and their enthusiasm at week-ends, had reached a standard high enough to enable them to take an exceedingly creditable part in the A.D.G.B. Command's annual exercises, (9) but by their terms of service they were bound to be in the nature of second-line units. (10)

/ If

- (1) Note of 7 Jan. 1930 - A.M. File S. 22846/II/1: also 7th Revise of Expansion Scheme, 1 April 1930 - *ibid.* enclosure 12A.
- (2) Nos. 18 and 57 in October, No. 40 in April. Nos. 18 and 57 were still not fully trained in Nov. 1932 - A.M. File S. 30973/24A.
- (3) No. 607 had nominally been formed in March 1930, but it was not until October 1932 that the nucleus of Regular officers and men was sent to its station and it "first began to function". - O.R.B. of No. 1 A.D. Group, under date 1.10.32.
- (4) A.M. File S. 30285/5.
- (5) 3rd Revise of the Expansion Scheme, 1 April 1925 - A.M. File S. 22846/I/34A.
- (6) Quoted in a minute by D.O.S.D., 14 Feb. 1929 - *ibid.* minute 59.
- (7) In March 1929 the D.C.A.S. minuted that this disproportion need not be regarded too seriously since "our aim is still to have one type" for both day and night bombing - and in any event, the Ten Years Rule made operational considerations less decisive - *ibid.* minute 60.
- (8) i.e. excluding the three day bomber squadrons only formed in 1931.
- (9) In the 1930 Exercises Nos. 600, 601 and 605 put in more than 450 hours flying and made two 'long' raids against different targets in the same day. In the 1933 Exercises No. 602 did more flying than any other squadron and was placed third in the bombing results - No. 1 A.D. Group O.R.B., 1930 and 1933.
- (10) They were so regarded by the C.A.S. in his Appreciation of 27th April 1931 - C.I.D. Paper 1048-B.

Lack of reserves

If the bomber force was weak in first-line strength, it was yet weaker in reserves. All the reserve aircraft that were available were the initial reserves (the I.R.) of the squadrons. These were supposed to total 25% of the initial establishment (the I.E.); that is to say, a squadron of 12 aircraft I.E. should have 3 aircraft I.R. This was enough only to meet the ordinary peace-time wastage from accidents and the wearing out of machines. In war the wastage would obviously be very much higher and, if the force was to continue to operate at its full I.E. strength, it would need a war reserve sufficient to tide over the period before the aircraft industry got into its war-time stride and produced an output equal to the total wastage. The A.D.G.B. force, however, possessed no war reserve, for, as the Air Member for Supply and Research had remarked in January 1930, "the amount of money we have allotted to us is quite insufficient to build up any reserves at all". (1) A minute by the Director of Operations and Staff Duties in February 1933 is perhaps the most striking commentary on the position. He pointed out that the despatch overseas of the two bomber and one fighter squadrons which, with three Army Co-operation squadrons, would form Contingent A of the Expeditionary Force, would take all the I.R. aircraft of the other squadrons and would so deplete home stocks of aircraft spares and general stores that it would make operational flying for home defence practically impossible. To despatch Contingent B - two more fighter and two more bomber squadrons - would "completely disorganise A.D.G.B.". (2) The position with regard to reserves of pilots was apparently little better. The whole situation was summed up by the Defence Requirements Committee in their Report of 28 February 1934. "It is significant to note", that Report said, "that both the Army and the Royal Air Force have been compelled during the regime of the Ten Year Rule to hold such small stocks of War Reserves that at the present time they are in the alarming position of being unable to take part in a major war with the prospect of maintaining themselves for more than a few weeks" (3)

Limitations of range and load

A handicap no less serious was the limited range and load of the aircraft with which this handful of squadrons was equipped. The gospel of 'independent' air power was being preached as loudly as ever and considerable pains had been taken to ensure the administrative independence of A.D.G.B. Yet that other, no less vital, independence which comes from the possession of bombers with adequate range and endurance, had been provided in only an exiguous measure. (4) The craving for an all-purposes, day-and-night, bomber, natural child of strict economy, had helped to produce a striking force in which eighteen of the twenty-six squadrons (5) were equipped with light, short-ranged, two-seater, single-engined aircraft, mostly Harts and Wapitis. The Wapiti, with which six of the eight A.A.F. squadrons were still equipped in 1933, was an overseas General Purpose type capable of barely 120 m.p.h. and was admittedly a stop-gap. (6) Yet even the Hart, though 30 m.p.h. faster, could carry only

/ four

- (1) A.M. File S.26021/8. The history of the abortive attempts to find a way to build up a war reserve is given on Files S.26021, 32372, 36970 and 33376.
- (2) A.M. File S.30973/33.
- (3) C.I.D. Paper 1147-B (= D.R.C. Paper 14).
- (4) There had, of course, been a number of notable long distance flights by R.A.F. machines and special flights or squadrons between 1919 and 1933. The immediate influence of these upon the home-based bomber force is not, however, very apparent.
- (5) Or, including Nos. 15 and 22 which would also be equipped with light day bombers when mobilised, 20 out of 28.
- (6) A.M. File S.30285/1.

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four 112 lb or two 230 lb bombs as its normal load and could carry them only to targets within 250 miles of its base. (1) It could, that is to say, just reach Paris and the industrial area around Lille from the regular bases behind or on the flanks of the A.D.G.B. Aircraft Fighting Zone, without having to re-fuel at advanced landing grounds on the exposed southern coast of England.

Specification P.27/32

Nor was anything much better in sight. A specification, P.27/32, for an aircraft to replace the Hart, was prepared in 1932 and issued in the summer of 1933. But it only called for a range, out and home, of 600 miles at 195 m.p.h. with 1,250 lb of bombs, "for a range which will enable day bombers to reach targets on an arc from Paris to Amsterdam from all regular day bombing stations". (2) This P.27/32, moreover, bore little resemblance to the Hart and almost exactly duplicated the specification for a twin-engined replacement of the Sidestrand, a type with which one squadron only had been equipped and which was the nearest approach yet made to the day-and-night bomber. The Sidestrand replacement itself was to have a range of only 720 miles out and home with 1,000 lb of bombs. (3) The P.27/32, therefore, although it might prove useful for testing single-engined against twin-engined types (4) in the effort to evolve a satisfactory day-and-night bomber, had very little reason for existence. It certainly could not, as was intended, produce that day bomber of exceptionally high performance, (5) which had been envisaged in 1923 and was still lacking. It was therefore decided in July 1933 that the P.27/32 specification, while still calling for a single-engined machine, should be amended to give the same requirements of range and load as those for the Sidestrand replacement. At the same time it was decided that an attempt should be made in 1934 towards getting a smaller, single-engined, high performance, day bomber to carry only 500 lb of bombs for only 600 miles out and home. (6)

Preference for light bombers

Thus the Air Staff were still wedded to the idea of the short-ranged light bomber. Even as late as 27 February 1934 the C.A.S. minuted that "what I foresee in the future is that a type, such as the Sidestrand replacement, will prove suitable both as a day and a night bomber"; when this happened, he would equip five Regular squadrons and all the five Special Reserve squadrons with this type and "this would leave us with 10 Heavy Night bombers and 15 Light Bombers of which 5 would be Auxiliary Squadrons". (7) So, official policy as late as February 1934 still held out little hope of any early provision of day bombers with really adequate range and load. The practical inconveniences attendant upon inadequate range had long been felt in desert operations in Egypt, Iraq, and India; (8) and the Russians were known to be building a considerable fleet of four-engined heavy bombers which, if England and Russia should go to war, would easily out-range the squadrons from A.D.G.B. upon whose assistance the air

/ side

- (1) A.M. Files S.32367/6B, 20A; S.31154/1, 1B; S.35247/1A.
- (2) Minutes by D.C.A.S., 15 June 1932 - A.M. File S.22846/II/67.  
Type requirement, April 1932 - S.31154/1B; approved by C.A.S.  
26 April 1932 - ibid, minute 1; Specification P.27/32 issued  
12 April 1933 - ibid, enclosure 19A; in contractor's hands by  
June 1933 - ibid, minute 20.
- (3) Ibid, minutes 5, 6.
- (4) Ibid, enclosure 5A.
- (5) Ibid, minute 20.
- (6) Ibid, minutes 20, 21, 23. The amended P.27/32 specification was eventually issued on 24 Oct. 1933 - ibid, enclosure 28A.
- (7) A.M. File S.22846/II/89. By that time it had been decided that 3 of the A.A.F. squadrons were to be converted to fighters.
- (8) e.g. a minute by the C.A.S. (Trenchard) of 13 March 1928 emphasised this point - A.M. File S.23577/13A.

side of the Defence of India Plan chiefly depended (1). Nevertheless, the light, short-ranged, day bomber still retained its high place in the R.A.F.'s affections thanks to the financial economy imposed by the Government and, perhaps, to the strong but limited traditions inherited from the Royal Flying Corps.

The heavy bomber position

It seems difficult to escape the conclusion that economy and this affection for the light bomber had weakened the sense of urgency in the R.A.F.'s researches into the development of heavier bombers of greater endurance. At the same time, no strong stimulus could come from British civil aviation which was still comparatively backward and had but limited opportunities. (2) The heavy bomber position was, in fact, approaching a crisis. Even in 1923 Members of Parliament had accused the Air Ministry of neglecting to develop high-powered aero-engines, the essential nucleus around which all aeroplane development must revolve. At that time, however, the Air Staff were certainly alive to the need. The C.A.S. had emphasised that a machine capable of carrying a 4,000 lb bomb might perhaps be required (3). The A.O.C. Inland Area had also urged the need for a new night bomber with an 800 mile range out and home and capable of taking a 1,500 lb or 2,000 lb bomb. "We must", he said, "design our future machines in accordance with our strategical and tactical policy, which we are now in a position to do, and so obviate the necessity of modifying our tactics and strategy to suit the machines available". (4) This was wise advice, but it was little heeded during the next ten years. The great four-engined Handley Page V.1500 of 1918 had no successor and the three squadrons of 'Giant' bombers for which the C.A.S. had provided in 1923 had never materialised.

Virginias and Heyfords

Instead, in March 1933 the home defence night bomber squadrons were still equipped with Vickers Virginia twin-engined aircraft (5) which had first come into service in 1923 as replacements for the Vickers Vimy, itself designed in 1917. Replacements for the Virginia were certainly in sight in the Heyford and the Hendon, but it was not until January 1934 that the first Heyfords went into service and the Hendons did not arrive until November. (6) Nor did either offer any very substantial improvement upon the Virginia in range or bomb-load. Beyond them, the disquieting nature of the more distant prospect may be judged from a minute by the D.C.A.S. "At present", he wrote on 28 August 1934, "we have to rely entirely for our heavy bomber

/replacement

- (1) These Russian machines were the T.B.3, which an R.A.F. Mission saw in April 1933. They had four 600 H.P. engines, a speed of 124 m.p.h., and could carry 3,360 lb of bombs for 675 miles out and home or 1,000 lb for 1,240 miles. Seventy of them were believed to be in commission - C.O.S. Papers 313, 316 (= C.I.D. Paper 1127-B).
- (2) So long as aircraft ranges had to be measured in hundreds of miles instead of thousands, this was almost inevitable. As the C.A.S. pointed out in 1931 (C.I.D. Paper 1048-B) in a small and highly developed country such as the British Isles civil aviation could not easily compete with other and longer-established forms of transport, whereas on the continents of Europe and America the greater distances gave the aeroplane, because of its greater speed, a definite economic advantage. It was only when, just before the War, aircraft ranges grew sufficiently to encourage the establishment of inter-continental, as opposed to transcontinental, air lines, that true long-distance flying over Imperial air routes began to give British civil aviation its opportunity.
- (3) Minutes of a conference, 19 July 1923 - A.M. File S.22846/I/14D.
- (4) 23 July 1923 - *ibid.*, enclosure 16A.
- (5) Except for No. 99 which had Hinaidis of a similar vintage.
- (6) See below, Appendix II.



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replacement on a single aircraft to be produced, to an ambitious specification, by Armstrongs. If this aircraft proves unsatisfactory, we shall be very badly let down. We are already very behindhand in the performance of our heavy bombers and we are gambling our future on this single throw".(1) It usually took about eight and a half years to evolve a new heavy bomber,(2) so if the Armstrong machine failed, Britain might have no suitable machine of that class in service until 1941.(3)

Such were some of the results of prolonged and drastic economy, of the inveterate Ten Years Rule, and of the devotion to the ideal of the "all rounder". The bomber force, which had been built up with the air force of France as its yardstick and with the destruction of industrial targets as its primary strategical purpose, could reach only the northern parts of France. The iron-works of Lorraine, the industries around Nancy and Toulouse, most of the ports and naval bases on the French Atlantic coast and all those on the Mediterranean, were beyond the reach of the light day bombers which made up three-quarters of the existing squadrons: and only a few of these targets were within reach of the night bombers. Should the air force of France, England's nearest continental neighbour, be replaced as the yardstick by the air force of some other country with whom war was not 'inconceivable', the British bomber force would be powerless to strike a blow unless it sacrificed part of its 'independence' and, like the so-called Independent Force of 1918, operated from bases behind the armies of a continental ally.

Lack of  
detailed  
plans

The truth was that equipment had again preceded planning. The general strategical purpose for which the home-based bomber squadrons existed was clear: it was, to conduct the air counter-offensive upon which the air defence of Great Britain must chiefly depend in a European, home defence, war. But there were no detailed plans for such a war.(4) Detailed plans presume the existence of a potential enemy, and, at least until 1933, such an enemy did not exist in Europe. France, who had a powerful air force, was not to be regarded as a potential enemy and Germany, who alone among the major European Powers might have qualified for such a role, had no air force. There were, therefore, no detailed plans for any European war.

Lack of  
target  
intelligence

Not only were there no plans, but also the most essential kind of intelligence for forming such plans was lacking. The Air Ministry, of course, had a good deal of information about the strength, character, and dispositions of the French and other air forces. But the primary targets of a bombing offensive would, it was generally agreed, be the enemy's war industries. The greatest need of all was therefore for industrial intelligence, and until 1929 no organisation existed whose primary duty was to collect and

/ sift

- (1) A.M. File S.32445/17B.
- (2) Minute by F.O.1 to D.C.A.S., 16 June 1933 - A.M. File S.32372/1.
- (3) D.D.O.I. to D.C.A.S., 12 Oct. 1934 - A.M. File S.34932/1A.
- (4) The only major war plans in existence in 1933 were:- (1) the Far Eastern Plan, elaborated after the Manchurian crisis of 1931-2; this was almost entirely a naval plan, the R.A.F. being called upon for little more than local defence, reconnaissance, and naval co-operation. (2) The Defence of India plan, approved in general outline by the C.I.D. on 2 May 1929 (C.I.D. Minutes, 242nd meeting, minute 3): this was predominantly an Army plan, although it called for the despatch to India of 24 fighter and bomber squadrons from A.D.G.B. for operations against the Russian army and air force bases and lines of communication.

sift such intelligence and to study the industrial geography and war potential of foreign powers.<sup>(1)</sup> Even after the Committee of Imperial Defence established its sub-committee on Industrial Intelligence in Foreign Countries in 1929 and gave it a permanent, whole-time staff, the Industrial Intelligence Centre, in 1931,<sup>(2)</sup> such work progressed but slowly. The Centre's staff was small, its task was immense, and it naturally did not begin by studying so unlikely an enemy as France. It had, moreover, to supply information for all three Services and was not concerned exclusively with intelligence about air targets, although the Secretary of State for Air had asked that "it should bear in mind the points raised by the Air Staff in regard to the study of objectives which might provide suitable targets for air attack in potentially hostile countries".<sup>(3)</sup> By 1933 the organisation was getting into its stride and beginning to produce valuable reports, but still those reports did not deal with France, the country against whose air force the A.D.G.B. squadrons had to measure themselves. There was, therefore, no detailed, digested, study to show just how decisively French war industry could be crippled by a bomber force which could reach only so far as Paris and Lille; there was no precise definition of targets to define exactly what weight of attack or what type of bombs would be required at any particular point. The bomber force's equipment could not be closely related to the targets against which it would have to be employed in a European war because those targets were not themselves precisely known.

The  
Defence  
of India  
Plan

These, of course, were handicaps from which a Fighting Service must always suffer during a period so pacific that no potential enemy is in view. Before 1933, however, they were exaggerated by the fact that the home-based bomber force, in addition to its primary home defence role, had also a secondary role. It had to serve as a general Imperial air reserve behind Britain's extra-European air forces. And a detailed plan for the conduct of one possible function of this secondary role did exist from 1929 onwards. This was the Defence of India Plan which called, in the event of a war against Russia, for the despatch of twenty-four of A.D.G.B.'s fighter and bomber squadrons to assist the Army to preserve the independence of Afghanistan and to protect the northern frontiers of India.<sup>(4)</sup> The existence of this secondary plan at a time when no primary plans existed, made the influence of the bomber force's secondary role upon the character of its equipment more marked than it might otherwise have been. And that influence again favoured the light bomber. For in a war fought among the wild and economically backward regions on the Afghan borders, the Air Force's work would be predominantly army co-operation: maintenance and landing facilities would be primitive and light, handy, easily serviced aircraft would be at a premium.<sup>(5)</sup> A.D.G.B.'s secondary commitment in India thus pulled the same way as Treasury economy. Both favoured the light bomber which, besides being cheap to build, to man, and to maintain, needed for its operation only a small airfield, only a small hangar, and no elaborate prepared runway.

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- (1) C.I.D. Minutes, 238th Meeting, 8 Nov. 1928; Memorandum by C.A.S., C.I.D. Paper 909-B.
- (2) D.C.O.S. Report on central machinery for co-ordination of intelligence, 1 Jan. 1936 - C.O.S. 420(D.C.), enclosed in C.I.D. Paper 1208-B.
- (3) C.I.D. Minutes, 238th Meeting, 8 Nov. 1928.
- (4) An outline of this plan, and of the R.A.F.'s ability to execute it, is given in the C.O.S. annual report for 1933, 12 Oct. 1933 - C.O.S. 310 (C.I.D. Paper 1113-B).
- (5) This was one of the arguments advanced in favour of retaining the light bomber squadrons in Expansion Scheme 'A' of 1934 - A.M. File S.22846/III/2A.

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Effects of  
the force's  
small size  
upon  
tactical  
Development

The absence of detailed plans for the execution of the bomber force's primary task was not compensated by any great opportunities for realistic and large-scale manoeuvres. The stimulus of adequate tactical experiment was thus denied it no less than the stimulus of detailed strategical planning. For an Air Force, like an Army or a Navy, can derive only a limited value from its exercises or manoeuvres if those exercises have to be conducted upon a scale and under conditions that bear little relation to the scale and conditions of its probable operation in war. This was perhaps where the Ten Years Rule and the repeated delays in the formations of the fifty-two squadrons were most harmful to the bomber force. Mr. Churchill, in pressing for the acceptance of the 1928 version of the Ten Years Rule, had claimed that "it would not in any way hamper the development of ideas but would check mass production until the situation demanded it".<sup>(1)</sup> Yet, as the Secretary of State for Air (Sir Samuel Hoare) had feared<sup>(2)</sup> and as events were to show, the development of ideas was bound up with the provision of adequate numbers of effective squadrons.

Effects  
upon staff  
experience

The smallness of the bomber force was a serious handicap to higher training in practical staff work and to the development of tactical experiment upon an adequate and realistic scale. Until the Oxford Area was formed in October 1933, only one of the three Bombing Areas was in existence. No.1 Air Defence Group, which administered the A.A.F. and Special Reserve squadrons, could be regarded as the nucleus of a second Area Command headquarters,<sup>(3)</sup> but its duties gave it little experience of operational staff work and the problems and character of the non-regular squadrons were sufficiently distinct to give the Group a somewhat specialised outlook.<sup>(4)</sup>

Effect  
upon  
exercises

Again, although the A.D.G.B. Command held annual air exercises, for many years the forces which could be engaged were too small, the crews too raw, the few days allotted too short, and the exercises themselves still too novel for the more advanced problems of large-scale bombing tactics to be at all deeply investigated. Annual practice camps, annual R.A.F. and station Displays, and occasional local exercises with other squadrons or with Army anti-aircraft forces, were of a still more limited character and it was not until 1930 at the earliest that even the more experienced squadrons began to get any adequate training in operations involving forces of greater than

/squadron

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- (1) C.I.D. Minutes, 236th Meeting, 5 July 1928.
  - (2) Ibid.
  - (3) A.M. File S.22846/II/64A, 73.
  - (4) Ibid., enclosures 77A, 77B.

squadron or wing strength. (1) The marked, and comparatively sudden, increase in the number of tactical and technical discussions which found their way on to Air Ministry files from the latter part of 1932 onwards reflects the growing scale and value of the A.D.G.B. or Area exercises no less than it reflects the emergence of a potential enemy in the German Air Force.

Progress of  
day bombing  
tactics

It was in day bombing tactics that most progress had been made. The Training Manuals laid down with considerable precision which types of targets could be attacked most effectively by high level, and which by low level bombing; which required dive bombing; and what formations and methods

/of approach

- (1) These points may be illustrated from the O.R.B. of No.12(B) Sqn. for 1928 and 1930. No.12(B) Sqn. had been formed in 1923 and was placed first in all day bomber squadron competitions in 1928, 1929 and 1930. It was stationed at Andover. The exercises, etc., in which it took part were:-

1928

- 22.6.28. Andover Display - close formation flying, and 'dive past' by flights.
- 15.7.28. Hendon Display.
- 4.7.28 to 7.7.28. Blackpool Display.
- 21.8.28 to 14.9.28. North Coates annual practice camp; bad weather prevented completion of programme.
- 16.9.28 to 21.9.28. Army Manoeuvres. Only 3 reconnaissance and bombing flights. "There was a marked lack of interest in most of the exercise as the unit was sent to reconnoitre over country not occupied by troops and to bomb other troops who could take no decisive part in the action".

1930

- 17.3.30. Wessex area air pilotage, signals, and photographic exercise: with 4 other sqdns.
- 31.3.30. to 3.4.30. Camera obscura exercise: with other sqdns: 9 raids on Birmingham and London; average altitude 6,400 ft.
- 20.5.30. & 27.5.30. Tactical exercise with Fighting Area: 2 raids on Watford via Selsey Bill. "Weather conditions did not permit the raids being carried out at any great height, 3,000 ft. being the average height. Interception was attempted by the Fighter Squadrons with indifferent success owing to the superior speed of the bombers".
- 5.6.30 to 19.6.30. At Bircham Newton for Display Practice.
- 20.6.30. Andover Display: with 2 other sqdns.
- 28.6.30. Hendon Display.
- 31.7.30 and 1.8.30. Tactical exercises with Fighting Area: 2 raids on Watford, one via Brighton and Guildford, other via Selsey Bill. Fighter interception fairly successful one day, unsuccessful the other.
- 11.8.30 to 15.8.30. A.D.G.B. Air Exercises of 1930: made 4 sqdn. raids, 6 flight raids, 9 reconnaissance patrols.
- 18.8.30 to 27.9.30. North Coates annual practice camp.
- 29.9.30 to 1.10.30. Exercises with No.1 A.D. Brigade: sqdn. and flight raids and reconnaissance patrols "when the weather permitted".

of approach, attack, and getaway were most suitable to each. (1) Yet a good deal of this paper precision was deceptive since few, if any, of the squadrons had actually practised all the methods prescribed. They were skilled at flying in formations of various patterns and in bombing in formation from medium heights up to 10,000 or even 12,000 feet. But it was not until No.12(B) Squadron began its experiments in the summer of 1932 that any serious practical investigation began into the best methods of pattern bombing. (2) Bombing from really low levels was also an unplumbed mystery until 1935 and the standard bomb-sights were useless below 2,000 or 3,000 feet. (3) Few squadrons, again, had ever practised attacks upon moving targets until in 1933 Nos.12 and 33(B) squadrons did so, from heights up to 16,000 feet, against a moving motor-boat in connection with the Centurion bombing trials. (4) As it was with bombing, so it was with defensive tactics. Command and other exercises and fighter affiliation practices with neighbouring fighter squadrons had added something to the bomber crews' experience in dealing with intercepting fighters. Nevertheless, in the absence of an adequate camera-gun by which the results of those mock combats might be assessed with reasonable accuracy, (5) such experience served rather to practise the fighters in interception than the bombers in self-defence. In the annual Exercises it was usual for the fighters to intercept about half of the raiding bombers, (6) but there was no means of estimating accurately how many of the intercepted machines would have been shot down or how they might best have defended themselves. There could still be no convincing answer to the vital question of how, and how often, would the day bombers be able to fight their way through without fighter cover.

Progress of  
night bomb-  
ing tactics

In night bombing tactics progress was slow. The night bomber squadrons still practised their attacks from the low levels and by the one-aircraft-at-a-time methods customary during the War of 1914-1918. Some experiments had, however, been made in flying in formation at night. In this the initiative came from the squadrons, for until the autumn of 1926 the official Flying Training Manual (7) described night formation flying as not feasible and both the Air Staff and Commands were decidedly sceptical about its value even if it could be done. The squadrons which demonstrated that it could, at any rate, be done, were Nos.45 and 55 in Iraq and No.58 at Worthy Down in England. All had proved that "not only is it feasible but it is comparatively easy" on any night when an average pilot could fly at all. (8) No.45 Squadron, using hull and navigation lights, had flown in formations of three and even of five: they had, in addition, successfully practised night bombing in line astern, though the bomb-dropping had not been by formations but had been "bombing in company", the machines following each other in and each one doing its own bomb-aiming. (9) No.58 Squadron, which had been formed only in 1924, had, under Squadron-Leader Longton and Squadron-Leader A.H. Harris, used a blue "steaming light" similar to that used by the Navy during the War of 1914-1918 and had found that on moonlit nights no illumination at all was necessary. (10) Probably as a result of these experiments, a conference of bomber squadron-leaders and flight-lieutenants, held at the Armament and Gunnery School, had urged that formation flying should become a regular part of the night bombers' training; but the A.O.C. Inland Area had ruled that the time was not yet ripe. (11)

/An

- (1) A.P.874 (ed.1925).
- (2) No.12(B) Sqdn. O.R.B., under dates June, Sept. and 5 December,1932; Report on pattern bombing trials 1932.
- (3) A.M. File S.35130; No.12(B) Sqdn. O.R.B., 1935.
- (4) No.12(B) Sqdn. O.R.B., 1933.
- (5) Statement by A.O.C., Fighting Area (A.V.M. Joubert de la Ferte), 26 Oct. 1934 - A.M. File S.34572/I/1A.
- (6) Ibid.
- (7) A.P.874.
- (8) Report by S/L A.H. Harris, 4 June 1926 - A.M. File 688909/26/7c.
- (9) Report on experiments by Nos.45 and 55 Squadrons - Ibid., enclosure 5c.
- (10) Report by S/L A.H. Harris, ibid., enclosure 7c.
- (11) Ibid., enclosure 1A; minute 2.

Night  
formation  
flying  
discussed  
1926

An inspection of No. 58 Squadron by the C.A.S. in May 1926 eventually brought the subject to the fore and, immediately after it, the Director of Training called for reports from the three experimenting squadrons. (1) Squadron-Leader A.H. Harris in his report (2) urged that by flying in formation night bombers would be better able to defend themselves when returning in daylight or twilight from long raids, and would navigate more accurately in war since the lowering of navigational standards might be offset by the few really good navigators being able to guide the rest of the squadron to its target. These arguments did not entirely convince the higher authorities that such training ought to begin at once, for both the A.O.C.-in-C., A.D.G.B. (Sir J.M. Salmond) (3) and the D.C.A.S. (4) agreed that the primary function of the night bomber was to work individually and that "only a very limited amount of night formation flying should be practised in peace-time by bombing aircraft". However, on 15 October 1926 the C.A.S. approved the amending of the Flying Training Manual to permit a limited amount of training in flying by night in formations of not more than three aircraft. (5) At the same time researches apparently began for the evolution of a shaded formation - keeping light which would not readily betray the bomber to enemy fighters. (6)

Little  
further  
progress

Even now, progress was slight. For some years the night bomber squadrons were so busied with other forms of training that they had no time to spare for practising formation flying, (7) and it was not until 1933 that a satisfactory formation-keeping light was produced (8) a delay which suggests how little urgency was ascribed to this work. There was a momentary revival of interest when the Air Staff's comments on the 1931 A.D.G.B. Exercises suggested that, as the night bombers' loss of effective power was chiefly due to the crew and equipment they had to carry to enable them to operate individually, it was for consideration whether they could not fly in formation: "the defensive and navigational equipment would then be more akin to that in day bombers, to which type they would in general conform" (9) - another, and somewhat unusual, manifestation of the 'all-rounder' idea. Nothing came of this suggestion until the summer of 1933. Until then, the idea of bombers flying in formation at night was no farther tested and not at all practised, and it was not until August 1933 that its possible value as a means of increasing the weight, speed, and concentration of night bombing attacks was brought into discussion by a minute from Group Captain A.T. Harris, the D.D.O.I. (10) That development, however, belongs to a later section of this narrative.

Technical  
problems

The most difficult problems of the night bomber, and even to a large extent of the day bomber, were, however, neither strategical nor tactical but technical. Broadly speaking, the strategy and tactics of a bombing offensive, what the bombers should try to do and what were the ways by which they might try to do it, could be deduced fairly clearly from the experience of 1914-1918. What was still obscure was the nature of the technical and scientific

/equipment

- (1) Ibid., enclosure 4A.
- (2) Ibid., enclosure 7c.
- (3) Letter covering Sqn.Ldr. Harris' Report, 7 August 1926 -  
ibid., enclosure 7A.
- (4) Ibid., minute 13.
- (5) Ibid., enclosures 11A, 11B; minute 14.
- (6) Ibid., enclosures 7C, 7B; minute 13.
- (7) Ibid., enclosures 16A, 19A; minute 21.
- (8) A.M. File S.32234/2A, 3.
- (9) A.M. File S.30624/16A.
- (10) A.M. File S.32234/6.

equipment that this strategy and these tactics would require to make them effective. What armament and protection would the bombers need to fight their way to their targets? How could both day bombers and night bombers minimise the effects of bad weather and poor visibility? How, in such conditions, could they find their way to their target areas with reasonable certainty and regularity? How, having reached the target area, could the night bombers, in particular, locate their specific objective? How ensure that their bombs could not only be aimed accurately enough to hit the target but would also be of the correct character and power to destroy it? These questions, left obscure by wartime experience, received less than their share of attention during the years of peace. The concentration of research upon problems of defence rather than of offence, the absence of plans, the lack of detailed study of targets, and the limitations so long imposed upon tactical experiment by the small size of the effective bomber force, all combined to prevent such technical problems emerging from their obscurity and assuming the importance which was properly theirs - or, rather, which must appear to be theirs to the historian looking back to 1919-1933 across the years 1939-1945.

Defensive  
Armament

In defensive armament<sup>(1)</sup> the bombers of 1933 differed little from those of 1918. The Hart carried two machine-guns and the Heyford only three. The day bombers still relied as much upon their speed, which was steadily approaching that of the fighters, as upon the mutually supporting fire which they could afford one another by flying in formation. The night bombers, for their part, trusted to darkness still to hide them from both air and ground defences. Yet some thought had been given to the question of providing the night bomber with a better rearward defence. As early as 1926 Squadron Leader A.H. Harris, in urging the value of night formation flying as a means of defence, had suggested that a rear-gunner should be installed aft of the tail-plane<sup>(2)</sup> and the A.O.C. Wessex Area (A.V.M. J.M. Steel) had supported him by asking that the possibility of improving the night bomber's defensive armament should be carefully considered, even though he regretted that this extra weight must reduce the aircraft's bomb-load.<sup>(3)</sup>

Discussions  
about  
protective  
armour

The idea of protecting the pilot and the more vital parts of his machine by armour-plating had also been considered. It had arisen in 1924 in relation to army co-operation machines, as a result of a report that the French might be considering the development of small calibre automatic anti-aircraft guns for use against low flying aeroplanes. It was then generally agreed that it was undesirable because of the loss of manoeuvrability, performance, and altitude, and therefore of usefulness for other duties such as air fighting or photographic reconnaissance, which must result from the weight of the armour. Experience with the Salamander armoured aircraft, produced during the 1914-1918 War, seemed also to justify this opinion.<sup>(4)</sup> In 1928 the idea was again put forward, this time by the Secretary of State for Air and in relation to the desert operations of bombers in the Near and Middle East.<sup>(5)</sup> Again it was rejected upon the same grounds by the C.A.S. and his technical experts, the C.A.S. adding that on a Wapiti to protect the pilot alone against attack only from below would require 391 lbs of armour

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- (1) The statements contained in this paragraph and the next are subject to modification by the specialist narrative dealing with Armament which is being prepared in this Branch.
  - (2) A.M. File 688909/26/7c.
  - (3) Ibid., enclosure 7A.
  - (4) A.M. File S.23577/1A, 2, 3, 4, 8A, 10A.
  - (5) A.M. File S.23577/13A.i.



and that this would seriously reduce both the range and the offensive load of the aircraft. (1) The Secretary of State accepted these arguments but urged that research should be undertaken to produce a lighter form of armour. He also suggested that it might be well to put out "a specification for a machine which would have the performance and range for desert warfare and yet be capable of carrying armour". (2) The Armaments Section of the Research and Development Branch also discussed at this time the possibility of making aircraft petrol tanks bullet-proof, but they came to no very hopeful conclusion. (3) By 1933 there was very little to show for all these discussions: nor indeed could there be until larger bombers of greater power and lifting capacity could be developed.

High  
altitude  
problems

Those other technical problems which might arise from any marked improvement in anti-aircraft gunfire, were just beginning to be faced in 1933. The most likely effect of such an improvement would be to force the bomber to operate at higher altitudes. This would raise all the manifold physiological, engineering, and navigational problems connected with flying at great altitudes. In 1933 scientific investigation into these problems was still in its infancy. The problem of fatigue at what were then normal altitudes had, however, received considerable attention. Something had been done to make the pilot's work less tiring and less exacting by careful attention to the design of aircraft seats and the position of the controls, to the exclusion of draughts and the provision of cockpit heating, whilst the Heyfords which were about to come into service were to be equipped with automatic pilots. But progress in high altitude research was only just beginning in 1933 and it was not until 1936 that a special High Altitude Flight began the first methodical investigations.

Meteoro-  
logical  
organisation

Progress had also been slow in the solution of the greatest of all the technical problems which beset the bomber, the problem of how to overcome the serious limitations imposed by bad weather and poor visibility. A good deal had certainly been done to provide regular information and forecasts about weather conditions. The Meteorological Office had been incorporated in the Air Ministry in 1919-1920 (4) and an increasing proportion of its work was concerned with Service and civil aviation. It collected weather reports from a network of stations and observers all over the British Isles and from foreign broadcasts, (5) while from 1 November 1924 the two aircraft of its Meteorological Flight made regular daily observations of the upper air to altitudes of 16,000 feet or more. (6) From 1925 it made this information available, day and night, to R.A.F. and civil pilots through its Aviation Services division and through a number of 'distributive stations' on R.A.F. airfields. (7)

/Weather

- (1) Ibid., enclosure 13A.ii (13 March 1928); minutes 15, 16.
- (2) Ibid., minute 14 (10 April 1928).
- (3) Ibid., enclosure 16A.
- (4) Annual Report of Meteorological Committee, 1920 (Cmd.948), pp.12-14.
- (5) The organisation is described in considerable detail in the Annual Report, 1934, pp. 5-18.
- (6) Annual Report, 1925, p.7 - by this latter date altitudes of 25,000 to 30,000 feet had become normal, though this appears to have been a recent development since the Annual Report, 1936, p.16, remarks that, from data provided by the Flight 1925-1934, mean monthly values of temperature had been worked out for altitudes from 1,500 to 16,000 feet.
- (7) Annual Report, 1934, pp. 5-18

Weather reports and forecasts for particular flights were also supplied on request and meteorological officers had been regularly attached to A.D.G.B. and Area headquarters and to squadrons during Command and other air exercises from 1928 onwards. (1) The need for economy and the limited size of its staff had perhaps handicapped the Meteorological Office in the field of pure research, (2) but none the less in 1933 an efficient organisation already existed which might readily be adapted and expanded to provide the bomber force with regular, detailed, and increasingly reliable statements and forecasts about meteorological conditions.

Lack of  
progress  
in other  
matters

Efforts to overcome the handicaps imposed by those conditions were, on the other hand, only just beginning. Little had been done to provide scientific devices for bringing aircraft safely home to their bases in bad weather and poor visibility. For example, R.A.F. airfields were not yet equipped with any blind-approach system, nor had any experiments in fog dispersal been attempted. This last subject had been raised in 1921 by Professor Lindemann, Sir Napier Shaw, and Colonel Moore-Brabazon and had been discussed by the Air Ministry Aeronautical Research Committee, but too little was then known about the causes and character of fog for any progress to be made. Not until 1935 were any serious investigations into the problem undertaken. (3)

Cloud flying  
trials 1932

One direction in which a useful advance was just starting was in flying through cloud, but even this advance was very recent. It was only in 1932 that No.12(B) Squadron began its pioneer cloud-flying trials. (4) Those trials were markedly successful. After a course in instrument-flying and a period of individual and Flight training, the Squadron carried out effectively a number of practice raids through cloud upon industrial and other targets - for example, from Andover via Brighton on London. These raids were made in squadron formation and proved that in many - though not all - types of cloud such operations were quite practicable. One major handicap imposed by the weather upon bombing was thus partially removed and new possibilities of successfully evading the enemy's defences were opened to the day bombers.

Their  
limitations

Yet even this advance was still a very limited one. It meant that day bombers could now fly in formation to their objective through certain types of cloud, but it did not mean that they could bomb through cloud. They still had to come below cloud level to drop their bombs, which meant that often, when the clouds were too low, they would not be able to bomb at all and that on most occasions

/they

- (1) Annual Reports, 1929; p.15; 1931, p.21; 1932 p.11; 1933 p.12 1934, p.16.
- (2) "So far the routine research has not suffered, but special investigations have decreased... We recommend that steps be taken by the Air Ministry to ensure that adequate attention is given to the promotion of fundamental scientific work in meteorology". 2nd Report of Research Co-ordination Sub-Committee of the Committee of Civil Research, 14 December 1927. (C.I.D. Paper 879-B) After this Report the R.A.F., Meteorological Committee was set up in 1930 to advise on technical questions - Annual Report of Met. Office, 1931, p.21.
- (3) Bomber Command O.R.B., May, 1945.
- (4) This paragraph is based upon the Abridged Report on Cloud Flying Trials 1932 by No.12(B) Sqdn. (C.D.97) and upon the Sqdn's O.R.B. for that year.

they would have to make their bombing run, perhaps over a heavily defenced area, at a lethally low altitude. Moreover, in 1933 No.12(B) Squadron alone had practised this new technique and the navigational methods and equipment which it used were still relatively primitive. The approximate strength and direction of the wind was usually calculated by the leader, who came below cloud to make landfalls and check his aircraft's drift at points sixty miles from his base and ten minutes flying time from his target. The instruments used were a turn indicator; fore-and-aft level; the standard air speed indicator, which was often put out of action by icing; and the P.4 compass, whose northerly turning error proved something of a complication. Some use was made of radio-telephony from aircraft to aircraft, but the sets available were very unreliable at the speeds normally flown and most of the signalling was done visually. Wireless 'fixes' were also obtained occasionally, but the question of developing such scientific aids to navigation over long distances in poor visibility had hardly yet been raised. Navigation was, in fact, chiefly by dead reckoning, assisted by occasional visual checks. The real navigational problems of a long range bomber offensive in poor visibility or in darkness had as yet hardly been envisaged, least of all those which would confront the night bombers if improvements in anti-aircraft gunfire should force them to fly at greatly increased altitudes. Indeed, in these matters of bad weather and night navigation the R.A.F. lagged well behind Continental and American civil air lines. In 1934 the A.O.C.-in-C., A.D.G.B., confessed that his bombers' ability to fly by night in all weathers compares unfavourably with that, for instance, of the German Lufthansa service between Cologne and Croydon, which had missed only four nights during the past twelve months. (1)

Lack of opportunities for specialists in navigation

The reason for this is not far to seek. It was that navigation was still regarded as principally a matter of observation and practice, not as a complex science requiring prolonged scientific investigation. At the Air Ministry there were Assistant Directorates for aircraft, for engines, for armament, and for instruments: but there was none for navigation. In the squadrons there were no special posts for navigational specialists and in January 1933, out of the 1,346 officers between the ranks of Flight Lieutenant and Group Captain (both inclusive) whose names appeared in the Air Force List, only 38 had passed the ordinary specialist course in navigation. By contrast, 184 had passed the ordinary course in engineering and a further 66 had passed both the ordinary courses and the University course; 98 had passed the ordinary signals course and 16 more had passed the University course as well; and 78 had passed the ordinary, and 4 more the advanced, courses in armaments. The poverty of opportunity which confronted the navigational specialist meant that few officers cared to waste their time specialising in navigation.

Target location, etc.

The problem of locating a distant target precisely, when once the target area had been reached, had likewise not been fully appreciated. It was well understood that careful briefing was necessary if crews were to find and recognise their aiming point. Considerable thought had also been given to the best methods of illuminating a target at night, and the need for more powerful and longer-burning flares was recognised - one great advantage claimed for formation flying was that it would enable each crew to aim its bombs by the light of flares dropped by the aircraft next ahead. (2) But, in war, at least after the first few weeks, an increasingly large proportion of the target information required would have to be obtained by reconnaissance, chiefly by

Reconnaissance

/ photography:

- (1) A.M. File S.34572/26A.
- (2) A.M. File S.32234/17A.

photography: and the problem of reconnaissance for a long-range bombing offensive had not yet been thought out. This was a natural result of economy and of that dislike of specialisation which economy encouraged. There could be no specialised reconnaissance units. There could be no specialised organisation - in fact, there was no organisation at all, - for the interpretation of photographs. All, or nearly all, the day bombers were intended to carry cameras, which the crews were trained to use more or less efficiently. It was apparently assumed that the bomber force would do its own reconnaissance in ordinary bomber aircraft and its own interpretation by the light of nature. The need for exact damage assessment does not appear to have been considered. Indeed, in 1933 the bomber force had in these matters progressed little, if at all, beyond the ideas of 1918.<sup>(1)</sup>

#### Bomb aiming

The importance of accurate bomb-aiming was much better appreciated and there was a widespread belief that the general standard of accuracy was much higher than in 1914-1918. Yet, even here, the improvement seems to have been due to more regular practice and to better training rather than to any marked technical advance. New automatic bombsights were, it is true, just reaching the experimental stage of their development. But the standard of sighting apparatus - the drift sight for attacks made up-wind or down-wind, and the course-setting sight for other attacks<sup>(2)</sup> - was still comparatively elementary, a somewhat more elaborate version of the bombsights used during the 1914-1918 War. Moreover, there were certain limitations about the training which made it doubtful how far this improved accuracy would be maintained in war conditions. It was impossible in peacetime practice to assess the probable effect of anti-aircraft fire upon a bomber during its run up to the target. Most bombing practice was carried out from medium altitudes and, while moderately high level bombing was seldom practised, the existing sights were useless for attacks made from below 2,000 or 3,000 feet.<sup>(3)</sup> It was only in 1932, as already mentioned, that No. 12(B) Squadron began 'pattern' bombing experiments; that, in other words, any serious attempt began to be made to develop the suggestions put forward by Mr. Churchill in 1917.<sup>(4)</sup> Clearly, even in bomb aiming there was still ample room for both technical invention and intense scientific study of methods.

#### Bombs: research

Finally, the slow progress of scientific research into offensive equipment and technique was reflected perhaps most clearly in the inadequate range of bombs available to the bomber squadrons in 1933.<sup>(5)</sup> The need for such research in this field / had

- (1) Upon this, see the Photographic Reconnaissance narrative prepared in this branch.
- (2) Notes in bombsighting, with a short account of the apparatus now in use - A.P. 961.
- (3) See above p. 45.
- (4) See ~~Part~~ <sup>chap</sup> II. i. 19-20, above.
- (5) This and the following paragraphs are subject to modification by the Specialist narrative on Armament that is being prepared in this Branch. These paragraphs are based chiefly upon: - (i) A paper on 'Bomb Development and Ammunition', by A.A. Appleby of the Air Armament School, 14 March 1934 - A.M. File S. 35150/3A; (ii) another paper on 'Air Bombardment; Some Considerations in the Matter of Inflicting Material Damage', by Appleby and F/Lt C.N.H. Bilney (undated) - *ibid.*, enclosure 3B; (iii) Correspondence between the Air Staff and A.D.G.B., Jan. to April 1935, which may be found on A.M. File S. 35247/; and (iv) the reports and papers of the Bombing Committee which was set up in Jan. 1934 and first met on 6 April 1934.

had been fully appreciated in 1919, for "wartime experience had amply demonstrated that the problem of designing an adequate range of bombs for all purposes of air attacks had not been nearly solved". As a result, "the targets which would normally be encountered by an Air Force in times of war were reviewed and a programme of investigations into the design and performance of a wide range of special purpose and general purpose bombs was initiated". A considerable number of types, ranging from 4½ lb anti-personnel bombs to 2,000 lb A.P. and G.P. bombs, had been investigated according to a carefully designed routine.(1) It seems, however, that attention was concentrated too much upon questions of exterior ballistics and too little upon the study of the material damage a bomb would inflict.(2) It is somewhat remarkable, for instance, that in December 1934 a Sub-Committee of the Committee of Imperial Defence should have had to ask for a grant so that it might in the following year conduct its own experiments to discover the penetrative effect of bombs of 500 lb or over.(3) In any case, by March 1934, although "many of the initial researches have now been completed", there still remained "a wide field to be covered before intensive research into technical details of design and performance can be relaxed".(4) Certainly, very little of this research was as yet reflected in the actual equipment of the bomber squadrons.

Bombs:  
policy

Indeed, it seems that, while in research progress had been slow, in bomb policy there had been actual retrogression. The possible need for heavy bombs of 1,500, 2,000, and even 4,000 lbs, which Lord Trenchard and others had foreseen in 1923(5), had been forgotten or discounted and in July 1932 the C.A.S. ruled that no bomb heavier than 500 lb was required.(6) Even in the early part of 1935 the Air Staff rejected a suggestion from the C.-in-C., A.D.G.B. (Air Marshal Brooke-Popham) that the 500 lb bomb should be replaced as the standard weapon of the heavy bomber squadrons by bombs of 1,000 and 2,000 lbs.(7) The aircraft designers, it was alleged,(8) could not meet such a requirement in the heavy and medium bombers then being designed. At the same time, the Air Staff also rejected the C.-in-C's proposal(9) that the 120 lb bomb should be abolished and the 250 lb made standard for the other squadrons. Their reasons for this decision were that an aircraft which could carry two 250 lb bombs could alternatively carry four of 120 lbs; that there would be a better chance of scoring a hit in four shots than in two; and that in most factories four 120 lb bombs would "probably" do more damage than two 250 lb(10) - which, of course, assumed that all the bombs would score hits. It is difficult not to conclude that, outside the research establishments, bombing was very widely regarded as being principally a matter of dropping one object accurately upon another object, without too much thought being given to the question of what would happen to the second object when the first struck it.

/ such

- (1) A.M. File S.35150/3A. The bombs tested and the purposes for which they were tested were - 450, 1500, 2000 lb A.P. for use against non-cemented deck armour of battleships; 250 and 500 lb S.A.P. for use against lightly armoured ships, mild steel structures, and ferro-concrete buildings; 100, 250 and 500 lb anti-submarine; 20, 50, 120, 500, 1000 and 2000 lb G.P.; 4½ and 20 lb anti-personnel. An incendiary bomb was "still under consideration".
- (2) Ibid., enclosure 3B.
- (3) The Report of Sub-Committee on co-ordination of departmental action in war, 20 Dec. 1934 - C.I.D. Paper 1160-B.
- (4) A.M. File S.35150/3A.
- (5) A.M. Files S.22846/I/14D; S.22910/16A.
- (6) A.M. File S.17413/75.
- (7) A.M. File S.35247/1A, 11a.
- (8) Ibid., enclosure 11A; the C.-in-C. doubted the truth of this allegation - ibid., enclosure 12A.
- (9) Ibid., enclosure 1A.
- (10) Ibid., enclosure 11A.

Reasons  
for the  
policy

Such an attitude was, again, a natural product of economy and of the lack of detailed planning. The rule of economy favoured concentration upon smaller and cheaper bombs no less than upon lighter and cheaper aircraft. The lack of detailed plans meant that no attempt could be made to estimate at all scientifically what proportion of the bombing effort in a European war would have to be directed, for example, against targets which would need heavy bombs and therefore heavy bombers to carry those bombs. It was therefore impossible to estimate scientifically what would be the correct numbers of the various classes of bomber aircraft needed to provide a perfectly balanced striking force. Nor could wartime memories and peacetime experience supply the place of such detailed plans. The lessons of the 1914-1918 War were either forgotten or variously interpreted; (1) and peacetime practice with dummy bombs or, overseas, against the limited selection of targets provided by native settlements in backward lands was no safe guide. So, in 1933 the home based bomber squadrons were equipped with a fair range of medium and light bombs, from the 20 lb anti-personnel to the 500 lb, but had no incendiary bomb and no really heavy bomb.

Such, then, was the home based bomber force in 1933 when the Ten Years Rule was discarded and the conditions which justified it passed finally away. It was a force in training rather than a force in being. Based upon a sound strategical theory, it had yet to evolve the tactical experience and the technical equipment to apply that theory effectively. In the new conditions created by the revival of German belligerent power and spirit, the same theory was to guide its development into a separate Bomber Command but the tactical and technical limitations imposed upon the bomber squadrons in the years of economy and disarmament were to give the new Command a poor start in its race with the reviving Luftwaffe.

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- (1) In the correspondence already referred to, the C.-in-C., A.D.G.B. seems to have interpreted these lessons quite differently from the Air Staff. It is interesting to note that he quoted the draft of the Official History (War in the Air VI c.4 - published 1937) to support his advocacy of heavy bombs - A.M. File S.35247/12A.





### III. THE ORIGINS OF BOMBER COMMAND, 1933-1936:

#### (i) GERMAN RE-ARMAMENT AND THE REVISION OF BRITISH DEFENCE POLICY: THE ROLE OF THE BOMBER STRIKING FORCE, 1933-1934

##### The origins of Bomber Command

The home-based, 'independent', bomber striking force, which had been created in 1923, was re-organised as a separate Bomber Command in 1936 and detailed plans for its employment in the event of a war with Germany began to be prepared in the summer of 1937. The reasons for that reorganisation and the broad principles upon which those plans were based must, however, be sought in the years 1933 and 1934. It was then that the failure of the Disarmament Conference first compelled Great Britain to look seriously to her long-neglected defences. It was then, too, that the revival of German military power and of aggressive German nationalism first compelled the British Government to take into account the possibility of another European war occurring within the near future; compelled it, therefore, to look especially to the defence of the United Kingdom, which was "the principal preoccupation of the Air Staff"<sup>(1)</sup> and the primary duty of the bomber striking force.

##### Discussions on rearmament in 1933-4

In the lengthy discussions which began in June 1933 and culminated in the decision of July 1934 to expand the home-based Royal Air Force to 75 squadrons, the whole field of British strategy in the event of another war with Germany was surveyed. The broad outlines of British defence policy were settled and the functions of the Royal Air Force in general and of its bomber striking force in particular were sketched out. During the five years which followed, further expansion programmes were introduced, the bomber striking force was reorganised as a separate Bomber Command, and detailed plans for its employment were gradually elaborated. Nevertheless, throughout those years the broad principles laid down in 1934 were preserved more or less intact, for, despite the distractions of growing Japanese hostility and of an unexpected quarrel with Italy, the threat from Germany was always recognised as the paramount, though not always as the most imminent, danger, and this threat, though it grew rapidly in intensity, did not greatly change in character.

The organisation of Bomber Command and the plans for its employment - plans, moreover, from which most of its major operations during the earlier years of the War were to originate - were thus little more than detailed elaborations of the principles laid down in 1934. A clear understanding of what those principles were and of how and why they came to be adopted is, therefore, essential if the history of Bomber Command is to be seen in its true perspective.

#### (a) The Foreign Office Memorandum of 19 May 1933

##### The Memorandum

The rearmament discussions of 1933-4 developed out of the review of foreign affairs which the Foreign Office, as was its yearly custom, drew up on 19 May 1933 to assist the Chiefs of Staff Sub-Committee in preparing its annual report to its parent body, the Committee of Imperial Defence.

##### Japan and China

This Memorandum<sup>(2)</sup> began by pointing out that during the past two years the world-wide economic crisis had borne political fruits

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(1) C.O.S. Minutes, 101st Meeting.

(2) C.I.D. Paper 1112-B, section 1, annexure 1 (= C.O.S. 307).

which revealed "the unsound basis upon which international relations rest". The prolonged and unsatisfactory discussions at the Disarmament Conference had increased the discredit into which the League of Nations had fallen through its inability to intervene effectively in the dispute between Japan and China over Manchuria and, since the Mukden 'incident' (September 1931), "the world seems, indeed, to have gone steadily downhill".

European situation

Yet, the Memorandum went on, it was not the Sino-Japanese dispute which threatened world peace and delayed economic recovery. "The political causes of our present distresses are to be found in Europe. They are to be found in the political relationships which resulted from the War and the peace treaties, and they have come to a head at the Disarmament Conference". The root of the trouble had always lain in the difficulty of reconciling the French demand for security with the demand of Germany and other ex-enemy States for equality of status: and now "the threatening and provocative attitude of Germany", since Hitler's accession to power, made this difficulty appear almost insoluble. There was little doubt that, under the "completely crude and unbalanced Administration of Herr Hitler ..... Germany, controlled by a frenzied nationalism and resolved to assert her rights to full equality, will proceed to the building up of formidable armaments on land and especially in the air .... Such action .... would plunge continental Europe into a bitter competition in armaments, and eventually into war". It might well mean also that Britain would be called upon to fulfil her obligations, under the Locarno Pact of 1925, to maintain the territorial status quo on the German frontiers with France and Belgium and to preserve the demilitarisation of the Rhineland.

The German menace

Its significance to Britain

Clearly, then, in the opinion of the Foreign Office, the League of Nations no longer provided a safeguard for peace sufficient to justify the low scale of British armaments which had been accepted since 1919.<sup>(1)</sup> Equally, the Royal Air Force could no longer be content to measure itself against the air force of a France with whom war was inconceivable;<sup>(2)</sup> it must begin to prepare in all seriousness to defend Great Britain against the reviving air force of a rearming Germany whose spirit "is worse than at any time before 1914". For the other Services, too, the Foreign Office Memorandum carried similar implications. It led the Chiefs of Staff, therefore, to undertake a survey of Britain's defence position as a whole.

(b) The Chiefs of Staff Annual Report for 1933

The C.O.S. hitherto occupied with Japan

The Chiefs of Staff, even had they wished, could hardly have ignored so shrill a warning from so authoritative a source. Since the Spring of 1931, when they had surveyed in considerable detail the relative strength of British and foreign forces in preparation for the Disarmament Conference<sup>(3)</sup>, they had not, as a Committee, been officially called upon to pay any attention to European questions. For the past eighteen months they had been concerned almost exclusively with Far Eastern problems arising out of the aggressive policy of Japan.<sup>(4)</sup> Only once had they glanced at Europe, in April 1933 when they discussed somewhat cursorily the security of British communications through the Mediterranean to India and the Far East.<sup>(5)</sup>

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CHAP.

- (1) See Part II.ii.33, above.
- (2) Ibid.
- (3) C.I.D. Papers 1046-B, 1047-B, 1048-B.
- (4) C.O.S. Minutes, vol.IV.
- (5) C.O.S. Minutes, 109th Meeting, 11 April 1933.

C.O.S.  
discussion  
20 June  
1933

But now Europe could no longer be ignored. The Chiefs of Staff were themselves growing anxious about German policy and the Foreign Office Memorandum gave them the opportunity to voice their anxiety. Accordingly, when they met on 20 June 1933 to consider their Annual Report, they discussed at length the ability of the three Services to fulfil their obligations under the Locarno Treaty. The picture of "extremely slender means" which emerged, led them to resolve that their Report should deal comprehensively with the whole defence position and should urge that the unsatisfactoriness of the situation be placed squarely before the Cabinet.<sup>(1)</sup>

The C.O.S.  
1933 Report

The Chiefs of Staff's Annual Report<sup>(2)</sup>, which was issued on 12 October 1933 was therefore a comprehensive review of Britain's commitments and of her present ability to meet them. It was, however, noticeably less alarmist than the Memorandum which had inspired it, for, although it also took account of future intentions, it dealt more with present facts. The Chiefs of Staff recognised that in Europe a new danger-zone had arisen and "that Germany is not only starting to rearm but that she will continue this process until within a few years hence she will again have to be reckoned as a formidable military power". They realised that a rearmed and aggressive Germany might provoke a crisis in which Britain would be called upon to fulfil her Locarno obligations and to ensure, "as is vital to our security, that the Low Countries are not again overrun by a great continental Power". They felt compelled, therefore, to insist that, if the Disarmament Conference failed, "the whole position in respect of our Imperial defence forces will require reconsideration"; and to point out that, by the time the anticipated military revival of Germany was complete, "we shall be in a worse position than to-day to implement the Treaty of Locarno, unless the unsatisfactory and inadequate means at our disposal are increased and the general position is rectified".

Probable  
German  
policy

On the other hand, the Chiefs of Staff did not regard the German danger as imminent. They considered that Germany's programme was probably, first to rearm; then to bring about a revision of her frontiers, particularly in the East, and to get control of Austria; and perhaps, last of all, to attempt to recover her lost colonies. But at the moment her most urgent necessity was for a period of national consolidation and the building up of her armed forces. It would be some years before she would dare to attack France, for the French had, at the cost of some £35,000,000, made their eastern frontier defences almost impregnable to direct assault and it was "inconceivable that the Germans with their bitter experiences of the last war would be so foolish as again to invade France and to seek a solution in a rapid knock-out blow". The real danger lay in the East, for all Germany was united in a determination to recover her lost territories there. Yet, even so, the Chiefs of Staff thought it unlikely that Germany would precipitate a war "until she feels strong enough to throw off the mask and to attain her ends in a war of offence in the East, combined, if necessary, with a defensive in the West". She could, they were confident, hardly attain to such strength for another three or five years. So there was still time enough for Britain to put her house in order if the task were promptly tackled.

England's  
commitments

The remainder of the Report was devoted to a detailed statement of the deficiencies which must be made good if the Services were to be capable of meeting their major commitments. These major commitments were reduced to three. First came the defence of British interests and possessions in the

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- (1) C.O.S. Minutes, 111th Meeting, 20 June 1933.  
(2) C.O.S. Paper 310 (= C.I.D. Paper 1113-B).

Far East; next, European commitments; and, third, the defence of India against possible Russian attack. That these commitments were explicitly and deliberately placed in this order of priority shows again how far the Chiefs of Staff were from taking panic over the German danger.

Deficiencies in the Services

Nevertheless, in all three Services the deficiencies which the Report enumerated were serious. It was little more than a year and a half since, on 22 March 1932, the Committee of Imperial Defence had accepted the Chiefs of Staff's advice<sup>(1)</sup> and recommended the Cabinet to withdraw the Ten Years Rule.<sup>(2)</sup> It was only eight months since, on 15 February 1933,<sup>(3)</sup> the Cabinet had effectively withdrawn that Rule by directing, as the Chiefs of Staff had advised a year earlier, that a start should be made in providing for essential defensive requirements. Even then, priority had been given to Far Eastern requirements and as the Treasury did not consider that the financial state of the nation justified any expenditure except in the Far East, no strengthening of home defences had yet been possible.<sup>(4)</sup> Hence, although the Ten Years Rule had gone, the deficiencies which had accumulated under it remained.

Nature of the defence problem

Now, it is true that in 1933, despite these accumulated deficiencies, Britain was still overwhelmingly better armed by sea and in the air than Germany yet was. The crux of the defence problem, however, was that Britain could no longer risk concentrating the great bulk of her forces in north-western Europe, as she had been able to do before 1914 when the Japanese alliance had guaranteed the Far East, the Russian entente had freed India from anxiety, and the French entente and Italian friendship had secured the Mediterranean. Even assuming, as the Foreign Office Memorandum assumed, that any idea of war against the United States, France, or Italy could be ruled out, there remained the possibility of three simultaneous attacks by three great Powers - Japan, Germany and Russia - in widely separated theatres. It was this possibility which made Germany's military revival so dangerous and which led both the Foreign Office and the Chiefs of Staff to emphasise the absolute necessity of making sure of French support. As always before in her history, Britain could not hope to wage a successful European war without a great continental Power as her ally. Yet, as the Chiefs of Staff were later to point out, even with such an ally "we cannot depend entirely upon others to defend that which is vital to our own security"<sup>(5)</sup> - the independence of the Low Countries, the defence of the United Kingdom against air attack, and the protection of its sea-communications.

Naval deficiencies

Of these, the last was primarily the Navy's responsibility, and the Navy had little to fear from the German fleet acting alone. On the other hand, if trouble with Germany should coincide with trouble with Japan, the outlook was less comforting. Only if time were given to bring forward for service two capital ships now undergoing major repairs, if twenty more cruisers were provided, if reserves of fuel, ammunition, and anti-submarine weapons were adequately replenished, would Britain "be in no naval danger in our alliance with France against Germany whilst at the same time fighting Japan in the Far East".

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- (1) C.O.S. Annual Report, 23 Feb. 1932 - C.I.D. Paper 1082-B.
- (2) C.I.D. Minutes, 255th Meeting; Cabinet 19(32), conclusion 2.
- (3) Cabinet 9(33), conclusion 3; also below, Appendix I.
- (4) C.I.D. Paper 1087-B.
- (5) C.O.S. Paper 335.

R.A.F.  
defici-  
encies

The Royal Air Force, upon which the defence of Great Britain against air attack chiefly depended, was in a position not unlike that of the Navy. As against Germany alone it would, especially in an alliance with France, possess an overwhelming superiority. But a situation "of considerable anxiety" would be created if a German war should coincide with a Russian attack upon India. The Defence of India plan called "for the employment of 28 squadrons from the United Kingdom, of which 24 are bombers and fighters. This number (i.e. 24) constitutes almost half the 52 squadrons which, according to the present Cabinet ruling, are to be provided by 1938 for the Home Defence Air Force. Up to the present only 42 of these squadrons, including 12 on a non-regular basis, (1) have been formed. It is clear, therefore, that the despatch of 28 squadrons would, in existing circumstances, leave this country virtually defenceless as regards the air, and the formation of the remaining ten squadrons is therefore a necessary preliminary to the provision of the air units for the Defence of India Plan. Furthermore, little or no provision has yet been made for the necessary reserves of aircraft, engines, transport and general stores.....The situation as regards personnel is also unsatisfactory "and special arrangements would be needed to train the existing reserves of pilots and to increase the reserves of training aircraft.

Army  
defici-  
encies

With the Army, which would bear the main burden of assisting the Low Countries to preserve their independence, the case was almost desperate. Economy and the Ten Years Rule had left it "barely sufficient to provide for internal security in the Empire and on mobilisation to form an expeditionary force which can only be mobilised gradually for a campaign in undeveloped or partially developed countries in the East. The Government has, in fact, deliberately accepted the risk of spreading the mobilisation of the regular divisions over a period of six months. Our present resources do not permit us even to aim at anything better than to place in the field single divisions in each of the first two months of the war, a third at the end of the fourth month, and the remaining two divisions at the end of the sixth month". The modern equipment, tanks and reserves of ammunition needed for a European campaign were lacking. To provide these things for a force of even five infantry divisions and one cavalry division - a force of the same size as that which crossed to France within three weeks of the outbreak of war in 1914 - and to enable this force to take the field within even three months, would take much time and money. Indeed, the Chief of the Imperial General Staff had stated that it would take eight or ten years to get the machinery of mobilisation into proper working order. (2) "We are not to-day", the Annual Report continued, "in a position to intervene effectually in a continental war with our land forces for many months. Limited participation in a European war would not be feasible, and to commit a proportion of our slender military resources to the Continent would, in view of the world situation to-day, be fraught with the gravest danger. Unless His Majesty's Government is prepared to place our armed forces in a necessary state of preparation for participation in modern warfare on the Continent, our military action must be confined, at any rate during the first six months of a war, to the defence of the Empire overseas".

Need to  
begin  
rearming

In conclusion, the Chiefs of Staff pointed out that the "serious deficiencies in all departments of our Defence Forces cannot be made good in a hurry. Yet the nature of modern weapons

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(1) These, by the terms of their enlistment, were not available for overseas service.

(2) C.O.S. Minutes, 111th Meeting, 20 June 1933.

and scientific armament development renders surprise attack, on a considerable scale and with weapons of great destructive power, more possible than in the past". "Conscious of our financial dangers, we have purposely avoided specific proposals for the immediate provision of extra funds. Nevertheless, the accumulation of deficiencies resulting from the long continuance of the 'ten year' rule is very heavy, and if we are to be ready for the grave emergencies referred to above, a steady increase in certain of our Estimates over a number of years is essential".

(c) The Defence Requirements Committee, 1933-1934

The C.I.D. discuss the C.O.S. Report

Before the Committee of Imperial Defence met to discuss this Report on 9 November 1933, (1) European affairs took a sharp turn for the worse. On October 14 Germany finally withdrew from both the Disarmament Conference and the League of Nations. (2) That reconsideration of "the whole position in respect of our Imperial defence forces", which the Chiefs of Staff had insisted must follow a breakdown of the Disarmament Conference, could no longer be postponed.

Attitude of the Chancellor of the Exchequer

Finance, however, was still an obstacle and in this discussion by the Committee of Imperial Defence, as in the discussions that were to follow, the Chancellor of the Exchequer, Mr. Neville Chamberlain, took a leading part. At the outset he obtained a limitation of the field of defence liability by getting the Committee to agree that the possibility of hostilities against the United States, France, or Italy could be entirely left out of account. Then, after protesting at fixed priorities being established in so fluid an international situation, he sought to narrow the field still further by suggesting that the Foreign Office should make a determined effort to lessen the urgency of Far Eastern defence problems by improving relations with Japan. He thought that Japan had no ambitions outside China and that, if she were not thwarted there, she would not go out of her way to attack British interests, would certainly not want to attack Australia.

Other views

Other members of the Committee felt less confident of this, though they agreed with Lord Hailsham, the Secretary of State for War, that Japan would probably spend the next few years in consolidating her position in China. Yet this only made the situation more alarming, for the Chief of the Imperial General Staff reckoned that "in approximately five years" Germany, too, would be ready. Thus, as Mr. Bruce, the High Commissioner for Australia said, it seemed "that five years was the maximum time in which we ought to be in a position to defend our interests and it looked to him as if we had got to try to make good the major deficiencies in that period. This was a very difficult question from every point of view, and particularly from the financial aspect; but he thought the danger was the possibility of Germany and Japan coming together".

Appointment of the Defence Requirements Committee

At this point, Mr. Ramsay Macdonald, the Prime Minister, intervened with a suggestion, made in a rather muddled fashion but clarified by Lord Hailsham, that the three Services should draw up a list of their defence requirements and that a Cabinet Committee, with expert advice, should consider this list and, if necessary, allot priorities to its various items. The Chancellor of the Exchequer did not object to this. On the contrary, he

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(1) C.I.D. Minutes, 261st Meeting.

(2) W.N. Medlicott, British Foreign Policy since Versailles (1940), p.171.

admitted that since the last year, when the Cabinet had considered the financial risks to outweigh the military risks, "the centre of gravity of the problem had slightly shifted. It could hardly be said that the military situation had improved", but "perhaps the financial situation was not quite so difficult".

Its terms  
of refer-  
ence

Reassured by this admission, the Committee of Imperial Defence decided to forward the Chiefs of Staff's Report to the Cabinet, with the following resolutions of its own:-

- "(a) (i) For the present the expenditure of the Defence Departments should be governed by the Report of the Chiefs of Staff Sub-Committee and the following considerations of priority mentioned therein: the defence of our possessions and interests in the Far East, European commitments, the defence of India.
- (ii) No expenditure should for the present be incurred on measures of defence required to provide exclusively against attack by the United States, France or Italy.
- (iii) The above conclusions must be kept under careful observation by the Government Departments concerned and in any case should be reviewed annually by the Committee of Imperial Defence.
- (b) That on the basis of the above Resolution, the Chiefs of Staff Sub-Committee, with representatives of the Treasury, the Foreign Office, and the Secretary of the Committee of Imperial Defence, should prepare a programme for meeting our worst deficiencies for transmission to the Cabinet".

These resolutions were approved by the Cabinet a few days later and were given as instructions to the Defence Requirements Committee which was set up on 15 November 1933 with the membership recommended in the above Resolution (b). (1)

- (d) The Defence Requirements Committee's Report,  
28 February 1934

Character  
of the  
Report

The new Committee went promptly to work upon the programmes furnished by the Service Departments (2) and on 28 February 1934 it produced its Report. (3) This Report followed, in general, the same lines as the Chiefs of Staff's Report of 12 October 1933 and the Committee of Imperial Defence Resolutions of 9 November 1933. It differed, however, from both at several points and in its differences made a long step towards defining Britain's defence policy and the place of the Royal Air Force therein.

Home  
Defence  
brought to  
the fore

The chief difference was a difference in approach. As the Defence Requirements Committee itself pointed out, the Chiefs of Staff and even the Committee of Imperial Defence, when they discussed the matter, had been faced, except in the Far East, with a somewhat nebulous situation. But since the beginning of November, while the Far Eastern peril had receded a little into the background, the European danger had defined itself much more sharply. This had

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- (1) Cabinet 62 (33), conclusion 5.
  - (2) The R.A.F. programme was sent to the Committee on 18 Nov. 1933: it provided for the completion of the 52 squadron home defence scheme and additional units for overseas. - D.R.C. Paper 3 (also A.H.B.V.i.5).
  - (3) C.I.D. Paper 1147-B (= D.R.C. Paper 14).



placed the defence of the United Kingdom firmly in the centre of the picture and so had made a better balanced and more comprehensive view possible. The Committee could, in short, consider not so much what deficiencies were greatest as which interests were most vital, could examine the broad principles of a long-term defence policy instead of the narrower question of the effects of the Ten Years Rule.

The first priorities

The immediate result of this difference in approach was the discarding of the order of priority suggested by the Chiefs of Staff's Report. The Committee interpreted the reference in its instructions to Far Eastern interests, European commitments, and the Defence of India, not as establishing an order of priority between those three matters, but as singling all three out as matters that should be provided for at once. Moreover, it agreed that, while Britain could for the time being ignore the possibility of any danger from the U.S.A., France or Italy, the international situation was changing so fast that British defences against those three Powers must not be allowed to fall into too great disrepair. This broadening of view at once emphasised that Britain could not afford the lavish expenditure that would be needed to give her equal security at all points and against all possible enemies. To attempt such a security would be to adopt a three-Power standard of armaments which was entirely beyond her resources.

Europe and Germany

The Committee had now to frame a new order of priority, had to decide which of the three dangers was the most vital. Clearly, it was the European danger, for only from Europe could the United Kingdom, workshop and nerve-centre of the whole Empire, be mortally wounded. And danger from Europe could only come from Germany. Germany, therefore, became the chief potential enemy against whom Britain's long-term defence policy must be primarily directed. The first task must be to provide full security for home defence against a possible German attack.

Japan

The next most vital, or at least most urgent, danger lay in the Far East. At the moment Britain's possessions and interests there were practically defenceless and this weakness must be remedied. On the other hand, she could not hope to build up her Far Eastern strength to such a degree that she could wage a successful offensive war against Japan in addition to providing full security for home defence against Germany. Fortunately the existing situation did not call for such preparation for an offensive war. The danger was that Britain's weakness might tempt Japan into attacking her if she were to be involved in trouble elsewhere, with Germany for example. At the moment Japan appeared to harbour no such thoughts. On the contrary, the recent worsening of her relations with Russia had begotten signs of friendliness to Britain. Like Mr. Chamberlain, the Committee held that Britain should recognise her Far Eastern policy, show herself less subservient to American opinion, and seek to improve her relations with the Japanese. The immediate aim of British policy should be to "show a tooth" by strengthening the Far Eastern defences, but the long-term purpose should be to re-establish that Anglo-Japanese friendship which had been the cornerstone of British Far Eastern policy from 1902 until 1921.

Defence of India

The third vital interest, the defence of India against possible Russian aggression, was placed last in the list because it involved no additional strengthening of Britain's forces. If these forces were made strong enough to ensure the defence of the United Kingdom against Germany and of the Far Eastern possessions against Japan, they would also be strong enough to carry out the Defence of India plan.

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SECRET

The suggested programme

This clearer perception of the correct balance of British defence policy enabled the Defence Requirements Committee to see more clearly what tasks must be allotted to each Service and to frame a more balanced programme for remedying deficiencies. Germany was "the ultimate potential enemy against whom our 'long-range' defence policy must be directed". She was therefore the true pacemaker of British rearmament and, as she might be ready for aggression in five years or so, the Committee "aimed in principle at a programme spread over a five year period". Moreover, Germany, owing to Britain's insular position and overwhelming naval superiority, could make a direct and dangerous attack on the United Kingdom only by air. Therefore, the first concern of British policy must be to have a home-based Air Force strong enough to counter such an attack. So, besides providing 88 more aircraft for the Far East and 243 for the Fleet Air Arm, it was "of the first importance that the fifty-two squadron programme should be completed and its war reserves built up. The Cabinet should, moreover, consider very carefully whether yet another twenty-five squadrons ought not to be provided within the five year period for port defence at home and abroad, for strengthening the fighter defences of the South and South Midlands, and for anti-submarine work and naval reconnaissance.

The R.A.F.

The Navy

This strengthening of the Royal Air Force was the most urgent necessity. But the protection of Britain's sea-communications was also of fundamental importance, for 60% of her food came from overseas and, if sea-communications were not made secure, "not only shall we fail abroad but we shall starve at home". So, the Navy must be adequately provided with anti-submarine equipment - at the moment there was none to spare for any auxiliary vessels. It must also be made sufficiently strong to deal simultaneously with the German and the Japanese fleets. Its older battleships must be modernised. Its crews must be brought up to full complement - in 1931 at least five of its fifteen battleships had, though in full commission, been so short-handed that they could only man half their secondary armament.<sup>(1)</sup> Its reserves of men, stores and ammunition must be replenished. Its route to the Far East must be safeguarded and its base there, Singapore, must be made capable of holding out until it arrived. Finally, the Fleet Air Arm must be strengthened by 243 more aircraft to give it parity with that of Japan.

The Army

The Army, too, must be strengthened for, owing to the development of air power, it was more than ever before necessary to keep out of hostile hands countries bordering on the Channel and the Narrow Seas. France would look after herself, but the British Army must "be in a position to co-operate with others in securing the independence of the Low Countries". The Committee therefore recommended "that we should be capable of putting into the field within one month, and there maintaining in all its essentials, a Regular Expeditionary Force of one Cavalry Division, four Infantry Divisions, two Air Defence Brigades, and one Tank Brigade, together with a full complement of G.H.Q., Corps, and L. of C. troops. We regard this as an essential first step: the support of this force by contingents from the Territorial Army is a matter which will require consideration when the urgent needs of the Regular Army have been met. We consider that a force, organised as above, and supported by appropriate Air Forces, would, as a deterrent to an aggressor, exercise an influence for peace out of all proportion to its size".

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(1) Appreciation by the 1st Sea Lord, 14 April 1931 - C.I.D. Paper 1047-B.

Cost of  
this  
programme

This was a formidable programme for a nation grown accustomed to expecting peace to endure indefinitely and living in a state of 'moral' as well as material disarmament. The capital cost of the programme was estimated at £72,232,000. Out of this, £64,174,600 would have to be found within the five-year period, during which there would be an additional charge of £10,148,980 for maintenance costs. On top of this, another £72,500,000 or so might be required during the years 1935-1940 for new naval construction, though that depended upon the outcome of the 1935 naval conference.

The  
prospect  
of worse  
to come

Yet this programme which the Defence Requirements Committee recommended was not a programme of expansion. It was confined to remedying "the worst deficiencies in existing programmes that have accumulated during the régime of the Ten Years Rule, abandoned not a moment too soon: in other words, our recommendations all fall within the scope of approved Government policy". That they would long remain adequate, even the most pacific optimist could hardly believe. If the German menace developed, as the Foreign Office anticipated it would, not only would the home-based Air Force have to be expanded to keep pace with the growth of the German Air Force, but also the Territorial Army, as well as the Regular Army, would need to be modernised.

(e) The Ministerial Disarmament Committee,  
March - July 1934. (1)

Importance  
of these  
discussions

For a Government which, so recently as the autumn of 1931, had taken office with the avowed mission of stabilising the national finances by ruthless economy the prospect revealed by the Defence Requirements Committee's Report was in the last degree distressing. It is small wonder, then, that the Ministers subjected that Report to long and anxious scrutiny. Between the beginning of March and the end of July 1934 no less than seven meetings of the full Cabinet and thirteen more of the strong Ministerial Disarmament Committee (2) were devoted to discussing it; the Chiefs of Staff were often consulted and cross-examined; and almost every conceivable means of avoiding or reducing the expense of rearmament was carefully considered. In this way the discussions did much to clarify the picture of the defence problem as a whole and from them there emerged a reasonably clear and balanced policy which allotted each Service its own special role and which in its broad principles continued to govern their development until 1939 and beyond.

Search for  
alter-  
natives to  
rearmament

At first the Ministers' chief concern was to find some alternatives to national rearmament. Regarding world-wide international co-operation to keep the peace through the League of Nations as no longer a practical possibility, they sought those alternatives in regional forms. In the Far East, where there seemed little hope of international action and where British possessions were not

/yet

- (1) This section is based upon the Interim Report of the M.D.C., 16 July 1934 - C.P.193(34) (+C.I.D.1148-B enclosure); the Final Report of that Committee, 31 July 1934 - C.P.205(34) (=C.I.D.1148-B); and other sources referred to in the foot-notes.
- (2) The members of the M.D.C. were:- The Prime Minister (J.R. Macdonald); S. Baldwin; Chancellor of Exchequer (N. Chamberlain); Secretaries of State for War (Hailsham), Foreign Affairs (Simon), India (Hoare), Dominions (Thomas), Colonies (Cunliffe Lister), and Air (Londonderry); President of Board of Trade (Runciman); 1st Lord of Admiralty (Eyles-Monsell); Minister of Agriculture (W.E. Elliott); 1st Commissioner of Works (Ormsby-Gore); Lord Privy Seal (Eden).

yet directly threatened, they agreed with the Defence Requirements Committee that Britain should, while making the necessary minimum of defensive preparation, rely ultimately upon a policy of restoring good relations with the Japanese. In Europe, where international co-operation was still possible and where a German military revival would threaten the very heart of the British Empire, they hoped to save some, if not all, of the costs of rearmament by organising 'collective security' upon a more limited, and therefore perhaps more workable, scale. That organisation, they recognised, must be of a military character, for the Reports of the Advisory Committee on Trade Questions in Time of War, (1) showed that purely economic 'sanctions' would take effect too slowly and too incompletely to deter either Germany or Japan and that they would lead, and lead quickly, to war. But might not the military contribution of each State to Europe's collective security to a limited one? Might not security still be linked to disarmament?

Proposed  
limited  
liability  
partnership

It was this hope which inspired Mr. Neville Chamberlain's proposal for a "limited liability partnership" wherein the States of Europe would guarantee one another against territorial aggression and would promise to place promptly at the disposal and under the orders of a signatory State whose territories were violated, a specified force, varying perhaps from time to time in composition, but always limited in amount. (2) The proposal at first greatly attracted the Ministers, but the Chiefs of Staff had little difficulty in showing them that the methods of commerce could not thus be applied to the problems of defence. (3) The scheme for mutual assistance might work; but the liability could never be limited. Suppose, for example, that Germany attacked Poland. The strongest deterrent to such action might, the Chiefs of Staff thought, be prompt and heavy bombing of the Ruhr and Rhineland by the air contingents of the other Powers, for Germany was "notoriously apprehensive of an air attack on the Ruhr and Rhineland where are situated the main industries on which her military effort depends". But British and French bombers could not reach the Ruhr from Polish bases, even if the Poles could provide those bases. They must therefore operate from airfields in England and France and it was inconceivable that the German Air Force would obey Mr. Chamberlain's rules in such sporting fashion as not to bomb those airfields and, in addition, London, Paris and the industrial towns and communications upon which the law-enforcing squadrons depended. So England and France would still have to maintain fully equipped and organised home defence forces as well as to provide their contingent to the international offensive which, to be successful, must be conducted on a large scale. They would, in short, find themselves involved, not in a police operation of limited liability, but in total war.

Proposed  
Air Pact

Mr. Chamberlain's proposals proving impracticable, Ministers turned to consider a somewhat similar but more restricted project put forward by the Secretary of State for Foreign Affairs (Sir John Simon). (4) This suggested that the States of Europe should sign a pact by which they promised never to drop bombs on each other's territories and agreed to join in a concerted bombing offensive against any State which broke its promise. The Secretary

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- (1) Report on Economic Action against Japan, 2 March 1932 - C.I.D. Paper 1083-B; against Germany, 30 Oct. 1933 and 25 Jan. 1934 - C.I.D. Paper 1118-B, 1128-B.
- (2) Mr. Chamberlain's proposals, referred to C.O.S. 27 March 1934 - C.O.S. Paper 328.
- (3) C.O.S. reply, 28 March 1934 - C.O.S. Paper 329; C.O.S. discussion, 28 March 1934 - C.O.S. Minutes, 122nd Meeting.
- (4) C.P.137(34) quoted in the M.D.C. Final Report.

of State for Air (Lord Londonderry), however, objected that this, too, would inevitably "involve us in general hostilities" and that, in addition, "we might find ourselves involved in war in connexion with some dispute in which we had no direct concern in some remote part of Europe, such as Poland, a contingency which His Majesty's Government have always taken great pains to avoid". It would, moreover, entail long negotiations during which it would be difficult to remedy the deficiencies in Britain's armaments.<sup>(1)</sup>

C.O.S. criticisms

Lord Londonderry's objections were reinforced by the more technical arguments of the Chiefs of Staff.<sup>(2)</sup> They pointed out that, while all the signatory Powers were to promise not to use bombing aircraft, all would have to maintain large and well equipped bomber forces in case one Power broke its promise. This would vitiate the Pact, as a means to disarmament, from the very beginning. There was, too, the question of what targets should be attacked. Bombing which was confined strictly to military objectives - assuming that anyone knew just what was or was not a military objective - would not, it was generally agreed, prove a sufficiently strong deterrent; yet the upholders of international law could hardly themselves break that law at the outset by ordering an unrestricted bombardment of the aggressor. There was a possible middle course - to bomb munition centres, with the incidental risk of causing civilian casualties. But there was some difference of opinion among the Chiefs of Staff as to whether this would be either lawful or effective. The Air Staff view, voiced by the D.C.A.S. (Air Vice-Marshal Sir E. Ludlow-Hewitt), was that it would be both. Thanks to the increasing accuracy of bombing, the civilian population should not suffer severely, and the effect would be achieved not, as the A.R.P. Committee had thought in 1925,<sup>(3)</sup> by causing the moral collapse of workers in factories and public services but by diverting the enemy's energy to precautionary measures, by wasting his time through dislocating his communications, and by causing a general and continuous hold-up in his war production. The Chief of the Naval Staff and the Chief of the Imperial General Staff, however, were more sceptical of the bombers' ability to strike the factories and spare the workers, and they doubted if Hitler would "say that he was so afraid of bomb attacks on the Ruhr that he would not attack the Polish Corridor" or if the outcries of his industrial population would deflect him from his purpose when once the attack had begun.

The Pact abandoned

In any case, all were agreed that, to be effective, the attacks must be made upon a scale which would entail an increase rather than a decrease in Britain's bomber force. The D.C.A.S. reckoned that Britain, France and Poland would need to possess in combination a three to one superiority over the German Air Force. Now, although Germany at the moment was believed to possess no more than 350 military aircraft of all kinds, the rapid expansion of her aircraft and aero-engine industries and of her training establishment might before very long enable her to maintain in war a first line force of fully 800 aircraft.<sup>(4)</sup> The D.C.A.S.

/considered

- (1) C.P.138(34) quoted in the M.D.C. Final Report.
- (2) C.O.S. Minutes, 123rd Meeting, 17 April 1934: at this meeting the C.O.S. discussed the arguments, summarised above, which they would put before the Ministers.
- (3) C.I.D. Papers 135-A, 140-A, 143-A.
- (4) Report on German rearmament by Sub-Committee on Industrial Intelligence in Foreign Countries, 22 March 1934 - C.I.D. Paper 1134-B; noted by the C.I.D. May 31 - C.I.D. Minutes, 264th Meeting.

considered, therefore, that Britain, France and Poland would each need to maintain metropolitan air forces of some 1,000 first-line aircraft, two-thirds being bombers and one-third fighters. This would be tantamount to doubling the authorised British establishment, for the existing 52 Squadron programme was designed to provide a Home Defence Force of no more than 594 first-line machines. For all these reasons, the proposed Air Pact had in its turn to be ruled out. The hope that it might yet serve as a useful means to aerial disarmament caused its ghost to haunt British diplomacy for a few years more; but as an immediate alternative to rearmament it was clearly impracticable.

Decision  
to rearm

Further search for such alternatives had now to be abandoned and the Ministers admitted that they could not "at the moment foresee any development of this nature which is likely to enable us to avoid considerable expenditure in re-equipping our defence forces". At the same time, "the accumulating evidence that Germany has started to re-arm in earnest" compelled them to recognise "that it would be unsafe to delay the initiation of steps to provide for the safety of the country". The Foreign Secretary's reaffirmation on May 30, in accordance with a Cabinet decision of May 9, that Britain was determined to honour her Locarno obligations was a public avowal of this change of attitude.

The problem  
of finance

That change, however, at once brought Ministers sharply up against the problem of finance. The Chancellor of the Exchequer told them bluntly that the Defence Requirements Committee's proposals were "impossible to carry out".<sup>(1)</sup> The most he would be able to provide in the next five years, and even this he could not promise, was £50,300,000 instead of the suggested £76,800,000. The Ministerial Disarmament Committee was therefore faced with the need to cut the Defence Requirements Committee's proposals by no less than one-third. To Ministers who fully shared the popular reluctance "to undertake any kind of military commitment on the Continent of Europe", the most obvious field for such a saving was the Army. Most of the £26,500,000 which the Chancellor insisted must be saved, would be saved if it were not necessary to modernise and prepare the Regular Army to act as an Expeditionary Force for the defence of the Low Countries.

Questions  
to the C.O.S.  
about the  
Low  
Countries

On May 3, therefore, the Ministerial Committee sent to the Chiefs of Staff a series of questions on this subject.<sup>(2)</sup> Could the proposed Force of four divisions be moved across in time and, if so, would it be strong enough in combination with allied forces to hold the Germans back from the Belgian and Dutch coasts? As the Belgian fortifications were out-of-date, would it not be better to use British money to subsidise their repair rather than to prepare an Expeditionary Force to defend them? If, as was alleged, the German Air Force could make the United Kingdom untenable by operating from Low Country bases, why should not the British bomber force be able to make the Low Countries untenable for the Germans? In other words, must Britain send an Expeditionary Force to defend the Low Countries? Could she not limit her contribution in a war against Germany to providing naval and air forces?

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- (1) He made to the Ministerial Committee "a somewhat grave statement" about "the financial outlook for the next few years" - M.D.C. Final Report. In his Budget speech in the Commons on 17 April 1934, however, he had said that "we have now finished the story of 'Bleak House' and that we are sitting down this afternoon to enjoy the first chapter of 'Great Expectations'". - Hansard CCLXXXVIII. 905-6.
- (2) C.O.S. Paper 334.

The C.O.S.  
reply

The Chiefs of Staff debated these questions at some length<sup>(1)</sup> and their reply compelled the Ministerial Committee to recognise that "it is essential for us to be in a position to intervene with a military Expeditionary Force on the Continent of Europe for the defence, in co-operation with other nations, of the Low Countries".<sup>(2)</sup> The Chiefs of Staff pointed out that, while "no one can doubt our necessity for a strong Navy and Air Force", only the existence of a military Expeditionary Force suitable for European warfare would convince Continental nations that Britain really meant business. The outlook of those nations was essentially military. For then a land campaign might decide the issue long before the slow effect of a naval blockade began to be felt by Germany; and the effect of an air offensive was too problematical for any nation to rely upon it exclusively - "the use of aviation as the primary weapon in war has not yet been tested in Europe".

Moreover, the military defence of the Low Countries was of very great importance to the success of either a naval blockade or an air offensive. The naval motives, which had caused Britain to fight "at regular intervals on the Continent in order to prevent any Power, strong or potentially strong at sea, from obtaining bases on the Dutch and Belgian coasts", had now been strengthened by the development of submarines. The air motives were even more compelling. A powerful German Air Force based in the Low Countries would not necessarily succeed in making the United Kingdom 'untenable', but it would be able to attack vital targets much more heavily and more frequently than it could do from German bases. The possession of the Low Countries might, the C.A.S. considered, increase by 80% the weight of the initial attack upon London.<sup>(3)</sup> Nor was that all. If, as most authorities believed, the most effective way, perhaps the only effective way, of checking and defeating a German air offensive against Britain was to maintain an even heavier air counter-offensive against Germany, then a German occupation of the Low Countries might prove a decisive handicap to Britain's defence. Even the Air Staff did not claim that bombing alone could expel disciplined German ground and air forces from those Countries. The Germans would, therefore, always be able to maintain there an invaluable advanced warning organisation and powerful air and ground anti-aircraft defences. This would make the counter-offensive against Germany very much more difficult and more costly, perhaps prevent it altogether. On the other hand, if the Low Countries were firmly held and actively friendly, the position would be reversed. Britain might then have the advanced warning organisation and part of her bomber force might be based within a very short distance of the Ruhr valley. Even the neutrality of the Low Countries would be to Britain's advantage provided that British bombers could operate from France, for, whilst it would not lessen the weight of attack against the Midlands and North, which were little farther from north-western Germany than from Eastern Belgium, it would greatly relieve the pressure upon London and the south-east.<sup>(4)</sup>

/Further

- (1) C.O.S. Minutes, 125th Meeting, 4 May 1934; C.O.S. Paper 335.
- (2) M.D.C. Final Report.
- (3) Reply by C.O.S. to M.D.C., 14 May 1934 - C.O.S. Paper 336. The arguments summarised in the remainder of this paragraph were put forward in this and other papers, particularly the C.O.S. reply to M.D.C., 8 May 1934 (C.O.S. Paper 335); a paper by D.C.A.S. on possible scale of German attack, April 19 (C.O.S. Minutes, 123rd Meeting, Appendix II); a note by the C.A.S. appended to the C.O.S. reply on the strategical importance of Holland, May 28 (C.O.S. Paper 339, Appendix I); and two papers by the C.A.S. on the potential air menace from Germany June 12 and July 11 (C.O.S. Papers 341, 344).
- (4) Statement by D.C.A.S. at an Air Ministry and War Office Conference on A.D.G.B., 28 June 1934 - A.M. File S.33237/46A.



Questions about the French defences

Further questioning of the Chiefs of Staff only emphasised these points. On May 12 the Ministerial Committee enquired about the purpose and value of the French 'Magenot Line' defences,<sup>(1)</sup> hoping apparently that these fortifications might leave enough French troops free to assure the defence of the Low Countries. To this the Chiefs of Staff had to reply that the French, heavily out-matched by the Germans in manpower and industrial capacity, could regard the Maginot Line as no more than a means of economising men so as to be able to meet the Germans "on more even terms" on their open left flank. It could do little more than allow them to hold a continuous stabilised front until their allies could come to their aid and enable them to launch the offensive by which alone victory could be won. The possibility of leaving France "to defend that which is vital to our own security" was thus also ruled out.

Questions about Holland

A further, final, attempt to reduce the military commitment by confining it to Belgium was also made vain by the Chiefs of Staff's answer<sup>(2)</sup> that Holland and Belgium were strategically inseparable. The existence of the 'Limburg appendix' made a German violation of Dutch neutrality no less probable than their violation of Belgian neutrality, and although the German Air Force might perhaps be content with bases in only one of those two countries, both were equally important to the air defence of Britain.

The Cabinet's decision that Belgian independence vital to British security

It was clear, then, that for air defence no less than for naval reasons, the integrity of the Low Countries was of very great importance to British security and that Britain could not rely upon others to preserve their independence without herself being prepared to despatch an adequately equipped Expeditionary Force to their assistance. The C.A.S.<sup>(3)</sup> might fear that "once we were committed in this way, we should be committed with all our forces", as in 1914-1918. He might also doubt whether it would be possible to get the troops across in time in face of German bombing of the Channel and Narrow Seas ports, and whether the Government would agree "to send an Expeditionary Force out of this country till the German air threat had been sized up". But all were agreed upon the desirability and importance of keeping the Low Countries out of German hands. Accordingly, on June 27 the Cabinet decided in principle<sup>(4)</sup> that the defence of Belgium was a vital British interest which they must, if necessary, actively sustain and "that this fact should be placed on record at an early and suitable opportunity". The opportunity arose and was seized by the Foreign Secretary in a statement in the House of Commons on July 13.

Probable German courses of action

The Chancellor's £26,500,000 had, however, still to be saved and, as the Defence Requirements Committee had already limited its proposals to what were considered essential preparations, the Ministerial Committee could only make the required savings by economising upon those preparations that were essential in a somewhat less direct and immediate sense. This entailed a still closer scrutiny of Britain's home defence problems. Here the long discussions by the Chiefs of Staff, especially those concerned with the Expeditionary Force and the defence of the Low Countries, were of great assistance since they revealed more clearly the possible lines of German action and showed which would present Great Britain with her 'worst case'. The Chiefs of Staff thought it quite probable that the Germans would begin by making their offensive in Eastern Europe and by standing on the defensive in the West.<sup>(5)</sup> British

/preparations,

- (1) C.O.S. reply, May 14 - C.O.S. Paper 336.
- (2) C.O.S. reply, May 28 - C.O.S. Paper 339.
- (3) C.O.S. Minutes, 125th Meeting, May 4.
- (4) Cabinet 26(34), conclusion 4.
- (5) C.O.S. Paper 336 (May 14)

preparations, however, obviously had to be based on the assumption that they would take the opposite line. If they did, there seemed, broadly, two courses open to them. (1) They might concentrate all their military and air forces upon a land offensive through the Low Countries, designed to destroy the French armies and to secure air bases within easy reach of southern England. Or, impressed by the Maginet defences and regarding Britain as their most dangerous enemy, they might stand on the defensive on land and concentrate their energies upon an air offensive designed to cripple Great Britain at least so far as to make her intervention on the Continent impossible.

The 'worst case'

As to which of these two courses the Germans were more likely to adopt, there was a sharp difference of opinion between the War Office and the Air Ministry. (2) The General Staff thought that "air warfare by itself would not end a war" and they understood from their Attaché in Berlin that the Reichswehr ministers believed "that air forces should be used in close co-operation with land forces and that the employment of bombing outside the zone of the armies was undesirable until success on land had been assured". The War Office therefore considered that the Germans would seek to push their land forces forward as far as possible in order to destroy the French armies and secure air bases close to England. The Air Ministry, on the other hand, believed "that a school of thought is gaining ground in Germany that the Air Force will prove decisive in the next war, especially against Great Britain" and that, with the French frontier so strongly fortified, they should seek a decision by air attack and should "concentrate their major attacks on us and only attempt to hold the French". With opinion among their Service advisers so sharply divided, the British Government could not attempt to decide which course the Germans were more likely to adopt. But it was clear that the more directly and immediately vital menace would come from an attempt to deliver a 'knock-out blow' by air attack. This, then, was 'worst case', which had to be borne in mind in preparing Britain's defences, even if it were not regarded as the actual standard by which those preparations must always be measured.

Forecast of the character and course of the air war C.O.S. 341.

These discussions had also produced a fairly clear picture of what the Air Staff thought would be the character and course of the air warfare which Britain would have to face in this 'worst case'. As a result of their earlier debates, the Chiefs of Staff on May 9 asked the C.A.S. to prepare a paper on the potential air menace to the United Kingdom from Germany. (3) He presented this paper on June 12. (4)

Britain's disadvantages

The C.A.S. began by calling attention to Britain's strategic disadvantages in an air war against Germany, disadvantages which must considerably affect both the course of that war and British preparations against it. First there was "the exposed location, vulnerability, size and importance of our most vital

/districts...

- (1) C.O.S. Minutes, 125th Meeting, 4 May 1934.
- (2) Ibid: also C.O.S. Paper 335 (May 8) and A.I. File S.33237/46A.
- (3) C.O.S. Minutes, 127th Meeting. On April 17 the C.O.S. had already asked the D.C.A.S. (in the C.A.S. absence) to prepare a statement on the weight of bombs that might be dropped on the United Kingdom by a German Air Force of 1,000 first-line aircraft (C.O.S. Minutes, 123rd Meeting). This statement had been duly presented on April 19 (C.O.S. Minutes, 123rd Meeting, Appendix II). It showed the various scales of attack for a force operating (1) from bases in Germany, respecting the Low Countries' neutrality; (2) from bases in Germany, but violating that neutrality; and (3) from bases in the Low Countries.
- (4) C.O.S. Paper 341.

districts..... Added to this, there is the uncomfortable fact that, as defending aircraft can never positively prevent a proportion of air attacks reaching their objectives, so it is virtually impossible wholly to eliminate by defensive means alone the strategical disadvantage under which we suffer in this respect and it can only be negated by the provision of superior strength in bombing aircraft. But, perhaps more important ....., whatever may be our first-line air strength relative to that of the Germans, the decision in the air will ultimately depend upon the relative ability of each country to maintain the air offensive in the face of the heavy casualties which will result from intensive air operations". This required the building up in peacetime of large reserves of pilots and aircraft and the preparation of essential industries for rapid wartime expansion "to meet losses which may amount to 100% of first-line material every month". It also required the education of the factory workers and the civil population as a whole" to resist the demoralising effects of air attacks, and it necessitates the development, in peacetime of all the various means of protecting a civil population from the effects of air bombardment by high explosives or gas..... The issue will in all probability finally be decided, not by the strength of the first-line air forces, but by the relative ability of the two countries to withstand air attack and to replace air casualties and maintain the air offensive". It was Britain's crowning disadvantage that a democracy was able so much less easily than a dictatorship to make such preparations in times of peace.

Possible  
course of  
the air  
war

In the light of these general considerations, the C.A.S. went on to outline the possible course of the air war. He anticipated that "the war will open with an immediate air offensive by Germany against England", but he did not greatly fear that the Germans would be able to gain a quick decision "by an overwhelming air attack on some absolutely vital objective within, say, the first month". The provision of an adequate first-line British Air Force, combined with adequate peacetime preparations to supply and protect the civil population, should give "a reasonably sound assurance" against any such rapid 'knock-out blow'. Indeed, he did not expect the German air offensive to reach its peak "until Germany has succeeded in advancing her air bases into the Low Countries". When those bases had been secured, the attack would probably develop to its full intensity. After a time, as reserves were used up, this intensity might diminish, there might be a lull even. How long this "quieter period" lasted, would, however, "depend entirely upon the time which it takes for the industries and training schools to produce the necessary replacements and reinforcements and.....Germany may be able to maintain her initial effort undiminished". If she could, this would be the most critical period for Britain; but "if we succeed in weathering this second stage, the danger of the Germans obtaining any decisive result from their air offensive will moderate since once our industrial organisations overcome the initial difficulties of expansion and are in full production, we should be able to develop our air forces at least as quickly as the Germans".

Potential  
German  
strength

It was important, therefore, to form some estimate of the peacetime strength to which the German Air Force might grow during the next five years or so, and of her ability in that time to build up her industry for war expansion. At the moment the Air Ministry believed that the Germans aimed to have 480 first-line aircraft by the autumn of 1935 and that two further stages of expansion, each adding another 480 aircraft, were planned. Assuming a conservative rate of development this might produce by 1942 an efficient force of 1,440 first-line machines, of which 1,230 would be available as a striking force. A further expansion might subsequently raise this to 1,800 aircraft, with a striking

/force

force of 1,640. These figures, however, by no means reflected Germany's full potential capacity. Even in 1934, "given six months of uninterrupted expansion", the German aircraft and aero-engine industries could probably be developed to maintain a force of 800 first-line aircraft in war at a monthly wastage rate of 100%; and there was no reason why, in two years' time, they should not be able similarly to maintain a force of 1,800 or 2,000. Nor would there be any shortage of crews to man such a force, although it would take several years to make them operationally efficient. From these estimates, the C.A.S. therefore concluded "that Germany could, if she wished, build up rapidly in peacetime to a force of 2,000 aircraft and that the preparations which she is now beginning to make may, within, say, five years enable her to maintain such a force at practically its full strength in war".

Possible  
German  
objectives

How might such a force attempt to achieve a rapid decision? Airfields, which in the last war had proved disappointing targets, would probably attract only a small part of its effort and the disruption of the munitions industry would make its effects felt too slowly to be profitable. The centre of government at Whitehall and the large and vulnerable aircraft factories, most of which were situated in south-eastern England, were more tempting, but an attempt to break the will of the civil population might well appear the most promising of all methods. London presented "a target unequalled in importance and in difficulty of defence, with the Midlands as an alternative objective". The Germans might therefore make concentrated attacks upon certain targets in those areas, upon whose continued operation the well-being of the whole civil population of Britain depended. If they could destroy the port facilities in the Thames, Humber and Mersey estuaries, which handled nearly 70% of the foodstuffs and 60% of the total tonnage of shipping entering the United Kingdom, and if they could also blast the more important power stations, gasworks and communications centres, they might well hope to beat Great Britain speedily to her knees.

Inadequacy  
of defen-  
sive action

Now it would be impossible to defeat such an offensive by purely defensive measures. Standing patrols by fighter aircraft of short endurance would be prohibitively uneconomical - it would need six squadrons to ensure that there was always one squadron in the air during the daylight hours alone. Yet with the existing means of detecting the approach of hostile aircraft, an enemy force might penetrate far inland before the defending fighters could climb to operational height if those fighters remained on the ground until the warning was received. Within fifty miles of the coast interception of the raiders would be "always doubtful and often impossible"; between fifty and one hundred miles they ought generally to be intercepted in clear weather; but only beyond a hundred miles, would it be possible regularly to concentrate superior forces against them. "It is therefore impossible to ensure that German mass attacks will be met by aircraft in equal strength. A similar condition applies to the A.A. guns which can only be thinly spread along the probable lines of approach and round the most probable objectives."

The import-  
and and  
objects of  
the counter-  
offensive

It would therefore only be as the British air counter-offensive developed that her defensive forces might gradually establish an ascendancy and the enemy become less and less inclined to penetrate far inland. That counter-offensive was, in fact, the one truly effective means of defence. It would seek to weaken the German bomber squadrons by destroying their aircraft on the ground and by forcing them to withdraw their bases to a safer distance, which would decrease both the weight and the frequency of their attacks. It would attempt to shorten the period of large-scale attacks by destroying the depots and

/factories

factories from which the enemy squadrons were supplied and maintained. Above all, it would try "to compel the employment of German air resources defensively by the bombardment of suitable objectives such as war industries in the Ruhr and Rhineland."

Importance  
of France  
and the Low  
Countries

The success of this counter-offensive, as well as that of the defensive, would, however, depend very largely upon the attitude of France and the Low Countries. The worst possible situation for Britain and one "which must at all costs be avoided", would occur if the French remained neutral and the Germans were able to operate from Low Country bases. The Germans would then be able to develop their maximum offensive power and with little or no warning to launch heavy and continuous attacks against important objectives. The British bombers, on the other hand, would meet heavy opposition and suffer heavy losses on the long flight over enemy-held territory to the Ruhr and Rhineland. Even if France were Britain's ally, a German occupation of the Low Countries would still be very dangerous. The German attacks might be almost as heavy and frequent as ever, a striking force of 1,230 dropping perhaps an average of 150 tons of bombs every day during the first two or three weeks.<sup>(1)</sup> The Anglo-French counter-offensive from French bases would, of course, also be much heavier, yet a large part of it would have to be diverted to attacking airfields in the Low Countries; and the fighting, being conducted at such close quarters, would be exceptionally severe. If Britain could not stay the pace, owing to lack of reserves or to smaller factory production, this severe fighting might prove fatal "since once the enemy began to establish an ascendancy it would be difficult for us to regain the initiative".

In the other political conditions which might occur, there was less danger. A straight duel between Britain and Germany, in which both sides respected Low Country neutrality, could hardly produce decisive results. The Germans would have to attack at very long range and the weight of their attack, by 1,230 aircraft, might be reduced to some 75 tons a day. The British bombers, too, would only be able to approach such targets as they could reach through the narrow and heavily defended corridor between Holland and Denmark. With France allied to Britain and the Low Countries still neutral, the weight of German attack would probably fall to 50 tons a day and the Anglo-French bombers would be able to keep up an offensive that might divert much even of this effort to bombing French airfields and might eventually force the Germans on to the defensive. Finally, the situation most favourable to Britain would occur if France were her ally and her bombers could operate from Low Country bases within 75 or 100 miles of the Ruhr and Rhineland. Indeed, "the German air menace to this country will be substantially reduced if we can count upon France as an ally, and would no longer constitute a serious danger to this country if, in addition, we could hold at least the western half of the Low Countries".

French  
alliance  
vital to  
counter-  
offensive

In a second paper<sup>(2)</sup> the C.A.S. expressed this view even more strongly, and almost prophetically. "I would like to record my opinion", he wrote, "that if this country and France maintain adequate air forces and make every possible preparation in peacetime to permit of the rapid replacement of our casualties in war, and if Germany realises that she cannot attack one without the other, she is unlikely to attempt to undertake an air campaign

/against

- (1) The C.A.S. pointed out that the greatest weight of bombs dropped in the United Kingdom in one year during the 1914-1918 War was 127½ tons in 1916.
- (2) C.O.S. Paper 344, of 11 July 1934.

against us". A French alliance was in fact essential to the air defence of Great Britain, not merely in order to lighten the weight of German air attack upon the United Kingdom but, even more important, in order to give the British bomber force bases on the Continent within easy reach of vital German targets. Without those bases the British counter-offensive would have had to be conducted at such extreme range that it would provide no effective answer to the German attacks on London: "and it is the action of the counter-offensive which in the long run must decide the issue of the air campaign".

Value of  
this fore-  
cast

Here, then, was a fairly clear, if necessarily very conjectural, picture of what an air war with Germany might possibly be like and of the kind of menace it might present. It is true that the other Chiefs of Staff considered the C.A.S. paper to be unduly alarming and that it was not sent forward to the Ministerial Committee or the Committee of Imperial Defence.<sup>(1)</sup> The picture was drawn, as the C.A.S. admitted, from "an A.R.P. point of view",<sup>(2)</sup> from the point of view of what the Germans might attempt rather than of what the R.A.F. might do. That, however, was exactly its value: it showed what was the worst danger against which Britain must prepare. Nor can there be much doubt that the Ministerial Committee and the Cabinet were quite well acquainted with at least its general outline, seeing that the Secretary of State for Air was a member of both bodies and that most of the arguments contained in the paper had been placed often, though not as a whole, before the Ministers.

Attitude  
of the  
Ministers  
to these  
 dangers

Those Ministers were, moreover, peculiarly susceptible to such arguments. Home defence, as Field-Marshal Robertson had remarked,<sup>(3)</sup> must always take precedence over overseas problems: and never more so than when it is home defence in the very literal sense of defence against air attack. The alarms of June and July 1917 remained green in everyone's memory and ever since that summer British politicians had felt a strong, even an exaggerated, dread of bombing. "The attack from the air", Lord Thomson had said in 1924,<sup>(4)</sup> "is sudden, swift, and appalling, and because it is the only form of attack of serious magnitude to which we are now exposed we know perfectly well that the people of this country would never justify a government which neglected to take proper precautions against a repetition of the horrors of the air raids of the War".

Doubts  
about the  
effect of  
bombing  
upon  
civilians

Besides, *omnia ignota pro magnifico*: bombing was dreaded the more because no one had yet experienced it upon any large scale. Faced by a danger in whose assessment imagination could be so little controlled by experience, few politicians of the inter-war years were able to feel that robust confidence, which Mr. Churchill had expressed in 1917,<sup>(5)</sup> in the courage and endurance of Britain's civilian population. They agreed, rather, with the Report of Sir John Anderson's Air Raids Precautions (Policy) Committee, presented in 1930, which advised the provision of two or three battalions of troops to repair roads, decontaminate streets, and so forth in London after and during raids. Sir John, in presenting this Report to the Committee of Imperial Defence,<sup>(6)</sup>

/had

- (1) C.O.S. Minutes, 130th Meeting, 27 June 1934. The C.A.S. second paper, already quoted was written in answer to the objections raised at this meeting.
- (2) *Ibid.* <sup>CHAP.</sup>
- (3) Above, <sup>PART</sup> II.i.10.
- (4) Hansard (Lords), 1vi.506 (4 March 1924).
- (5) Above, <sup>CHAP.</sup> <sup>PART</sup> II.i.19.
- (6) C.I.D. Minutes, 250th Meeting, 29 September 1930.

had maintained that civilians could not be relied upon "to work under the same conditions, practically speaking, as might be expected of soldiers in the front line of a battle". If these battalions were not available as a nucleus and stiffening "he had little doubt that such a state of panic would be produced as might bring about the collapse, certainly of the community in London, if not of the whole country....He felt very strongly that it was only the fact of being under a code of military force, which would give the necessary security against a disastrous breakdown". It is true that the Chiefs of Staff seemed a little more ready to trust the civilians' power of endurance - or a little less enamoured of the vaunted blessings of military discipline. But no one knew with certainty what the effects of bombing would be and Ministers could not afford to take risks where the safety of the nation was involved.

Menace of  
German air  
attack  
emphasised  
by the dis-  
cussions

Moreover, the Ministers' examination of the defence problem had "thrown into somewhat higher relief the dangers to this country from air attack by Germany and the importance of the Low Countries from this point of view. This suggested the desirability of strengthening our air defence with as little delay as possible, in order to safeguard the heart of the Empire" and to show the Germans that the United Kingdom would not be left so inadequately defended as to invite attack. (1)

Parlia-  
mentary  
pressure

The trend of public opinion favoured such a course and "although currents of more or less uninformed public opinion at home ought never to be a determining factor in defensive preparations, they have to be reckoned with in asking Parliament to approve programmes of expenditure". Members of Parliament were pressing the Government to make a statement of its air defence policy before the parliamentary recess and it was clear that an expansion of the home defence Air Force would not arouse the opposition that was likely to be aroused by other forms of rearmament. (2)

The M.D.C.  
Interim  
Report  
16 July  
1934  
Expansion  
Scheme A

In these circumstances, the Ministerial Committee on July 16 anticipated its Final Report by presenting an Interim Report dealing with Air Defence. (3) In this they recommended the adoption of an expansion programme, later known as Expansion Scheme A, drawn up by the C.A.S. and designed to make the R.A.F. "ready for war in five plus three (eight) years". By this scheme £20,000,000 was allotted to the expansion of the R.A.F. during the next five years instead of the £7,514,000 suggested in the Defence Requirements Committee's Report and the home defence force was to be increased by 1939 to 75 squadrons in place of the 52 of the existing programme, of which only 42 as yet existed.

Provision  
of reserves  
postponed

Now this was an expansion programme, not just a programme for remedying accumulated deficiencies such as the Defence Requirements Committee had proposed. Yet the money to pay for it had to be found out of a total sum, for all three Services, amounting to only two-thirds of that contemplated by that Committee. Even after the Army's share had been cut by almost one-half and the Navy's

/by

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- (1) M.D.C. Final Report.
  - (2) Ibid.
  - (3) M.D.C. Interim Report, 16 July 1934 - C.P. 193(34) = C.I.D. Paper 1148-B, enclosure 1.



by more than one-third, (1) there was still too little money available to equip the proposed 75 R.A.F. squadrons with full war reserves by 1939. (2) The Ministerial Committee therefore allotted only £1,200,000 of the £20,000,000 to the provision of such reserves. At the moment there was a good case for this decision. It would be some years before Germany was ready for war. Meanwhile, "considered from the point of view of the deterrent effect upon Germany as a potential aggressor and from that of public opinion in this country, there is much to be said for the formation of as large a number of new squadrons as possible. Apart from this, there are strong objections to piling up reserves of aircraft too soon", owing to the rapid development of aircraft design. The Committee therefore postponed the provision of the bulk of the war reserves to the years 1939-1942. This, while it would not produce by 1939 a force "capable of sustained warfare", would provide "the framework of such a force, with those permanent elements such as personnel, aerodromes, buildings, workshops and so forth, which take so long to provide in normal times. If necessity arises", the Interim Report added, "it will be possible to accelerate the provision of all the essential accessories".

The Report's  
warning on  
this matter

The Committee, however, recognised that "there are obvious risks in the plan of 'putting all our wares in the shop window', if pressed too far". Other Powers might discover the true position and then the deterrent effect of the expansion might be largely destroyed. The Interim Report, therefore, added a warning that "the reserve must be provided before an outbreak of war becomes imminent".

x  
x

- 
- (1) The allotment to the Army was reduced from £35,660,000 in the 5 years to £20,000,000. Only £12,004,000 was allowed for the Regular Army Expeditionary Force, leaving £15,568,000 to complete: and only £200,000 was allotted to the Territorial Army. The Navy's allowance was reduced from £21,000,000 to £13,000,000. M.D.C. Final Report.
- (2) M.D.C. Interim Report.

III. THE ORIGINS OF BOMBER COMIAND:(ii) EXPANSION AND EQUIPMENT, 1934-1936

A new  
phase in  
air  
strategy  
opens

The Cabinet's approval<sup>(1)</sup> on 18 July of the Ministerial Disarmament Committee's Interim Report began a new phase in the history of the R.A.F. and the home-based bomber force. They had now to prepare against the possibility of a major European conflict breaking out in eight, or perhaps even in five, years, instead of looking forward to 'no war for ten years'. They had now to prepare in earnest to defend the United Kingdom against the rapidly expanding air power of Germany, instead of measuring themselves somewhat academically against the Air Force of France. They had now to envisage bombing operations at long range against the Ruhr and Rhineland, instead of comparatively short-distance raids to Paris and Lille. They had therefore to consider the development of bombing aircraft of much greater range and power, or, failing this, the transference of most of their bombing squadrons to continental bases. There were changes of no small magnitude and they necessitated a complete revision of the strategical requirements of the bomber force.

It coincides with  
a new  
phase in  
technical  
development

At the same time a new phase in technical development was also beginning, and this was gradually to impose an equally thorough overhaul of technical and tactical requirements. The biplanes, which had held the field since the War of 1914-1918, were about to give place to all-metal monoplanes whose cleaner lines and more powerful engines gave them a much greater speed, performance, and lifting capacity. How far the established tactics, even the accepted strategy, of air warfare would be modified by the introduction of these new aircraft was a matter needing the most careful examination. So, from July 1934 onwards, the R.A.F. was faced not only by the problems attendant upon a rapid expansion of its numbers, but also by the need to re-orient its policy and to reconsider its equipment against a new strategical situation and a rapid technical development.

The 1933-4  
discussions  
as a  
working  
guide to  
expansion

And once again, as in 1917 and 1923, all this had to be put in hand before any detailed operational plans were available. Indeed, two further Schemes of Expansion beyond the 1934 Scheme were to be adopted before work upon detailed operational plans even began.<sup>(2)</sup> The position was, however, a good deal better than in 1917 or 1923, for the lengthy discussions in 1933 and 1934 had provided a very fair working guide to what would be required. It was clear enough that the R.A.F.'s first duty was now to prepare itself to defend the United Kingdom against the German Air Force. It was also clear that an air counter-offensive was still regarded as the best form of air defence. And even the probable objectives of a counter-offensive against Germany had been marked out in a general way - the bases and depots of the German air striking force; the aircraft factories and the communications which maintained its strength; the great industrial districts of the Ruhr and Rhineland upon which all German belligerent power was founded.

Character  
of the  
years  
1934-6

In a broad sense, then, the nature and objectives of the operations for which the bomber force had now to make ready, were fairly well defined. Yet it was some time before this general appreciation could be translated into detailed requirements and

/longer

(1) Cabinet 29(34), Conclusion 3; 31(34), Conclusion 1.

(2) For the history of this operational planning, see below, ~~Part~~ Part IV, i.

longer still before these requirements could be satisfied. The history of the years 1934-1936 is thus largely a story of how the character and composition of the bomber forces were gradually developed as the implications of its new role were worked out and the possibilities of the rapid advance in technical development became apparent. All the while there was in the background a growing anxiety about the international situation, serving as a relentless goad to more rapid change and compelling the Air Ministry repeatedly to produce a new scheme for a yet larger expansion almost before the ink upon the last paper was dry.

(a) Expansion Scheme A, July 1934

Character  
of  
Scheme A

The first of these Expansion Schemes, that approved on 18 July 1934 and known later as Scheme A, was designed not so much to produce a force equipped already for war as to provide a deterrent to German ambition and a training establishment from which a more adequate force might be created if the Germans refused to be deterred. This explains its more obvious peculiarities - its provision for a greater proportionate expansion of the fighter force than of the bomber force and its failure to provide a bomber force capable of mounting an effective air offensive against Germany.

Greater  
proportionate  
increase  
in fighter  
strength  
despite  
lessening  
prospects  
of the  
defensive

The greater proportionate increase in fighter than in bomber strength seems at first sight especially remarkable, for the 1933-1934 discussions had suggested that the prospects of successful defence by fighters were steadily lessening. The improvement in scientific aids to navigation, in which continental countries were ahead of Great Britain, (1) made it likely that bombing attacks would be made more frequently in those conditions of darkness or poor visibility where interception was most difficult. (2) The increasing speed of night bombers - in 1923 only 80 m.p.h. had to be reckoned with, but now there was good reason to expect that 200 m.p.h. "will soon become normal" - added to the fighters' difficulties and necessitated widening from 15 to 25 miles the lighted zone where they might hope to make their interceptions. (3) The increase in day bomber speeds was equally disturbing. Interception depended largely upon the ratio between the bomber's forward speed and the fighter's rate of climb and while the former was steadily increasing, the latter seemed incapable of any great improvement. For this reason it was necessary even now to push the aircraft fighting zone back almost on to the areas it was designed to protect; and the A.O.C., Fighting Area (A.V.M. Joubert de la Ferté) believed that, if bombers were to fly at more than 200 m.p.h. and over 10,000 feet and if no warning of their approach could be given before they crossed the coast, then it would be impossible to intercept them from the ground before they reached London or the Midlands. The only feasible, though most uneconomical, form of fighter defence would be to maintain standing patrols. (4) Furthermore, the narrowing margin of speed

/between

- (1) Statements by AOC-in-C, A.D.G.B. (A.M. Brooke-Popham) and D.D.O.I. (G.C. Peck), 1st meeting of Brooke-Popham Sub-Committee on A.D.G.B. 17 Oct. 1934 - A.M. File S.34572/26A.
- (2) Interim Report of Brooke-Popham Sub-Committee, 31 Jan. 1935 - A.M. File S.35381/1/2B.
- (3) Air Staff Memorandum on reorientation of air defence system, 30 July 1934 - A.M. File S.33237/50A.
- (4) 26 Oct. 1934 - A.M. File S.34572/39B; also memorandum by Maj.-Gen. Salt, 19 April 1934 - A.M. File S.33237/2A.

between fighter and bomber was reducing the value of "sporadic 'close-in' attack" by single-seat fighters whose fire-power was insufficient to destroy the enemy in a single attack and whose narrowing margin of speed would hardly permit them to regain position to repeat their onslaught. Very much faster single-seat monoplane fighters, carrying eight machine guns instead of two or four, were already being considered. But these were still little more than projects on the drawing-board. Until they had been tested and proved, "the need for some more deliberate and sustained method of building up superiority of fire" could be met only by creating a number of twin-seat fighter squadrons, (1) a measure which threatened to produce just that 'double-banking' of the fighter force against which Lord Trenchard had striven in 1923. For the time being, at least, it seemed that the prospects of successful fighter defence were diminishing and that the importance of the bombing counter-offensive was correspondingly enhanced. (2) How was it, then, that Scheme A allotted a larger proportion - and indeed actually a larger number - of the new squadrons to fighters than to bombers?

Reasons  
for this  
disprop-  
ortionate  
increase

The answer seems to be that, while in the absence of detailed operational plans the requirements of the bomber force were not easy to estimate exactly, the needs of the defence and of the ancillary forces serving with the Navy and Army had been fairly closely assessed before Scheme A was promulgated. These defensive and ancillary requirements, indeed, had to be settled, since they involved the other Services as well as the R.A.F. The guns and searchlights needed for the Air Defence of Great Britain had to be supplied by the War Office and the scale of their provision would vitally affect the development of the Territorial Army (3) and even of the Regular Expeditionary Force. (4) An early decision was therefore necessary, and discussions upon the lay-out of the defensive system had begun in the Air Ministry as early as 13 December 1933. (5) Informal discussions with the War Office had followed from February 1934 onwards (6) and by the middle of June, a month before Scheme A was authorised, the Air Ministry's proposals had already been formulated. (7) These proposals could not leave the fighter force out of account and so the detailed requirements for fighter aircraft in the air defence system had already been worked out when Scheme A came to be prepared.

Edward

Efforts to  
limit ex-  
pansion of  
defensive  
side

The C.A.S. (Air Chief-Marshal Sir John Ellington) had certainly done his utmost in these preliminary discussions to keep the number of fighter squadrons down to the bare minimum. In February 1934, when the 52 Squadron scheme still held the field, he had insisted that they must not be increased above the 17 provided for in 1923. (8) At the same time, he tried to redress the balance between first-line bomber and fighter units. He ruled that the three fighter squadrons which remained to be formed to complete the 17, should be provided by converting three of the R.A.F. squadrons from bombers to fighters and forming three new Regular bomber squadrons in their place. (9) Again in April when the 75 squadron home defence force

/was

- (1) A.M. File S.32445/1A, 19A.
- (2) Minute by C.A.S., 22 March 1934 - A.M. File S.33015/19.
- (3) Lt.-Gen. Dill to D.C.A.S., 15 June 1934 - A.M. File S.33237/39A.
- (4) Minute by C.A.S., 1 Aug. 1934 - *ibid.*, minute 62.
- (5) Minutes of a conference, 13 Dec. 1933 - A.M. File S.33015/5A.
- (6) A.M. File S.33015, 33237.
- (7) D.C.A.S. to Hankey, 16 June 1934 - A.M. File S.33237/40A.
- (8) Minute to D.C.A.S., 16 Feb. 1934 - A.M. File S.33015/1.
- (9) Minute by D.O.S.D. to C.A.S., 26 Feb. 1934 - A.M. File S.22846/II/88 C.A.S. reply, 27 Feb. 1934 - *ibid.*, minute 89.

was envisaged and the Director of Operations and Intelligence estimated that 28 fighter squadrons would be needed for the more extended aircraft fighting zone then proposed, (1) the C.A.S. again insisted that 25 was the most that could be allowed. (2)

Increased  
needs of  
the  
defence

It was nevertheless impossible to ignore the fact that the needs of the defence had increased considerably since 1923. The substitution of Germany for France as the potential enemy meant that "England now presents her longer, instead of her shorter, side to the enemy". Again, the increase in the operational range of bomber aircraft - ranges up to 375 miles had now to be reckoned with - meant that the industrial areas on the Tyne and Tees, in Lancashire and western Yorkshire, in the Midlands and around Birmingham, were well within reach of bombers based in north-western Germany. And while these areas were no longer covered, as they had been against France, by the defensive system of southern and south-eastern England, the possibility of the Germans operating from or across the Low Countries ruled out any weakening of the defences of London and the South. The aircraft fighting zone had therefore to be re-oriented and extended until it stretched in a continuous line from Portsmouth around London to Middlesborough. (3) For such a line, even the C.A.S. had to admit that 25 squadrons was a minimum, (4) and this figure was incorporated both in Scheme A and in the Air Staff's proposals for re-orienting the defensive system. (5)

Needs of  
the Army  
and Navy

Of the 75 squadrons, 25 had thus to be allotted to fighter defence at home. But this was not all. The Army needed three fighter squadrons for the Expeditionary Force, (6) in addition to the five army co-operation squadrons which were not counted among the 75. These three squadrons, too, had to be deducted from the 75. The Navy, again, needed the help of shore-based aircraft, in addition to the four flying boat and 16½ Fleet Air Arm squadrons. So two torpedo-bomber and four general purpose squadrons had to be allotted to Coastal Area Command, (7) and of these six had likewise to be found from the 75. Finally, the two 'emergency' squadrons (Nos. 35 and 207), though counted among the home-based bombers and placed under the A.D.G.B. Command, were primarily intended as reinforcements for the overseas Commands. Equipped with Gordon aircraft, they were to spend a portion of each year in training for torpedo work and were eventually to be rearmed with torpedo-bomber aircraft. (8) So, besides the 25 home-based fighter squadrons, 11 other squadrons had to be provided out of the 75 for these various purposes.

39 bomber  
25 fighter  
squadrons

There were therefore no more than 39 squadrons properly available for the Bomber force and the true proportion between bombers and fighters was 39 to 25 instead of 35 to 17 as in the 1923 Scheme. (9) It is true that the Air Staff hoped to redress the balance a little by using the two 'emergency' and six general

/purpose

- (1) A.M. File S.33237/1A.
- (2) Ibid., minute 6.
- (3) Air Staff Memorandum on re-orientating the air defence system, 31 July 1934 - A.M. File S.33237/50A, 50B.
- (4) A.M. File S.33015/19.
- (5) A.M. File S.33237/50A.
- (6) Interim Report of Brooke-Popham Sub-Committee, 31 Jan. 1935 - A.M. File S.35381/I/2B.
- (7) See below, Appendix III.
- (8) A.M. File S.35438; also S.22846/III/6, 6A, 10A, 19.
- (9) This phrase refers, of course, to the proportions actually existing in the Scheme A force and the 1923 force. There was, the Air Staff repeatedly insisted, no fixed ratio between bombers and fighters.

purpose squadrons to reinforce the bombing offensive if the strategical situation allowed. But, leaving aside the question of how suitable such squadrons and their aircraft would be for such work, it was hardly to be expected that the Admiralty would welcome this idea and, in fact, every step taken to define the exact role of the Coastal squadrons was to make the chance of their co-operating with the bombers more remote.<sup>(1)</sup> Also, of course, if those eight squadrons were counted on the bomber side, the Army's three fighter squadrons had to be included on the fighter side. At best, therefore, there could be no more than 47 bomber as against 28 fighter squadrons, an appreciable falling off from the two to one preponderance allowed to the bombers in 1923.

Reasons  
for the  
inadequate  
equipment  
of the  
bomber  
force

The failure of Scheme A to equip even the 39 bomber squadrons with aircraft that would enable them effectively to attack Germany, might appear no less remarkable than its provision for a proportionately larger increase in the fighter force. The Air Staff were convinced "as a general principle that all bomber squadrons must be prepared to operate from this country". They knew that the light bombers could not effectively attack Germany from bases in England. They recognised "therefore that the heavy and medium squadrons not only "constitute the most powerful element in the striking force" but also were the only squadrons which could at all adequately fulfil the strategical purposes of that force in a German war."<sup>(2)</sup> Yet in preparing Scheme A the C.A.S. had explicitly accepted that not more than 17 of the 39 squadrons should be armed with heavy or medium bombers.<sup>(3)</sup> What were the reasons for this contradiction between theory and practice?

Financial  
reasons

The decisive reasons were undoubtedly financial. A light bomber squadron of 12 Harts entailed a capital outlay in works equipment of £245,000 and an annual maintenance charge of £83,000. A medium squadron of 12 Overstrands would cost £370,000 and £133,000. A heavy squadron of 10 Virginias cost £375,000 and £139,000.<sup>(4)</sup> Now the approved estimates for Scheme A allowed for no medium squadrons and only nine heavy squadrons, although there was margin enough to cover also the three Special Reserve heavy squadrons. Hence, when the D.C.A.S. proposed that the bomber force should be made up of 10 heavy, 16 medium, and only 15 light squadrons, it was quickly found that such a force could not possibly be provided out of the £20,000,000 allotted to the R.A.F. for its expansion. The most that could be done would be to form another five heavy or medium squadrons, in addition to the nine Regular and three Special Reserve already existing; and even these five could only be formed towards the end of the five years period of the programme.<sup>(5)</sup> These were the facts which decided the C.A.S. to decree that only 17 of the 39 bomber squadrons could be equipped with heavy or medium bombers.

Technical  
reasons  
lack of  
tested  
heavy and  
medium  
bombers

There were, however, other considerations, both technical and political, which disposed the Air Staff in 1934 to accept the limitations imposed by finance. On the technical side there was the fact that only among the light bombers were there types available which were not either already obsolescent or else in so early a stage of designing that their success could not be relied upon. Among the heavy bombers, the Virginias

/were

- (1) See the Narrative of The R.A.F. in Maritime War prepared in A.H.B.
- (2) Conference of 25 July 1934 - A.M. File S.22846/III/2A.
- (3) Minute by C.A.S., 24 July 1934 - *ibid.*, enclosure 1B.
- (4) *Ibid.*, enclosure 1A.
- (5) Minute from S.6 to C.A.S. 24 July 1934 - A.M. File S.22846/III/1B.

were so ancient as to be obviously useless; the Heyfords and Hendons, which were just beginning to replace them<sup>(1)</sup> had been designed six years ago and were admittedly inadequate for a German war; and beyond these, there was nothing in sight except the speculative Armstrong B 3/34 monoplane whose two prototypes were not due to fly until February 1936.<sup>(2)</sup> With medium bombers, the situation was similar. The medium bomber class was a new one, evolved out of the light day bomber class in the search for a day-and-night bomber. The existing Sidestrands, and their improved version, the Overstrand, rather foreshadowed than belonged to this new class, whose true first representatives were the monoplanes that were being designed to the B9/32 and amended P27/32 specifications. But the prototypes of these B9/32 and P27/32 aircraft would not be ready to fly until December 1935.<sup>(3)</sup> The outlook in the heavy and medium bomber classes was thus speculative, all the more so since the new designs were all monoplanes embodying new and untried features in both airframes and engines.

Tested ,  
light  
bombers  
available:  
arguments  
in their  
favour

War not  
expected  
till 1939  
or 1942

Need to  
form and  
train new  
squadrons  
rapidly

In the light bomber class, on the other hand, there were tested types available which were already, or soon would be, in full production and which were not yet obsolescent. These types were the Hart, and its improved version, the Hind, which had passed its service trials in May 1934.<sup>(4)</sup> Neither, of course, could operate effectively against Germany from bases in England. But in 1934 there was still no immediate prospect that they would be called upon to attempt such operations. The whole British rearmament programme was based upon the assumption that war with Germany, even if it were inevitable, could hardly occur before 1939 and probably not before 1942. What was needed in 1934 was to form as many squadrons as possible as quickly as possible, both to serve as a present deterrent to German ambition and to provide - lest Germany should not be deterred - trained crews in adequate numbers, to man a more effective force by the time Germany might be ready to act. For these purposes the Harts and Hinds had much to recommend them. Conversion training from them to the new medium bombers was not likely to be a lengthy process and meanwhile they would not themselves be quite useless. They were suitable for dive-bombing and army co-operation work; they were easy to ship and handle in the field in the less developed parts of the Empire; and their speed was (at that date) a tactical asset that would in war offset some of the deficiencies in the training of non-regular or hastily trained crews.<sup>(5)</sup> Above all, they had been tested, they were cheap and easy to build, and they could be produced immediately in the numbers required. For immediate purposes, which did not justify the Air Staff in gambling upon new and untried types, the light bombers would serve well enough. With them the formation of squadrons and the training of crews could be pressed forward at once and present economy need not therefore be unduly harmful to ultimate efficiency.

Composi-  
tion of  
Scheme A  
bomber  
force

It was on these grounds that the Air Staff retained the light bombers in the home-based bomber force, and even increased their numbers. Of the 41 bomber squadrons (including the two 'emergency' squadrons) of 476 first-line aircraft that were to be completed by 1939, 25<sup>(6)</sup> with an initial establishment of

/12

- (1) The first squadron to be equipped with Heyfords was No.99(B) in Jan. 1934.
- (2) A.M. File S.32832/I/1A to 36A: S.35214/13, 18.
- (3) A.M. File S.31154/43, 46C, 46D, 48; S.35247/5b.
- (4) A.M. File S.33276/9A.
- (5) Conference of 25 July 1934 - A.M. File S.22846/III/2A.
- (6) Originally fixed at 24, but altered to 25 (heavy and medium being reduced from 17 to 16) to avoid creating two single-squadron stations, one for light and one for heavy or medium bombers - ibid., enclosure 5A.



12 aircraft apiece were to be light bombers, a total of 300 aircraft; 8 with an initial establishment of 12 each, were to be medium, a total of 96 aircraft; and 8 with an initial establishment of 10 each were to be heavies, a total of 80 aircraft. So the ratio of 4 : 3 between light and heavy squadrons laid down in 1923 was now altered to a ratio of 3 : 1 : 1 as between light, medium and heavy squadrons.

Measures  
to miti-  
gate its  
weakness

Certain measures were, however, taken to mitigate the admitted deficiencies of this force. All the non-regular squadrons were, for example, to be numbered from henceforward among the light bombers,<sup>(1)</sup> so that the more adequately equipped heavy and medium squadrons would also have the best trained crews. Plans were also laid to prepare, or at least to discover, advanced landing grounds near the coast where the short-range light bombers might re-fuel.<sup>(2)</sup> And further plans were started for basing 22 of these squadrons on the Continent where they would be within more practicable distance of German targets.<sup>(3)</sup>

Measures  
to prepare  
a more  
adequate  
force for  
the future

At the same time preparations were made to ensure that a more adequate striking force could be provided when circumstances required or finance permitted. These preparations were, broadly, of three kinds. Some were intended to produce a planned, long-term, programme which would secure a regular flow of new designs of aircraft. Others were directed towards settling the classes of aircraft, the methods, the types of machines, and the equipment needed to carry out the Air Staff's operational requirements. Yet others were concerned with estimating the probable requirements of the force in aircraft, and supplies during the first year of war, as a preliminary to the adoption of a balanced policy for the eventual building up of war reserves.

Planning of  
aircraft  
design and  
replacement  
programme

The idea of a long-term programme for the design and production of new types of aircraft was an old one. It dated back at least to the Charlton Report of 1926, whose recommendation of a "stabilised re-equipment policy" had been endorsed by the Aircraft Supply Committee of 1931 and the War Supply Committee of 1933.<sup>(4)</sup> So far, however, little had been done to realise this idea. Financial economy had made any programme impossible and the unpredictability of technical progress, particularly in the development of aero-engines, made any rigid programme undesirable.<sup>(5)</sup> Yet the need for some measure of planning was obvious, if only to lessen the time taken to design and produce a new machine<sup>(6)</sup> - five and a half years from the formulation of the Air Staff's requirements to the delivery of the first production aircraft in the case of light types, six and a half years for medium and eight for large.<sup>(7)</sup> Various projects put forward in 1923 for planning design and re-equipment down to 1950<sup>(8)</sup> served, however, only to manifest the difficulties of looking so far ahead. There was more hope in the modest suggestion, made by F.O.1 on June 16<sup>(9)</sup> and sponsored by D.C.A.S. on July 22,<sup>(10)</sup> of a committee to review the

/Air

- (1) A.M. File S.22846/III/1B, 2A.
- (2) Ibid., enclosure 2A.
- (3) Minute by D. of O., 13 Dec. 1934 - *ibid.*, minute 29.
- (4) Minute by F.O.1 to D.C.A.S., 16 June 1933 - A.M. File S.32372/1.
- (5) Ibid.
- (6) Ibid., minutes 10 to 13; also S.34919/1, 1A, 2: S.30373/8, 10.
- (7) A.M. File S.32372/1.
- (8) Ibid., enclosures 9A and B, 14A and B.
- (9) Ibid., minute 1.
- (10) Ibid., minute 5.

Air Staff's requirements and consider a programme each year for the replacement of old and the design of new types. This Type Replacement Committee, composed of representatives of the Air Staff, of the technical departments of the Air Ministry, and, when necessary, of the home Commands, (1) was eventually set up in March 1934. (2) In April it was reinforced by a similarly composed Re-arming Committee whose duty was to advise each year upon which squadrons should be re-armed and with which of the available aircraft. (3) Finally, at a conference held on 16 October 1934, it was decided that in future the Air Staff should initiate the next year's programme of new designs and that the Director of Technical Development, who had hitherto drafted the programme, should merely add suggestions for machines for experimental and research work. (4) Aircraft design was thus being brought into much closer relation with operational requirements while at the same time the conference agreed upon various measures to hasten the production of the new types of heavy and medium bombers. (5)

Preparation  
of statement  
of classes  
of aircraft  
required by  
Air Staff

But before the design programme could be properly related to operational requirements, another kind of preparation and enquiry had to be completed. It was necessary to know what classes of aircraft the Air Staff would require to execute this strategy; to know what tasks they would expect each class to perform; and to examine comprehensively the tactics, the technical equipment, and the types of machines and weapons which would accomplish those tasks most effectively. None of these investigations had hitherto been attempted except in a very limited and piecemeal fashion, (6) but during 1934 all of them were at least set going. On October 17 the D.C.A.S. called upon the Plans branch of the Air Staff to review the nature of the operations in which the overseas squadrons were likely to be engaged, and to advise upon the classes of aircraft that they would need. (7) Six weeks later, on November 27, he accepted the suggestion of the D.D.O.I. (Group Captain Peck) (8) that this enquiry should be extended to cover the home-based squadrons as well, (9) and the Plans and Operational Research branches settled to the task of preparing an Air Staff Memorandum on the subject.

Establishment of the  
Bombing  
Committee

Almost a year earlier, in January 1934, a 'Bombing Committee' had also been established under the chairmanship of the D.C.A.S. (10) Its terms of reference (11) were:-

/"(i)

- (1) Ibid., minute 8.
- (2) A.M. File S.33168/1.
- (3) Ibid., minute 3; 1st Meeting April 12 - ibid., encls. 10A, 11A & B.
- (4) A.M. File S.34513/7A; S.34932/6B.
- (5) Ibid., also S.31154/36, 37, 41, 42, 43, 45A to D; also S.34919.
- (6) Minute by D.D.O.I., 15 Nov. 1934 - S.34766/3.
- (7) Ibid., minutes 1, 2.
- (8)
- (9)
- (10) Its composition in Sept. 1936 was:- "Air Ministry: D.C.A.S. (Chairman); D.S.D. (deputy-chairman); D. of T; D.S.R; D.D.Ops; A.D.R.D. (Arm); A.D.R.D. (Inst.); R.D.Arm.4; O.R.S: T.W.1; T.Arm; S.A. to D.S.R. (Mr. A.P. Rowe). Commands etc: AOC., Armament Group; O.C. Air Armament School; S.A.S.O., Bomber Command; S.Arm.O., Bomber Command; R.A.E. (Mr. Meredith)" and three representatives of the Admiralty - 1st Interim Report of Bombing and Air Fighting Committees, Sept. 1936.
- (11) Ibid., quoted from A.M. File S.32780.

- "(i) To examine methods of bombing to be used against various types of targets under varying conditions, to investigate their operational, scientific, and technical practicability; and to make recommendations thereon.
- (ii) To consider and investigate (a) the special equipment (including types of bombs) required for specific methods of bombing, and to initiate and co-ordinate the supply of such equipment; (b) the suitability of existing and future types of aircraft for such methods of bombing as may be selected; and to make recommendations.
- (iii) To consider the principles to be adopted in training in the types of bombing to be selected, and to make recommendations thereon."

The committee first met on 6 April 1934 and it held four more meetings during that year.<sup>(1)</sup> At these five meetings, although it did little more than clarify the existing situation as to bombing methods,<sup>(2)</sup> it at least began to make clear the lines which its investigations should follow.<sup>(3)</sup>

Discussions  
on reserve  
policy

While these enquiries were beginning, the question of reserve policy was also being examined. Discussions on this subject had revived after the appointment of the Defence Requirements Committee in November 1933.<sup>(4)</sup> On 27 June 1934 the C.A.S. had approved proposals for providing the existing squadrons of the home defence force with war reserves on a scale of 150% of initial establishment for single - and 75% for twin-engined bomber squadrons.<sup>(5)</sup> At that time the only bomber squadrons which possessed any war reserves at all were the two 'emergency' squadrons (Nos. 35 and 207) and two earmarked for Contingent B of the Expeditionary Force (Nos. 12 and 33) - the two earmarked for Contingent A (Nos. 18 and 57) had just had their reserves taken to form two new squadrons (Nos. 15 and 142).<sup>(6)</sup> The Government's approval of Expansion Scheme A in July 1934, however, annulled the C.A.S. ruling of June 27. It was now impossible to provide for the building up of any appreciable war reserve before 1939.<sup>(7)</sup> Only £1,200,000 was allowed for such purposes during the five-year period and it was stipulated that this money should be used "to provide armaments and ammunition of which there would be no risk of deterioration or obsolescence".<sup>(8)</sup> This, in the existing turmoil of bomber development, practically ruled out the purchase of any war reserves of airframes or aero-engines or even machine guns.<sup>(9)</sup> The most that could be done was to arrange to provide some reserves of aircraft for the four Expeditionary Force and two 'emergency' squadrons; to build up the bomb stocks from 4,565 to 8,000 tons; and to lay in stores of torpedoes, pyrotechnics, oxygen cylinders and gas respirators.<sup>(10)</sup>

/Meanwhile,

- (1) Ibid.
- (2) Secretary of Bombing Committee to D.S.D., 6 Feb. 1935 - A.M. File S.35247/3.
- (3) Ibid., also 1st Interim Report.
- (4) A.M. File S.33376/6.
- (5) Ibid., enclosure 4A; minute 7.
- (6) Ibid., enclosure 4A; S.30973/76.
- (7) A.M. File S.33376/10.
- (8) Ibid., minute 9.
- (9) Ibid., minutes 16, 18.
- (10) Ibid., enclosure 20A; also S.35520/1A.

Estimates  
of require-  
ments, etc.

Meanwhile, somewhat better progress was made in the examination of certain preliminary questions. The size to which the R.A.F. would be expected to expand after the outbreak of a war with Germany was fixed. It was to grow to 192 squadrons at home and overseas by the end of the six months of war and thereafter to increase at a rate not less than that at which the German Air Force was capable of expanding.<sup>(1)</sup> The varying intensities at which the various classes of aircraft would be expected to operate and the scale of opposition which they might expect to meet were also settled. From this the probable rate of wastage in each class could be estimated.<sup>(2)</sup> This in its turn allowed the total requirement in men and material to be calculated for the first year of war. The Man-Power and Principal Supply Officers Sub-Committees of the Committee of Imperial Defence were pressing for such estimates from all the Services in order to lay their own plans for the allocation of men and industrial capacity.<sup>(3)</sup> On 26 October 1934, therefore, the C.A.S. instructed the Plans Branch to prepare a draft statement of what would be needed to provide for the proposed wartime expansion of the R.A.F. and for the adequate maintenance and replacement of its men and material during the first year of a German war.<sup>(4)</sup> On November 8 the Plans Branch produced a provisional statement - provisional, because neither the operational plans nor the exact classes of aircraft to carry them out had yet been decided upon.<sup>(5)</sup> The proposals, even so, called for the training of an impossibly large number of pilots during the first year of war and so provoked prolonged discussions with the Director of Training and made necessary further rulings by the C.A.S.<sup>(6)</sup> It was not until 22 March 1935 that the figures could be worked out upon a new and more practicable basis.<sup>(7)</sup> This revised, though still somewhat provisional, statement was eventually approved by the C.A.S. on April 4<sup>(8)</sup> and forwarded to the Principal Supply Officers Committee on April 8. It showed a total requirement during the first year of a German war, for a force entering the war at the Scheme A figure, of 123 squadrons and expanding to 192 by the end of the sixth month and to 260 by the end of the first year, of 21,956 aircraft (14,261 Service and 7,695 training types) and 9,911 pilots. Of the aircraft 3,476 would be light, 3,462 medium, and 788 heavy bombers.<sup>(9)</sup> By subtracting from these totals the figures for the estimated output of the training schools and factories and by allowing for the more lightly injured men and machines who might return to active service, an estimate could now be made of the quantity of war reserves which it would be desirable to build up in peace-time. With these matters provisionally settled, the approach to a definite reserve policy and to a 'stabilised re-equipment policy' seemed to have been cleared.<sup>(10)</sup>

(b) Expansion Scheme C, May 1935

Growing  
anxiety  
about  
G.A.F.

These preparatory investigations were just nearing completion when the assumptions upon which they were based were altered by the introduction of a new Expansion Scheme. The principal reason for this new Scheme was a growing alarm over the progress

/of

- (1) Air Staff paper, 4 October 1934 - A.M. File S.32963/12A.
- (2) A.M. File S.33423.
- (3) A.M. File S.32693/19.
- (4) Ibid.; minute 11.
- (5) Ibid., enclosures 18A and B, minute 19.
- (6) Ibid., minutes 23 to 29; enclosures 23A to D.
- (7) Ibid., enclosure 30A
- (8) Ibid., minute 34.
- (9) Ibid., enclosures 33A, 36A; C.O.S. Paper 371.
- (10) D. of O. to D.C.A.S., 12 Feb. 1935 - A.M. File S.32372/21.

of German air rearmament. For some time the Air Ministry's estimates of the growth of German air power had been rising steadily. In the autumn of 1933 they had not expected the Germans to possess any military aircraft before the end of 1935 and only some 200 for several years after that. (1) By March 1935, however, it was known that Germany already possessed 350 machines of military types and that her total production of all types amounted to 60 a month. (2) By July some information had been gleaned as to the aims of this expansion. There were, it seemed, to be several stages. The first stage was designed to provide by 1 October 1935 a moderately efficient force of 504 first-line and 72 auxiliary aircraft with an equal number of reserves. (3) The aims of the later stages were not known but it was apparent that the German aircraft industry could even now, "given six months of uninterrupted expansion", maintain in war a force of 800 first-line aircraft and that within two more years the figure might well be 1,800 or even 2,000. (4) Nevertheless, the Air Staff still believed that many years would be needed to train and organise forces on this scale and they did not anticipate anything worse than a doubling of the 504 first-line aircraft by 1939 and perhaps their trebling by 1942. (5) These were the figures upon which Expansion Scheme A had been based.

The alarm  
of Oct.  
1934

It was therefore something of a shock for the Government to learn in October 1934 that the Air Ministry had received reliable information giving the aim of the second stage of German expansion as 1,296 first-line aircraft with 100% reserves by 1 October 1936, instead of the anticipated 1,008 by April 1939. And beyond this there was a third stage whose aim was still unknown. The Air Ministry thought it would be no more than 1,500 aircraft by October 1939. But even they had to admit that these 1,500 would probably be backed by 30 squadrons of partly-trained auxiliaries and that German industry would probably be organised by 1939 for rapid expansion to an output of 1,650 aircraft a month rising to 2,000 after the sixth month of war. Already the output had risen since February from 60 to 140 a month and the first stage of expansion was well up to schedule. Bomber and fighter aircraft were being built in series "under what can only be described as emergency conditions" and it was reported that 200,000 bombs had been ordered. (6)

Inadequacy  
of Scheme A

The entire basis of the British air programme was thus undermined. The present strength of the home defence force (excluding army co-operation squadrons and flying boats) was no more than 500 first-line aircraft in 43 squadrons (7) and Scheme A was only designed to raise it to 884 aircraft in 75 squadrons - or, with army co-operation machines and flying boats, to 960 aircraft in 84 squadrons - by April 1939. Clearly, if the principle of air parity was to be upheld, a further R.A.F. expansion could not long be deferred. The appointment in November 1934 of a Ministerial Committee to consider German re-

/armament

- (1) Minute by C.A.S., 1 Aug. 1934 - A.M. File S.33237/62.
- (2) Report of C.I.D. Sub-Committee on Industrial Intelligence (in collaboration with Air Ministry), 22 March 1934 - C.I.D. Paper 1134-B.
- (3) Ministerial Disarmament Committee's Final Report, Appendix 2, 31 July 1934 - C.P. 205(34).
- (4) Paper by C.A.S., 12 June 1934 - C.O.S. Paper 341.
- (5) Minute by C.A.S., 1 Aug. 1934 - A.M. File S.33237/62.
- (6) Summary of German air rearmament, 24 Oct. 1934 - A.M. File S.32963/8A; Memorandum by Sub-Committee on Industrial Intelligence, 25 Oct. 1934 - C.I.D. Paper 1151-B; Memorandum for C.I.D., Nov. 1934 - C.I.D. Paper 1150-B; Air Ministry Memorandum, 20 Nov. 1934 - C.I.D. Paper 1159-B.
- (7)

armament showed clearly that a new scheme was not far off. (1)

Government's fears accentuated by the French

Other influences were pressing the Government in the same direction. The formation in April 1934 of the 'Stresa Front' by Britain, France, and Italy against possible German aggression, and the apparent restraining influence which it exerted over Hitler during the abortive rising of the Austrian Nazis in July, had led to renewed diplomatic efforts to organise 'collective security' in Europe. One result of this seems to have been to infect British ministers with something of the French panic over the progress of German rearmament - it is significant that the negotiations centred after January 1935 upon a project for an Air Pact which had been resurrected by MM. Flandin and Laval. (2) The French were convinced that Germany was already much better prepared for war than the British would believe. They reckoned that her army already numbered 42 regular, 7 or 8 police and S.S. or S.A., and 50 frontier divisions, whereas the British (and Belgian) estimates gave a mobilisable force of only 3 cavalry and 21 infantry divisions. (3) They were no less alarmed at German air expansion and were rustling through measures to match it which were seriously to dislocate the French Air Force and the French aircraft industry. (4) At the same time they were convinced that an air attack, powerful enough to deal its victim a mortal blow, could be launched at a mere eight hours' notice. (5)

A.C.I.D. Discussion  
25 Feb. 1935

Now this last fear chimed all too aptly with ideas that were already current in England. For example, at a meeting of the Committee of Imperial Defence on 25 February 1935 (6) Mr. Neville Chamberlain asked the Chiefs of Staff whether or not an air force could deliver "one single terrific knock-out blow on a vital spot" which "would more or less end the war before it had begun". The Navy and Army Chiefs were fairly reassuring. An approximate equality of forces would, they thought, provide a deterrent and a safeguard in the air as it did on land or sea; and it was doubtful if there were any targets in Britain, France or Belgium "which, if heavily attacked, would knock us out from the start". The C.A.S., however, whose special province this was, gave a less comforting answer. "If", he said, "by a knock-out blow was meant a period of twenty-four hours, it would not be possible at the present time so to paralyse a country that they were completely incapacitated. On the other hand, a country seizing the initiative in this way might get a big advantage and might deal the attacked nation a blow from which it might be unable to recover". After this, it is hardly surprising if the Ministers went away feeling that, as the Prime Minister put it, "it was not the soldiers who might be knocked out but the public who might become so demoralised as to get into unrestrained panic" and make the continuance of the war impossible.

The Simon-Eden visit to Berlin & Hitler's

It was in such an atmosphere that the final alarm was given which produced the new R.A.F. Expansion Scheme. Towards the end of March 1935 Sir John Simon (Foreign Secretary) and Mr. Eden visited Berlin to discuss the proposed Air and other Pacts. Even

/before

- (1) C.I.D. Minutes, 266th Meeting (22 Nov. 1934).
- (2) The proposals are contained in C.O.S. Papers 362, 363; the C.O.S. views on it are given in C.O.S. Paper 364 and C.O.S. Minutes, 137th, 138th, 139th Meetings (Feb. 2, 4, 5).
- (3) Memoranda for C.I.D., Nov. 1934 - C.I.D. Paper 1150-B.
- (4) Air Staff Notes on present position of the French Air Force, 8 Oct. 1935 - C.I.D. Paper 1195-B.
- (5) C.O.S. Paper 364.
- (6) C.I.D. Minutes, 268th Meeting.

claim to  
have  
attained  
parity  
with R.A.F.  
March 1935

before they could arrive, Hitler had denounced the disarmament clauses of the Treaty of Versailles, decreed a general conscription for a German Army of 36 divisions, and admitted the existence of a German Air Force. Now, in his conversations with Sir John Simon and Mr. Eden, he declared that this German Air Force had already reached equality in numbers with the R.A.F. and that it aimed to attain parity with the French Metropolitan and North African air forces. Further inquiries in Berlin revealed that the Germans placed the R.A.F.'s total strength, accurately enough, at 800 to 850 aircraft and that they reckoned the French forces at about 2,000.<sup>(1)</sup>

Expansion  
Scheme B,  
April 1935

If these claims were accurate, if the German Air Force already numbered 850 first-line aircraft and was soon to grow to 2,000, then Britain's present air programme with its goal of 960 home-based aircraft by April 1939 was patently inadequate. If air parity was to be maintained, a new Expansion Scheme had to be put in hand at once. So, on 15 April 1935 the Secretary of State for Air submitted to the Government proposals by the C.A.S.,<sup>(2)</sup> which came to be known as Expansion Scheme B.

C.A.S.  
views on  
Hitler's  
claims:  
confidence  
in present  
R.A.F.  
superiority

The object of these proposals was, of course, to provide an adequate safeguard against the German Air Force. The C.A.S., however, did not accept Hitler's claims at their face-value. He regarded them as "a serious over-statement" if they were intended to imply that Germany already possessed an Air Force equal in size to the R.A.F. and made up of "fully organised, trained and equipped first-line squadrons". Including reserves and training machines, Germany might now have 1,300 aircraft of military types and 1,000 pilots available for the formation of squadrons; and by allowing very low reserves, it might be possible to classify 800 or 850 of these as first-line. "But, even if it is assumed that the claim is substantially correct only as regards numbers of aircraft as opposed to organised units, it postulates a considerable degree of acceleration of her previous programme". In short, the R.A.F. was still substantially stronger "if all relevant factors are taken into account". There were, therefore, "no grounds whatsoever for anything in the nature of panic".

Anxiety  
about  
future  
position

Nevertheless there was "grave reason for anxiety as to the future". Strength in the air was not merely a matter of numbers: it depended also upon efficiency, reserves, industrial organisation and the study of strategy and tactics. "We are at present", the C.A.S. believed, "and for the next three years at least, far ahead of the German Air Force in efficiency. The position as to reserves, however, is less satisfactory and there is reason to believe that the organisation of the aircraft industry for war purposes in Germany is already in advance of that in this country".

Scheme B:  
principles

Need to  
avoid panic  
expansion

These considerations made it especially desirable that the R.A.F.'s present efficiency should not be diminished by any unnecessarily large or unnecessarily rapid expansion. Indeed, this appears to have been the dominant motive governing the C.A.S. proposals. He was, according to Lord Londonderry,<sup>(3)</sup> alarmed by the growing popular obsession with figures and frequently complained that "the public, the Press and several members of the Government wanted quantity and did not give a dam for quality". The investigations into training and aircraft

/supply

(1) C.P. 69(35), as quoted in C.P. 85(35).

(2) Memorandum on the German Air Programme and its bearing on British Air Strength, 15 April 1935 - C.P. 85(35).

(3) Wings of Destiny, pp.162-3.



supply had already shown how great were the demands even of Scheme A. To produce even its requirements in aircraft would "call for the most careful planning in peace in addition to a national effort on a very considerable scale in war".<sup>(1)</sup> The difficulties encountered in the design and development of the new types of aircraft, and the limited number of aircraft manufacturers and designers,<sup>(2)</sup> were further reasons for avoiding unnecessary haste. In training, too, further expansion would mean at least a temporary lowering of standards.<sup>(3)</sup> In short, the Air Staff believed that any acceleration of Scheme A "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".<sup>(4)</sup> Undoubtedly, therefore, their desire in preparing Scheme B was to expand the R.A.F. as little and as slowly as was consistent with reasonable security.

Estimate of requirements for parity; new interpretation of parity

Their scepticism about Hitler's claims enabled them partially to satisfy their desire. They did not believe that Germany's present goal could be 2,000, or even 1,800, first-line aircraft. It was more likely to be 1,512 (123 squadrons) by 1 April 1937 and even with that figure "it will be virtually impossible for her to produce within that period an Air Force so fully organised, equipped and trained that it will be adequately prepared for war". "Such a standard", they were convinced, "cannot be fully attained for at least a further two years after 1937". The C.A.S. proposals were therefore founded upon the premise "that if our preparations are designed to ensure parity with Germany by 1939, they will be likely to provide the measure of security which we require". But the proposals went even further. They advanced a new interpretation of the idea of parity. Numerical parity, the C.A.S. suggested, was essential only in bombers. The number of fighters required should depend upon the size of the area to be defended and the probable intensity of attack; the number of army co-operation squadrons upon the size of the Army; and the number of general purpose coastal squadrons upon the length of the coastline.

Scheme B: proposals

Upon these principles Scheme B was devised in a way which would, the C.A.S. considered, provide reasonable security without proving seriously detrimental to the efficiency of the Service. The bomber force was to be expanded from 47 to 67 squadrons so as to equal by 31 March 1939 the numbers which the German bomber force would attain by 31 March 1937. The Scheme A fighter force was to be expanded by seven squadrons from 28 to 35, so as to provide the 25 needed for home defence and a further 10 "for despatch overseas to supplement those allotted for defence by our allies and to protect the area in which the Field Force is located abroad". The army co-operation squadrons were to remain at five, but the Coastal Area general purpose squadrons were to be increased from 4 to 12, a further 13 squadrons were to be added to the Overseas Commands, and an extra 17½ to the Fleet Air Arm. The R.A.F. and Fleet Air Arm would thus be brought up by April 1939 to a total first-line strength of 194 squadrons, of which 119 would be shore-based in the United Kingdom. As for

/war

- (1) Letters from C.A.S. covering statement of Scheme A war requirements 8 April 1935 - A.M. File S.32963/33A.
- (2) Summary of brief for D.C.A.S., 10 March 1935 - A.H.B.V.5/1/3.
- (3) C.P.85(35).
- (4) Brief for D.C.A.S., 10 March 1935 - A.H.B.V.5/1/3.

- 91 -

war reserves, the C.A.S. still considered that "there is no reason to change the view that Germany will not be ready for and is not intending to go to war before 1942". Therefore the Scheme A policy of postponing most of the provision of reserves until after March 1939 might still be followed.

Government  
dissatis-  
faction with  
Scheme B

It is perhaps hardly surprising that the Government found Scheme B little to their taste. The politicians' worship of figures was doubtless excessive, for equality of numbers is almost the only obvious standard by which laymen can form their judgement in military matters. Moreover, pressure was being applied to them from inside and outside Parliament in favour of further R.A.F. expansion upon a large scale. The Rothmere Press had begun to support the lone campaign which Mr. Churchill had for some time been waging in the House of Commons and in correspondence. It is true that some of the newspaper estimates of German air strength were gross and obvious exaggerations. But the Air Ministry's own record in this field was not altogether reassuring: it had been forced to revise its figures too often and too much to inspire an unquestioning confidence.<sup>(1)</sup> And anyway, the argument largely hinged upon a distinction between total strength and first-line strength which sounded more than a little casuistical even to a politician so versed in military affairs as Mr. Churchill. It sounded still more dubious when the Air Ministry themselves, in referring to the large German production of a two pound thermite incendiary bomb which could burn through almost anything and "which resists all attempts to put it out", pointed to the fact that a single aircraft could carry over a thousand of these bombs and added that "the devastating effect of a large-scale attack by squadrons armed with this form of weapon upon a city or industrial area can be appreciated".<sup>(2)</sup> Such tactics might well be within the capacity of even half trained crews and if they were likely to be adopted, then, as Lord Swinton was later to remark,<sup>(3)</sup> the Air Staff's insistence upon counting only "fully organised, trained and equipped" first-line squadrons lost a good deal of its justification in the layman's eyes.

1st Interim  
Report of  
Air Parity  
Committee  
8 May 1935

Accordingly, the Cabinet, on receiving the C.A.S. proposals, appointed a special Ministerial Sub-Committee<sup>(4)</sup> to consider what must be done to implement their published policy of maintaining parity with the strongest Air Force within striking distance of the United Kingdom. This Air Parity Sub-Committee reported on 8 May 1935 that parity must be interpreted to mean "numerical equality with the total German Air Force", reckoned in first-line aircraft, that is in squadrons with aircraft and pilots properly organised and located at their stations. Further, Hitler's claim to possess 850 first-line aircraft must be taken as true and it must be assumed that he aimed to expand these to 1,512 by 1 April 1937. The British Metropolitan Air Force - in which might be counted the home-based army co-operation, general purpose, and flying boat squadrons as well as the bombers and fighters and, at least for the next two years, the Auxiliaries as well as the Regulars - therefore ought also to be expanded

/by

- (1) "One of the greatest difficulties with which we are faced is the lack of accurate information" - Ministerial Air Parity Committee 1st Interim Report, 8 May 1935 - C.P.100(35).
- (2) Air Staff Appreciation 14 June 1935 - C.I.D. Paper 1180-B.
- (3) Memorandum of 21 Feb. 1936 - C.I.D. Paper 1216-B.
- (4) Its members were the Secretary of State for the Colonies, the President of the Board of Trade, and the 1st Commissioner of Works.

by 1 April 1937 from its present strength of 580 aircraft to 1,512.(1)

Scheme C

On this basis the Air Staff had prepared for the Committee a new programme. This new Scheme, C, was in effect Scheme B with its proposed increases in the overseas and Fleet Air Arm squadrons omitted and its Metropolitan Air Force programme accelerated so as to provide 123 squadrons of 1,512 first-line aircraft by 1 April 1937 instead of by 1 April 1939. Of these 1,512, 1,386 in 112 squadrons would form the home defence force proper.(2) In its composition and proportions this force was to be a considerable improvement upon that provided under Scheme A. The preponderance of bombers over fighters was to be restored to the 1923 level, for, without counting the general purposes squadrons,(3) there were to be 70 bomber squadrons of 840 aircraft as against 35 fighter squadrons of 420 aircraft. The striking power of the bomber force was also to be increased by altering the ratio between light, medium and heavy squadrons from 3 : 1 : 1 to 3 : 2 : 2. This was to be done by adding only five squadrons - three of them Auxiliaries - to the light bombers, to bring them up to 30 (360 aircraft); by increasing the medium squadrons from 8 to 18 (216 aircraft) and counting the two torpedo-bomber squadrons for bombing purposes as mediums to bring their total up to 20 (240 aircraft); and by increasing the heavy squadrons also from 8 to 20, with an initial establishment of 12 instead of 10 aircraft each (240 aircraft).(4)

Its difficulties and deficiencies

It is clear that the Air Ministry regarded this as the best programme that could at present be devised. It would mean some lowering in efficiency. It would necessitate the adoption of extraordinary training measures, though these would be practicable if the money were forthcoming. It would also entail the production of 3,800 aircraft by April 1937 instead of the Scheme A 2,400 by April 1939; and this 3,800, though they would cover a certain amount of replacement of existing types by newer designs, would not allow for any war reserves. Nor would the British aircraft industry, without resorting to extraordinary measures, be able to produce so many by April 1937 unless orders were placed at once.

Technical reasons for Scheme C's deficiencies

Nevertheless, the Ministers were still not satisfied. And, despite their alleged obsession with mere numbers, it was about the performance and striking power of the bombers that they were especially uneasy. The Air Parity Sub-Committee themselves voiced this uneasiness in presenting the revised programme. They pointed out that the German three-engined heavy bomber was well ahead of the Heyford and the Hendon in speed and bomb-load; that the existing British medium bomber, the Sidestrand, was "not sufficiently good to put into production"; and that the light bombers were useless against Germany unless they could operate from continental bases. The Committee felt, however, that Scheme C was the best that could be devised at the moment, since the new heavy and medium bomber designs were still so speculative

/and

- (1) 1st Interim Report of Air Parity Sub-Committee, 8 May 1935 - C.P.100(35), enclosed in C.I.D. Paper 1179-B.
- (2) i.e. not counting the 6 squadrons (at 6 instead of 4 I.E.) of flying boats and the 5 (at 18 instead of 12 I.E.) of Army co-operation machines.
- (3) These were raised from 4 at 12 I.E. to 7 at 18 I.E., i.e. from 48 to 126.
- (4) Air Staff Outline of Expansion Scheme C, 4 May 1935 - A.H.B. V.5/2/1; also 2nd Interim Report of Air Parity Sub-Committee, 17 May 1935 - C.P.103(35), enclosed in C.I.D. Paper 1179-B.

and their prototypes were not due to fly for another seven (the P27/32 and the B9/32) or nine (the B3/34) months. Scheme C did aim at placing orders "for aircraft types as efficient as can be made available in sufficient numbers within the specified period", but it had to recognise that production deliveries of new types were unlikely to begin in any quantity before 1937 and that during the initial stages of expansion orders would have to be given chiefly for those older types that were already in production, some of the heavy and medium squadrons having perhaps to be temporarily equipped with light bombers. (1)

The bomber proposals reconsidered

The Cabinet, however, still hankered after more modern machines and greater striking power and on May 10 the Ministerial Disarmament Committee directed the Air Parity Sub-Committee to reconsider the heavy and medium bomber programme and to see if the more modern types could not be brought more speedily into service. Accordingly the Sub-Committee discussed at some length the possibility of reducing the number of light bomber squadrons and increasing that of the heavier types. But in the end they had to accept the Air Ministry's arguments in favour of the light bomber - that it was quicker to build, was suitable for reinforcing the 'Middle' East or India ("a matter which cannot be entirely disregarded"), had advantages in dive-bombing, and was especially suited to Non-Regular crews who might lack time for the more advanced training needed with heavier machines. They had to accept these arguments because the newer types simply did not exist. Even Scheme C required within the next two years 300 medium bombers, of which "no satisfactory type is at present available", and a still larger number of heavy bombers, of which the only up-to-date design was the problematical Armstrong B3/34 whose prototypes would not fly until February 1936 and of which no more than 40 were to be expected by April 1937. The Sub-Committee did further consider, again in consultation with the Air Ministry, how the production of these newer aircraft might be accelerated. The only method they found was to gamble by placing immediate "orders in bulk, before prototypes have been tested, for certain types of aircraft". Even this would not by any means satisfy the requirement for more modern machines. (2)

Equipment of heavy and medium bomber squadrons

The Sub-Committee considered that the circumstances were sufficiently urgent to justify such a gamble. They recommended (3) therefore that orders be placed at once for 150 of the Fairey P27/32 (Battle) medium bombers, though its prototype would not be ready to fly until December. The requirement for the remaining 150 medium bombers might be temporarily met by ordering a 'private venture' general purpose biplane that Hawkers were now testing, and an overseas general purpose monoplane (the Wellesley) designed by Vickers to the G4/31 specification and now likewise on test. (4) Neither of these would be more than stop-gaps, but they seemed the best that could be had until the other P27/32 machine came from Armstrongs and the two B9/32's from Vickers and Handley Page. For heavy bombers the best that the Sub-Committee could do was to suggest ordering the 40 Armstrong B3/34's and partially making up the rest with 50 Hendons and 140 Heyfords, which would equally have to be regarded as stop-gaps.

/With

- (1) 1st Interim Report of Air Parity Sub-Committee, 8 May 1935 - C.P.100(35); Air Staff Outline of Scheme C, May 4 - A.H.B.V.5/2/1; Minute by D. of O., May 7 - A.H.B.V.5/2/6; C.A.S. conference on new types, May 8 - A.H.B.V.5/2/7.
- (2) 2nd Interim Report of Air Parity Sub-Committee, 17 May 1935 - C.P.103(35), enclosed in C.I.D. Paper 1179-B.
- (3) Ibid., also C.A.S. conferences, May 8 and 13 - A.H.B.V.5/2/7 & 10.
- (4) A.M. File S.36066/2, 9A.

The Cabinet  
approves  
Scheme C  
21 May 1935

With this the Cabinet had to rest content. On 21 May 1935 they gave their final approval to the new programme<sup>(1)</sup> and Scheme C replaced Scheme A as the approved Scheme of R.A.F. Expansion.

(c) The 1935 Defence Requirements Inquiry

Interim  
character  
of  
Scheme C

The Scheme C home defence force thus had still about it much of the makeshift, interim, character which had marked the Scheme A force. It was the most effective force that the British aircraft industry could be relied upon to design and manufacture by 1 April 1937; not one which the Government or the Air Staff could regard as adequate to meet their operational requirements in a German war. As the Secretary of State for Air (Lord Swinton) wrote of it nine months later, "we were faced with this position - the new types of medium bomber were highly speculative and entirely untried. We did, in fact, gamble by placing orders 'off the drawing board' for machines embodying new and untried features. But we were bound to reinsure by orders of known types. Moreover, we had first to go for machines of which we could get early delivery, otherwise the training and formation of squadrons would have been indefinitely delayed and there would besides have been a hopeless congestion in production as the new types began to come forward".<sup>(2)</sup> Inevitably therefore Scheme C would have to be revised as the new types' capabilities were assessed and their success assured.

Effect on  
programmes  
of the  
other  
Services

Furthermore, Scheme C in effect amounted to a single and, as no decision had yet been made about its war reserves, an incomplete, instalment towards a wider defence programme covering all the Services. For by introducing an additional expansion of the R.A.F. alone it had upset the balanced programme of 1934<sup>(3)</sup> and had brought in question the date by which Britain's defence preparations as a whole ought to be completed. It implied that the R.A.F. ought to be ready by the spring of 1939.<sup>(4)</sup> But by that date the Navy would, under the 1934 programme, still have many deficiencies and the Army even more -- "the Regular contingents of the Army's Field Force will at the present rate not be fully equipped for at least nine years; no provision will have been made for the modern equipment of the Territorial Army contingents; our war reserves of ammunition will be totally insufficient; modern coast defences at home will be practically non-existent; and the (Army's contribution to the) Air Defence of Great Britain will be far from complete".<sup>(5)</sup> Yet surely, as the Chiefs of Staff had argued in their report on Scheme B,<sup>(6)</sup> the Army ought to be ready at the same time as the R.A.F., since it had to provide not only the ground defences needed to complete the air defence system at home but also the Field Force needed to defend the Low Countries whose integrity had been pronounced vital to Britain's security? At the same time, too great a diversion of the nation's manufacturing capacity to the R.A.F. and the Army might leave the Navy unprepared to defend the Empire against Japanese attack.<sup>(7)</sup>

/The

- (1) Cabinet 29(35).
- (2) Memorandum of 10 Feb. 1936 - C.P. 27(36) enclosed in C.I.D. Paper 1215-B.
- (3) C.I.D. Paper 1187-B, enclosure 2.
- (4) Although no date had been fixed for the completing of Scheme C by the provision of its war reserves, the discussions in the Air Parity Sub-Committee, and the decision to complete the 123 first-line squadrons by April 1937 instead of April 1939, clearly pointed to April 1939 as the date to be arrived at.
- (5) C.O.S. Report on Scheme B, 29 April 1935 - C.O.S. Paper 374.
- (6) Ibid.
- (7) Remarks by C.N.S., 16 April 1935 - C.I.D. Minutes, 269th Meeting.

The Government's adoption of Expansion Scheme C for the R.A.F. thus made necessary a fresh review of Britain's defence requirements as a whole and a reconsideration of the date by which those requirements ought to be satisfied.

New defence  
require-  
ments  
inquiry

Date of  
completing  
prepara-  
tions  
advanced  
from 1942  
to 1939

This inquiry was eventually to lead to a new R.A.F. Expansion Scheme which considerably altered both the character and the purpose of the bomber force. In its early stages the inquiry was entrusted, as in 1934, to the Defence Requirements Committee, working under the direction of a Ministerial Committee on Defence Policy and Requirements.<sup>(1)</sup> After a rapid preliminary survey the Committee came to the conclusion<sup>(2)</sup> that Britain should aim at attaining "a reasonable state of preparedness" in all arms by 1 January 1939. This it regarded, in agreement with the Foreign Office, as "the latest date which could reasonably be assumed for the purpose of our own security": to accept any later "would be to run a big risk". But to attain this reasonable state of preparedness would entail not only providing the R.A.F. with its war reserves but also making good the far larger deficiencies of the Army and also those of the Navy. This could not be done without adding a considerable capital expenditure to the budgets of the next three years, and even then the state of British industrial resources would set a very definite limit to what could be done in the time under normal peace conditions of working.

Finance  
to be a  
secondary  
considera-  
tion.  
Industrial  
inquiry

Accordingly, at the end of July the Committee was authorised to prepare a programme of requirements, in which financial considerations were to be secondary to the attainment of the earliest possible security. At the same time it was to report what special measures would be needed to increase the industrial output sufficiently to provide the material required within the time allowed; and to show how inadequate or belated the Services' preparations would be if these measures were not adopted.<sup>(3)</sup>

D.R.C. Report  
21 Nov. 1935:  
Air pro-  
posals

Upon these instructions and upon statements of deficiencies provided by the Service Departments,<sup>(4)</sup> the Committee framed the Report<sup>(5)</sup> which it presented on 21 November 1935. This Report did not recommend any alteration in the composition or the first-line strength of the home-based R.A.F., but it did urge the provision by 1 April 1939 of war reserves of material amounting to 150% of the first-line numbers. This, it considered, would suffice, with the 75% initial and maintenance reserves, to maintain the Scheme C force in full operation during the first four months of a German war and so tide it over until the output of the factories could be expanded to keep pace with war wastage. In addition, the Report suggested the creation of a larger reserve of trained pilots; the formation of 13 extra squadrons for overseas, which had been omitted from Scheme C; the formation of 8 more squadrons (4 Regular and 4 Auxiliary) for co-operation with the Territorial Army; and the expansion of the Fleet Air Arm to 514 first-line aircraft.

/The

- (1) Instructions for the D.R.C. (dated 8 July 1935) had been drafted by a committee (Sir M. Hankey, chairman; the Chiefs of Staff; a Treasury representative) which had been set up for that purpose on May 27 and which reported on June 7 - C.I.D. Paper 1187-B.
- (2) D.R.C. Interim Report, 24 July 1935 - C.I.D. Paper 1215-B, enclosure 2, annexe.
- (3) Instructions from the Ministerial Defence Policy and Requirements Committee, quoted in C.I.D. Paper 1215-B.
- (4) The Air Ministry's statements are on A.M. File S.35912/11A, 12A, 14A.
- (5) C.I.D. Paper 1215-B.

Military,  
naval and  
industrial  
proposals.  
Total cost.

The initial cost of these proposals, which the Committee regarded "as a minimum", was estimated at some £77,870,000. (1) Yet they formed only one part of a balanced programme for remedying the more serious deficiencies of all three Services by strengthening the Navy, accelerating the mobilisation procedure of the Regular Army, modernising the Territorial Army, hastening the completion of the air defence system, and providing 'shadow factories' to duplicate the existing armaments industry. (2) In all, this programme would add no less than £239,000,000 to the budgets of the next three years and a further £178,500,000 to those of the following two years.

Darkening  
European  
outlook

It was a formidable bill, but by now the Government had to recognise that it must be met. For during the latter half of 1935 the European outlook had darkened most alarmingly. (3) Italy had blatantly challenged the very principle of 'collective security' by attacking Abyssinia, a fellow-member of the League of Nations. Her action had brought her into sharp antagonism with Britain and France, the two principal League Powers. It had also broken the 'Stresa Front' against German designs and encouraged Germany to play more vigorously upon the fears and ambitions of her neighbours in the hope of creating a central European bloc under German leadership. Such a bloc, perhaps comprising Poland, Hungary, Bulgaria and Jugo-Slavia, would gravely endanger the independence of Austria and seriously threaten France's ally Czecho-Slovakia. It was partly as an insurance against such a threat that France had in May concluded an agreement with Russia, the chief bogey of German propaganda. The States of Europe thus seemed to be ranging themselves, as before 1914, into two hostile camps and, if Italy were driven into the German camp, the balance of power between them might become so equal that peace would not long endure.

'Sanctions'  
against  
Italy,  
and the  
 dangers  
of them

Yet Britain and France could hardly ignore Italy's challenge to the League of Nations, especially as British opinion, voiced in the so-called 'Peace Ballot' was clamouring for the application of economic, and even of military 'sanctions'. Sanctions, however, would not only drive Italy into the arms of Germany: they might also mean war. That war must, in the nature of things, consist chiefly of naval and air operations (4) and the brunt of it would fall upon Britain as the leading naval Power in the League. In it she might not only exhaust her naval strength and dislocate her air expansion (5) to the detriment of her security against her more dangerous potential enemies, Germany and Japan. She might also by her too vigorous championship of the League lose the support of her only powerful friend, France. For France under Laval's influence could not be relied upon to act unless she felt herself directly threatened, (6) and too vigorous a policy on Britain's part might drive the French to

/acquiesce

- (1) A.M. File S.35912/12A.
- (2) As recommended by Lord Weir in C.I.D. Paper 1138-B.
- (3) This paragraph closely followed the D.R.C. Report of 21 Nov. 1935 - C.I.D. Paper 1215-B.
- (4) J.P.C. Report, 4 Sept. 1935 - C.O.S. Paper 394(J.P.); J.P.C. Appreciation, 19 Dec. 1935 - C.O.S. Paper 421(J.P.).
- (5) Note on Italo-Abyssinian dispute, 9 Aug. 1935 - C.O.S. Paper 392; Summary of precautionary measures taken, 8 Oct. 1935 - C.P.176(35); J.P.C. Report on 'sanctions', 9 Aug. 1935 - C.O.S. Paper 390 (J.P.), amended as C.O.S. Paper 392.
- (6) This impression was strengthened by the Anglo-French staff conversations of 9 and 10 Dec. 1935 - C.O.S. Paper 423; C.O.S. Minutes, 161st Meeting (13 Jan. 1936).



acquiesce in the designs of Britain's enemies. Indeed, the Defence Requirements Committee believed that "we cannot exclude - particularly if we embark on further forward policies - the possibility of a European combination against us". At any rate it was clear that Britain could no longer cast a great part of her defence burden upon the League of Nations, nor even feel confident that France would help her to shoulder it. As the Defence Requirements Committee remarked, "we are living in a world more dangerous than it has ever been before and we can count only on ourselves".

Minister's  
considera-  
tion of  
D.R.C.  
Report

But if Britain now had to rely only upon herself, she could obviously not provide adequate defences for every part of her Empire against every possible enemy. She could not single-handed provide the forces to deal simultaneously with three great Powers, Germany, Japan and Italy. Even if Italy were left out of account - and the Defence Requirements Committee had deliberately omitted all but purely temporary provisions against Italian hostility<sup>(1)</sup> - "we could not", as Mr. Neville Chamberlain had said,<sup>(2)</sup> "undertake offensive action in the Far East when engaged in a war with Germany, as it appeared necessary for us to remain on the defensive in a war against Japan on the assumption that we might become engaged in a war with Germany". But if the Government could provide, in the time available, neither for full security against a hostile Italy nor for more than purely defensive preparations against Japan, it was absolutely essential that they should provide as adequately as possible against Germany. For Germany was, as Japan was not, within striking distance of the United Kingdom upon whose defence the defence of the whole Empire depended. So, in view of the strain which even the comparatively modest proposals of the Defence Requirements Committee must place upon British financial and industrial resources, Ministers had to consider very carefully whether or not those proposals would in fact give the fullest security then possible against the German menace.

Probable  
character  
of the  
German  
menace

J.P.C.  
Report on  
'Courses  
open to  
Germany'  
(Aug. 1935)

This, of course, entailed a consideration of the various forms which that menace might take, and an effort to provide especially against those forms which seemed the most deadly. Here, fortunately, the Government could now get the considered and agreed opinion of its expert advisers, for the Joint Planning Committee had on 1 August 1935 completed its provisional Report on defence plans for the event of a war against Germany.<sup>(3)</sup> This Report was wholly occupied with discussing the 'Courses open to Germany' and its conclusions had been approved, with minor amendments, by the Chiefs of Staff Committee on October 29.<sup>(4)</sup> It started from the premise that "it is self-evident that, if the defeat of Great Britain by a Continental Power of inferior naval strength is within the bounds of practicability, it is possible that Germany might attempt to eliminate Great Britain before undertaking the subjugation of France. If this attempt was made it would constitute the 'worst case' from our point of view and, no matter which course is considered the most likely for Germany to adopt, our own plans must be capable of meeting this 'worst case'".

Possibility  
of her at-  
tempting a

Now Britain's insularity and Germany's naval inferiority debarred the Germans from using their superior army as a primary weapon for such a purpose. "The offensive strength of the German

/Air

- (1) C.I.D. Paper 1215-B.
- (2) C.I.D. Minutes, 269th Meeting (16 April 1935).
- (3) C.O.S. Paper 491 (J.P.) (= J.C. Paper 105).
- (4) C.O.S. Minutes, 153rd Meeting.

decisive  
blow by  
air

Air Force and the vulnerability of London, our ports as a whole, and our shipping in home waters, to air attack do, however, suggest a means by which she might attempt our early defeat". She might attempt it in either of two ways. One, which the Report labelled Course C, was to occupy the Low Countries by a swift land and air campaign so as to be able to launch the heaviest possible bombing attacks against the United Kingdom from the shortest possible range. If this course were adopted, "the ultimate threat to England would be the greatest of all". The other course, labelled Course A, would be for Germany to stand on the defensive by land and attack the United Kingdom by air alone at the very beginning of the war. At the moment it seemed unlikely that the Germans would prefer this course to Course C. On the other hand, the continual increase in the speeds and operational range of aircraft would cause "the possibility of Germany adopting Course A .... to increase as time goes on", for it would progressively lessen the advantages of a preliminary occupation of the Low Countries. So, although at the moment an immediate air offensive against the United Kingdom was not the mostly probable course for the Germans to adopt, it could not be ruled out and British plans and preparations must be as adequate to counter it as to counter Course C.

Possible  
effects of  
German  
air  
attacks

It was still, of course, a matter of debate whether such an air attack could in fact cripple the military power of Great Britain. But all were agreed that it might place a very severe, perhaps an unbearable, strain upon the nation's endurance. The Air Staff did not expect the Germans to waste their efforts in merely indiscriminate bombing of the homes of the civilian population; but the C.A.S. had himself admitted that "concentrated attacks from the air upon military establishments and depots, centres of transportation or of munition production, would be, from our point of view and from their effects upon non-combatants and upon the morale of the civil population, almost equivalent to unrestricted bombing".<sup>(1)</sup> Just how testing those effects might be no one could accurately estimate for nothing on such a scale had hitherto been experienced. A Committee of Imperial Defence Sub-Committee, however, whose report was now in preparation, had worked out that, upon the basis of the average casualties caused by one ton of bombs during the German air raids on the United Kingdom in the 1914-1918 War (17 killed and 33 wounded), "an arithmetical computation would indicate casualties of the order of 5,000 a day from 100 tons of bombs, 10,000 a day from 200 tons of bombs, 25,000 a day from 500 tons of bombs". The probable material damage could hardly be guessed at, "but it would be only wise to assume" that it would be great enough "to put pretty well out of action the administrative machine of government: and this assumption applies also, we think, to the general life of London in its various aspects".<sup>(2)</sup>

Progress  
of G.A.F.  
expansion

There seemed, moreover, good reason to fear that the German air attack, when it came, might be upon a scale nearer to the 500 than to the 100 tons a day, at any rate at the outset. The expansion of the German Air Force was known to be going forward smoothly according to plan and in May 1935 Goring had boasted to the British Air Attaché that he would have 2,000 first-line

/aircraft

- (1) Comments by C.A.S., 15 Feb. 1935 - C.I.D. 1163-B.
- (2) Interim Report of Sub-Committee on Location of Government Departments on outbreak of war (Sir Warren Fisher, Sir M. Hankey, Sir Russel Scott (P.U.S., Home Office), Sir Patrick Duff (Secretary, Office of Works), Sir Herbert Creedy (P.U.S., War Office), W/C. Hodson), 17 March 1936 - C.I.D. Paper 1217-B.

aircraft by the end of the year. It is true that the British Air Staff regarded the attainment in so short a time of so great a first-line strength, in the British sense of that term, as outside the bounds of possibility. Yet even they had now come to admit that Germany might have a force of 1,500 first-line machines "fully equipped, manned and maintained by the British standards" by April 1937<sup>(1)</sup> and that this would undoubtedly be increased in time - perhaps by the end of 1938 - to 2,000.<sup>(2)</sup>

Progress  
of German  
aircraft  
production

It was clear, too, that the Germans were making great efforts to mobilise and expand their aircraft industry. Milch had told the British Air Attaché<sup>(3)</sup> that their aim was to make it "capable of producing 50% of her first-line strength per month two months after the outbreak of war", a statement which also implied that "the losses in the first two months of war would be met by reserves built up and held in readiness in peace". Nor did Milch's assertion look like an idle boast. The output of the German factories was still rising steadily. By August 1935 it was estimated at 225 airframes and 560 aero-engines a month, as compared with a British output of 150 and 375 and a French of 175 and 350;<sup>(4)</sup> by December 1935 the estimate had risen to 270 and 640;<sup>(5)</sup> and by March 1936 the estimate for airframes reached 300.<sup>(6)</sup> Indeed, it seemed likely that the German aircraft industry would soon be nearing a condition of over-production so far as domestic military and civil requirements were concerned.<sup>(7)</sup> The output of both the ab initio and the advanced training schools, too, was already adequate to provide by 1 April 1937 the trained crews needed to man a force of 1,500 first-line machines. If continued, it would serve to expand that force to 2,000 by the end of 1937. The training was thorough and systematic and was not being hastened to the detriment of future efficiency.<sup>(8)</sup>

Controversy  
over esti-  
mates of  
G.A.F.  
expansion

There were, moreover, a good many people in England who feared that the Air Ministry's estimates were serious under-statements of the true position. Mr. Churchill, for example, detected in them "a process of cumulative minimisings of each successive factor in German air strength" and felt that "it would be dangerous to trust to conclusions so founded". He believed that the German Air Force's war potential of aeroplanes simultaneously available for service and capable of indefinite maintenance was already about 1,200 and would be 1,500 by June 1936, 2,000 by the end of 1936, and perhaps 3,000 by October 1937.<sup>(9)</sup> Ministers did not, perhaps, admit to quite the same scepticism, but the Secretary of State for Air himself confessed, when presenting one set of estimates to the Committee of Imperial Defence,<sup>(10)</sup> that he felt bound "to express a

/personal

- (1) Air Staff Appreciation, 14 June 1935 - C.I.D. Paper 1180-B.
- (2) D.R.C. Interim Report, 24 July 1935 - C.I.D. Paper 1215-B, enclosure 2, annexe.
- (3) Minute by A.I. to D.D.O.I., 18 July 1935 - A.M. File S.34572/III/24A.
- (4) Report of Industrial Intelligence Sub-Committee, 9 Sept. 1935 - C.I.D. Paper 1186-B.
- (5) Report of same Sub-Committee, 11 March 1936 - C.I.D. Paper 1218-B.
- (6) Statement by Sir E. Crowe in presenting the above Report, 26 March 1936 - C.I.D. Minutes, 275th Meeting (9).
- (7) C.I.D. Paper 1186-B.
- (8) Air Staff Note on G.A.F. training organisation, 19 Sept. 1935 - C.I.D. Paper 1189-B.
- (9) Mr. Churchill's comments, 30 Sept. 1935, with Air Staff reply, 5 Nov. 1935 - C.I.D. Paper 1198-B; Mr. Churchill's answer, 9 Dec. 1935 - C.I.D. Paper 1205-B. A.M. File S.36159 also contains correspondence with Mr. Churchill, and Air Ministry discussions thereon; much of this relates more especially to aircraft production plans.
- (10) Memorandum covering Air Staff Note on G.A.F., 21 Feb. 1936 - C.I.D. Paper 1216-B.

personal anxiety" about all such figures. "German capacity to produce aeroplanes is enormous. She has vast man-power. She can and is giving some sort of flying training to a large number of men. Her mass-produced machines may not be of the highest performance. Many of her pilots will be inadequately trained. But if Germany chose to use partly-trained pilots to bomb indiscriminately, she could within a short time produce and go on producing machines for them. I cannot escape the foreboding that Germany would employ tactics of this kind to reinforce the more precise operations of her more highly-trained squadrons". In other words, as Mr. Churchill had argued, first-line strength in the British sense of the term was perhaps not the truest criticism of the German Air Force's potential strength in war.

Offensive  
character  
of G.A.F.

Moreover, doubts apart, the Air Ministry's own statements gave reasonable grounds for uneasiness. For they suggested that the Germans were providing themselves with an Air Force not only of the size, but also of the character, required to attempt a 'knock-out blow' against England. "The large proportion of heavy long-range bombers", the Chiefs of Staff thought, "indicates that offensive action is envisaged as its primary role. (1) The Air Staff believed that of the 594 first-line aircraft which they estimated the Germans to possess on 1 October 1935, 288 were bombers; and that of these 288 only 36 were short-ranged dive-bombers. On this basis they assumed that the German Air Force, when it reached 1,500 first-line aircraft would possess 768 bombers of which only 108 would be dive-bombers; and that when it reached 2,000, the bomber force would number 1,200. (2) At the moment the bulk of these bombers were machines of relatively low performance - the Junkers 52 heavy bomber had a top speed of 167 m.p.h. and a range of about 930 miles (3) - but these would be replaced, probably within three years, by more modern aircraft of 240 to 260 m.p.h. and appreciably longer range, (4) which would be able to strike directly from bases in Germany at a considerable part of the United Kingdom. (5) It looked as if the Germans would certainly have the means, if they wished to use them, of attempting a large-scale air offensive against Great Britain.

Offensive  
weakness  
of the  
R.A.F.

These considerations compelled Ministers to examine very carefully the Defence Requirements Committee's proposals regarding the home-based R.A.F. And, as it was still the accepted doctrine that the only adequate air defence was a counter-offensive equal in weight to the enemy's offensive, they naturally scrutinised with especial care the character and strength of the bomber force. The scrutiny was not reassuring. Even upon a purely numerical basis and if their present expansion schemes were completed to time, Britain and France in alliance would by 1939 have no more than a 25% superiority over the German Air Force in offensive, bombing, power and, thanks to the more advanced organisation of German industry for war production, even this superiority might vanish by the end of the first year of war. (6) Moreover, it was by no means

/certain

- (1) C.O.S. Annual Report, 29 April 1935 - C.I.D. Paper 1181-B (= C.O.S. Paper 372).
- (2) Air Staff Notes on G.A.F. training organisation. 19 Sept. 1935 - C.I.D. Paper 1189-B; J.P.C. provisional report on defence plans, 1 Aug. 1935 - C.O.S. Paper 401.
- (3) Air Parity Committee's interim report, 8 May 1935, Appendix A - C.P. 100(35), enclosed in C.I.D. Paper 1179-B.
- (4) Minutes of 12th Meeting of Brooke-Popham Sub-Committee, 17 July 1935 - A.M. File S.34572/III/25A.
- (5) C.O.S. Paper 401.
- (6) J.P.C. Report, 1 Aug. 1935 - C.O.S. 401.

certain that the French programme would be completed. They were already scaling it down<sup>(1)</sup> and their air force was deplorably weak in modern bombers as a result of the "panic measures" of expansion adopted in 1933 and the backwardness of the French aircraft industry and of French aircraft designs.<sup>(2)</sup> And, this apart, mere numerical equality would not necessarily provide equality of striking power. The retention of light bombers as the equipment of 30 out of the 50 bomber squadrons to be provided under Scheme C would gravely reduce the weight of attack which the British bomber force could deliver against Germany. For the Harts and Hinds, and even the P4/34 which was being designed to replace them,<sup>(3)</sup> could only reach German targets if they started from continental bases and, even so, could only carry 500 lbs. of bombs. And while these machines, which made up three-fifths of the Scheme C force, would thus be practically useless during at least the crucial opening weeks of a German war,<sup>(4)</sup> even the British heavy bombers, the Heyfords and Hendons, could carry only one-half of the German heavy bomber's load - 1,500 lbs. of bombs as against 3,000 lbs.<sup>(5)</sup>

This emphasised  
during  
Abyssinian  
crisis

These weaknesses had, of course, been recognised when Scheme C was approved but they had been more sharply emphasised by the Italo-Abyssinian crisis. In that crisis they had, for example, made necessary a serious modification in the plans for the defence of Egypt. Those plans had to provide for the basing of the British bombers almost on the actual frontier between Egypt and Libya, since only by being based so far forward could they reach the bases of the longer-ranged Italian bombers so as to impede by counter-offensive action an Italian bombing offensive against the Fleet at Alexandria. This in its turn had compelled the Army to accept a plan which required the holding of very advanced positions instead of one which would allow them to take up a much stronger defensive line some distance back from the frontier.<sup>(6)</sup> Such a pushing forward of the Army's main defence line to assist the bomber force might be feasible in Egypt against the Italians; but the small British Field Force, with limited French and Belgian assistance, could hardly hope to accomplish it in the Low Countries against the German army. Moreover, the difficulties encountered in trying to arrange with the French for the taking over of air-fields in Southern France and Tunisia from which a small force, of a few squadrons only, might, if sanctions led to war, strike at the air bases and industries of North Italy and Sicily,<sup>(7)</sup> had reiterated the lesson of 1918 that a bomber force might lose much of its 'independence' if it had to operate from bases in an ally's territory.

/Clearly,

- (1) Notes by A.I. on Mr. Churchill's paper (undated) - A.M. File S.36159/14A.
- (2) Air Staff Notes on present position of French Air Force, 8 Oct. 35 C.I.D. Paper 11950B; also letter from Air Attaché in Paris and Air Staff Notes thereon, 1 July 1936 - C.I.D. Paper 1247-B.
- (3) A.M. File S.32821/1A et seq.
- (4) C.-in-C., A.D.G.B., to Air Ministry, 10 April 1935 - A.M. File S.35563/1A.
- (5) C.P.100(35).
- (6) J.P.C. Report on defence of Egypt and the Sudan, 6 Nov. 1935 - C.O.S. Paper 411 (J.P.); Joint appreciation by the local commanders, 30 Nov. 1935 - C.O.S. Paper 419; J.P.C. Appreciation on defence of Eastern Mediterranean and 'Middle' East, 19 Dec. 1925 - C.O.S. 421 (J.P.); Note by D.M.O. and I. (Sir J.G. Dill) on situation in W. Desert, 25 Feb. 1936 - C.O.S. 445.
- (7) C.O.S. Minutes, 157th and 159th Meetings (5 and 13 Dec. 1935); Anglo-French staff conversations, 9 and 10 Dec. 1935 - C.O.S. 423; J.P.C. Appreciation, 19 Dec. 1935 - C.O.S. 421 (J.P.), approved by C.O.S. 13 Jan. 1936 and issued as C.O.S. 426.

Need to  
increase  
range and  
striking  
power

Clearly, a bomber force was needed whose aircraft would be able to reach targets in Germany from bases in England. But something more was needed, too. The Joint Planning Committee's Report on the courses open to Germany had emphasised once again how important - at any rate for the next few years - the integrity of the Low Countries was to British security. Yet the ability of those countries to defend themselves against Germany was small; and the power, perhaps even the will, of France to defend them single-handed could hardly be relied upon. So it was more than ever important that Britain should be able to provide the additional strength needed to preserve them from a German occupation. It was, however, no more possible for Britain to provide beforehand a great Army on the continental scale as well as a great Navy and a great Air Force, than it was for her to provide and deploy adequate strength against the Japanese and the Italians as well as against the Germans. Naturally enough, then, the Ministers looked again at the bomber force in the hope that it might in part supply their need. At the moment it was primarily thought of as a counter-offensive weapon for reducing the scale and intensity of a German air offensive. Might it not also be used as a frankly offensive weapon for reducing to within manageable proportions the scale and intensity of a German land offensive, indeed of the offensive power of Germany as a whole?(1)

Possibility  
of decisive  
air action  
against  
Germany

A recent review by the Air Staff of the vulnerability of German war industry to air attack(2) suggested that this might in fact be possible. Some 80% of Germany's bituminous coal, 84% of her steel production, 60% of her engineering industry, 54% of her chemical plants, and 58% of her industrial workers were concentrated close to her western frontier in the congested Ruhr-Rhineland-Saar area; and almost one-half of her aero-engine production was concentrated in the great B.M.W. works around Munich and Eisenach. "Provided a sufficient weight of air attack could be brought to bear on the Ruhr-Rhineland-Saar Area", the Air Staff believed, "Germany's armament industry would be paralysed, which would in turn preclude her from maintaining an Army in the Field", at the same time, "successful attacks on the B.M.W. works alone" might reduce the effectiveness of the German Air Force by 50%. Here, then, there seemed to be a way in which the bomber force might be used not only to reduce the scale of German air attack but also to cripple, or at least considerably weaken, the power of the German army. It called, however, for a bomber force of considerably greater range and much greater striking power than that envisaged under Scheme C.

Report of  
the D.P.R.  
Committee,  
6 Feb. 1936

It was in accordance with these ideas that the Ministerial Committee on Defence Policy and Requirements framed the Report on the Defence Requirements Committee's proposals which they presented to the Cabinet on 6 February 1936.(3) That Report

/was

- (1) Memorandum by Mr. Neville Chamberlain, 4 Feb. 1936 - C.I.D. Paper 1207-B, Appendix E.
- (2) C.I.D. Paper 1185-B (20 July 1935), circulated to the C.I.D. 30 July 1935.
- (3) C.I.D. Paper 1215-B, enclosure 1. The original members of the Committee were:- the Prime Minister; the Lord President of the Council; the Chancellor of the Exchequer; the Secretaries of State for Foreign Affairs, war, and Air; the 1st Lord of the Admiralty; the President of the Board of Trade; and Lord Weir. To these were added later the Secretary of State for Home Affairs and the Minister without Portfolio. The 3 Chiefs of Staff, the Permanent Secretary to the Treasury, and the P.U.S. Foreign Affairs, served as technical advisers.

was not a programme, like the Defence Requirements Committee's proposals, for remedying in equal degree the deficiencies of all three Services. It was, rather, a programme for providing the strongest possible defence against the worst of the possible dangers.<sup>(1)</sup> This, of course, entailed some sacrifice in the provision against those perils which were considered less urgent, since, even by using in peacetime the 'shadow armament industry' suggested by Lord Weir, it would have been impossible within three years to provide all that was required for all three Services. Once again it was the Army that bore the brunt of this sacrifice. For, while the Ministerial Committee only reserved their approval of the suggested new standard of naval strength until the Admiralty could work out the details of what it would involve, they recommended definitely that the reconditioning of the Territorial Army should be postponed for three years or until British industrial capacity and output made it practicable. In regard to the home-based R.A.F., on the other hand, they went a good way beyond the Defence Requirements Committee. They agreed that the Scheme C programme of 123 squadrons by April 1937 should be adhered to; that its war reserves should be provided; that the completing of the air defence system should be no longer delayed; and that the extra army co-operation and Fleet Air Arm squadrons should be formed. But in addition to this, they recommended "that the Air Ministry should have latitude to vary the R.A.F. programme so as to improve its offensive power and constitute the most effective deterrent against German aggression", even though "this will involve some increase in numbers in addition to the substitution of larger and more efficient machines".

(d) Expansion Scheme F, February 1936

Origin of  
the 'Bomber  
Command  
experiment':  
Ministers'  
responsi-  
bility

This recommendation was the final, immediate, cause of the new R.A.F. Expansion Scheme, Scheme F. It was also the cause of a notable change in the character and purpose of the bomber force. The Ministerial Committee were convinced that the German war plan would be to throw a highly mobile force at lightning speed through Holland and around the French and Belgian flank, so as to establish air bases in the Low Countries long before Britain could get her Expeditionary Force across the sea. They had therefore sought "to construct the most terrifying deterrent we can think of" against such a plan. And, having decided that "recent advances in design of aircraft and engines give us the weapons best calculated to effect that purpose", they had now made recommendations which were designed to give the bomber force a primarily offensive instead of a primarily counter-offensive purpose, to make it a principal weapon for winning a war on the continent of Europe rather than merely an effective agent for averting defeat from the air over England. A good deal of the credit - or the responsibility - for thus launching 'the Bomber Command experiment' must therefore be given to Britain's politicians rather than to their expert Service advisers. For, as Mr. Neville Chamberlain was quick to point out to the Cabinet, "the conversion of the Air Force from a defensive (*sic*) weapon into a weapon of aggression with unprecedented powers of destruction did not form part of the plans submitted to the Ministerial Committee". Those plans, as he said, bore "the appearance of an aggregate of three Service plans rather than a joint plan conceived *ab initio* in the light of recent developments. No alternative was put before us and there was no source from which such an alternative could be requested".<sup>(2)</sup>

/Nevertheless,

- (1) Memorandum by Mr. Neville Chamberlain, 11 Feb. 1936 - C.I.D. Paper 1207-B, Appendix F.
- (2) Memorandum by Chancellor of Exchequer, 11 Feb. 1936 - C.I.D. Paper 1207-B, Appendix E.



But Air Staff already thinking along similar lines

Nevertheless, if this important recommendation of the Ministerial Committee was all their own work, (1) it is only just to record that the Air Staff had for some time been feeling their way towards very similar ideas. Even at the time when Scheme A was prepared they had their doubts about the light bomber (2) and the paper on the vulnerability of German industry to air attack which they had presented to the Committee of Imperial Defence (3) shows that they were thinking of a bombing offensive, as distinct from a mere counter-offensive, at least as early as July 1935. It was, however, the progress of the new bomber designs which had brought these ideas to practical discussion.

Progress of new bomber designs: Whitley and Harrow

The prototypes of these new bombers had not yet been actually tested in the air, but by February 1936 all were ready to fly in a very few weeks and enough had been learned about them to justify a reasonable confidence in their success. (4) The Armstrong B3/34 heavy bomber, the Whitley, was based upon an Armstrong bomber-transport of very similar design whose prototype had now been built and tested. (5) Another heavy bomber, the Handley Page Harrow, had also been ordered to supply the needs of Scheme C, and this, too, was based upon the flying experience gained with an experimental Handley Page bomber-transport (C26/31) which had been modified to serve as a prototype for the Harrow. (6)

New medium bombers

With the new medium bombers likewise the position had become much clearer. The twin-engined B9/32 designs by Vickers (the Wellington) and Handley Page (the Hampden) had not yet flown, but in September 1935 the Vickers Wellesley, which was built upon the same geodetic principles as the Wellington, had passed its tests very satisfactorily and there seemed every reason to hope that both the B9/32's would prove at least as successful. (7) Moreover, thanks to Lord Rothermere, a promising new design had been added to the list of twin-engined medium bombers. This was the Bristol Blenheim, a military adaptation of the civil Bristol 142 which had been built for Lord Rothermere's private use and which, after being presented by him to the Air Ministry in July 1935, had been modified to serve as a prototype for the Blenheim. (8) Finally the prototypes of the Fairey P27/32 single-engined medium bomber, the Battle, had just been completed and appeared likely to justify the claims made for them. (9)

Good prospects of their success

There were, therefore, good grounds for confidence that all these new designs would satisfy Air Staff requirements and prove successful enough to be taken into service as standard equipment for the heavy and medium bomber squadrons. Their production in

/quantity

- (1) As the Secretary of State for Air was a member of the Ministerial Committee, it is not impossible that this idea was presented informally to the Committee by the Air Staff; but no evidence of this has been discovered.
- (2) Above, p. 82.
- (3) Above, p. 102.
- (4) A general description of the position of these new designs is given in the C.A.S. Air Liaison Letters to the Dominions, 25 June and 14 Nov. 1935 and 31 Jan. 1936 - A.M. File S.25873/VI/12B, 32A, 45A.
- (5) Ibid.
- (6) Ibid.; also C.I.D. Paper 1179-B, enclosure; Minutes of C.A.S. Conference, 30 May 1935 - A.H.B.V. 5/2/15.
- (7) The Wellesley had been preferred to the Hawker 'private venture' as the stop-gap medium bomber when the discovery of the Blenheim made the ordering of both types unnecessary - A.M. Files S.35748/7 S.36066/2.
- (8) Minute by A.M.R.D. (Dowding) suggesting adoption of Bristol 142, 30 May 1935 - A.M. File S.35748/7; approved by D.C.A.S. and C.A.S. May 31 - *ibid.*, minutes 8, 9; Rothermere's aircraft delivered to Martlesham for tests, July 8 - *ibid.*, minute 12; also Minutes of C.A.S. conference, 30 May 1935 - A.H.B.V. 5/2/15.
- (9) A.M. File S.25873/VI/12B, 32A.

quantity within a reasonable time could also be fairly safely relied upon, since orders for considerable numbers of each type had already been placed and the firms' forecasts of output received. (1)

Their  
probable  
performance

Now each of these new types possessed a much better performance and striking power than the bombers that were in service in 1935. The Battle was expected to have a top speed in the neighbourhood of 250 m.p.h. and a range of over 700 miles out and home with its normal load of 1,000 lbs. of bombs, (2) as against the 198 m.p.h. with 500 lbs. for 430 miles of the Hind. (3) The twin-engined Hampden, Wellington and Blenheim might be expected to improve upon these speeds and ranges and indeed the Bristol Company predicted that the Blenheim would reach 268 m.p.h. and that it would be able to carry its 1,000 lbs. of bombs for 810 miles and home at 234 m.p.h. and for 980 miles at 200 m.p.h. (4) The Whitley heavy bomber was designed for a top speed of 205 m.p.h. and for a range of 1,250 miles out and home with its normal 1,500 lbs. bomb-load, as compared with the Hendon's 152 m.p.h. with 1,500 lbs. for 920 miles. (5)

Air Staff  
discussions  
on increasing  
power  
of bomber  
force

When the Ministerial Committee in February 1936 called for an improvement in the striking power of the bomber force, the progress of the new designs thus justified "the Air Staff in formulating a much more effective programme which we hope can be realised by 1939". For "we have been directed to make this review and to recast our programme at a time when we can, without taking unjustifiable risks, concentrate our further orders upon types of greatly improved performance". (6) Indeed, the idea of formulating a more effective programme had occurred to the Air Staff even before it struck the Ministerial Committee. On 8 November 1935 the C.A.S. had asked the Air Staff for their views on the equipment of the bomber force, with especial reference to the retention of the light bombers. (7) The answers which he received (8) agreed unanimously with his own view that the light bomber would have little value "in a European war against such a country as Germany". So by the beginning of 1936 the Air Staff were already agreed upon the desirability of re-equipping the light bomber squadrons with medium bombers. They had also thought of two other ways of adding to the striking power of the bomber force. One way was to increase the initial establishment of some at least of the medium squadrons from 12 to 18 aircraft each. As early as June 1935 the C.A.S. had suggested (9) that this might be the most economical procedure to adopt in any future expansion, since it would not entail the expense of creating new squadron and station establishments and buildings. (10) The other method was for the squadrons to have their tactical sub-formation, the flight, increased from four aircraft to six, giving

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- (1) On 20 Nov. 1935 the numbers of bombers promised for production by 31 March 1937 were:- 393 Hinds, 69 Wellesleys, 126 Battles, 100 Blenheims, 45 Hendons, 60 Whitleys, 70 Harrows - A.H.B.V. 5/2/20.
- (2) Air Parity Sub-Committee's 2nd Interim Report, 17 May 1935 - C.I.D. Paper 1179-B.
- (3) Ibid.
- (4) A.M. File S.36015, unnumbered enclosure dated 6 Nov. 1935.
- (5) C.I.D. Paper 1179-B.
- (6) Memorandum on the Air Striking Force, by Secretary of State for Air, 10 Feb. 1936 - C.P. 27(36), enclosed in C.I.D. Paper 1215-B.
- (7) A.M. File S.37679/1.
- (8) Ibid., enclosures 1A, 2A, minute 2. For a fuller account of these discussions, see below, Part IV.ii.
- (9) A.M. File S.22846/III/34A.
- (10) Minute by D. of O., 10 Feb. 1936 - A.H.B.V. 5/4/15.

a tactical sub-formation in the air of five machines instead of three. This increase in size, which had recently been approved by the C.A.S.,<sup>(1)</sup> would not only give each flight a greater volume of mutually supporting defensive fire-power but would also increase the chances of success in formation bombing.

#### Scheme D

It was upon these three methods that the D.C.A.S. based the proposals which he put forward, to serve, as it were, as a first draft for an answer to the Ministerial Committee's suggestion. These proposals, Scheme D, aimed to re-equip the 19 Regular light bomber squadrons with medium bombers. With the 18 already provided for under Scheme C, this would bring the total of Regular medium squadrons up to 37. Of these 37, 12 were to be equipped with twin-engined aircraft and remain at an initial establishment of 12 aircraft each, while the other 25 were to have single-engined machines and their initial establishment was to be increased from 12 to 18 each. This would leave the total number of squadrons unchanged but would increase the first-line strength of the bomber force by 150 medium bombers. A further eight were to be added to this total by increasing the initial establishment of each of the two torpedo-bomber squadrons from 12 to 16. Finally, in accordance with the C.A.S. recent ruling, all the bomber squadrons, heavy as well as medium, were to be organised in flights of six aircraft each.<sup>(2)</sup>

#### Schemes

##### E & E<sup>1</sup>

This simple and tidy division, between twin-engined squadrons at 12 and single-engined squadrons at 18 initial establishment, did not, however, take into account the actual numbers of the various types that could be produced by April 1939. It might be satisfactory as an eventual ideal to aim at,<sup>(3)</sup> but within the period fixed upon for the completion of Scheme D the exact proportion between twin- and single-engined medium bombers would have, as the Director of Equipment pointed out,<sup>(4)</sup> to depend upon how many of each kind could be produced in the time. The Director of Equipment therefore put forward two alternative proposals, based upon two alternative estimates of production and known as Schemes E and E<sup>1</sup>. By these, the 25 squadrons at 18 initial establishment were to be made up either, under Scheme E, of 7 twin- and 18 single-engined or else, under Scheme E<sup>1</sup>, of 9 twin- and 16 single-engined squadrons.

#### Reasons for decisions on bomber squadron I.E. increases

There was, however, a further complication. For the ground organisation it was most desirable "that all twin-engined medium bombers, regardless of actual types, should be organised on the same basis - either 12 I.E. or 18 I.E., but not some of each. "Unless this is done", the Director of Organisation minuted,<sup>(5)</sup> "we shall find our stations varying in size and in accommodation. Such a state will allow no flexibility and will make extremely difficult any changes of policy as replacement types come forward". Now to organise the single-engined medium squadrons on an 18 machine basis raised no difficulties, but with the twin-engined squadrons the position was more complicated. The Bristol 142 with a span of 56 feet, and even the Hampden at 67 feet, would fit into the accommodation designed for the single-engined medium bombers. But the Wellington with its 86 feet span could not be so accommodated and it seemed likely that "the advent of geodetic construction, which apparently permits high aspect ratios, is likely to lead to greater span in aircraft generally and particularly in monoplane types to which we are now leaning". Therefore

/"future

- (1) A.M. File S.35795/7A, quoting S.37355.
- (2) Minute by D. of O., 10 Feb. 1936 - A.H.B.V. 5/1/15.
- (3) Minute by A.M.S.O., 11 Feb. 1936 - A.H.B.V. 5/4/17.
- (4)
- (5) 10 Feb. 1936 - A.H.B.V. 5/4/15.

"future twins are most unlikely to be of such small span as the Bristol", and were likely to approximate more closely to the Wellington. But, assuming that the Wellington was likely to be "a typical type of twin-engined medium bomber", an examination of the accommodation at bomber stations showed that the ideal initial establishment for the twin-engined squadrons would be 12 aircraft. This would allow the maximum flexibility in station organisation, for the same accommodation would suffice for either two squadrons of single-engined mediums at 18 I.E. or three of light bombers at 12 I.E. or two of twin-engined mediums at 12 I.E. If, on the other hand, the twin-engined mediums of Wellington size were organised on an 18 I.E. basis, stations of a 'non-standard' type would be needed for them. The Director of Organisation therefore urged that all the twin-engined medium squadrons should have an initial establishment of 12 aircraft. But this would give the bomber force 42 fewer twin-engined medium bombers than Scheme E allowed and 54 less than Scheme E<sup>1</sup>. To accept such a reduction of one-third in the proposed increase of first-line strength above the Scheme C figure for reasons of ground organisation alone was clearly unwarrantable, all the more so as the majority of the twins would for the next few years at least approximate to the Blenheim rather than to the Wellington in size. Besides in war, as Group Captain A.T. Harris had long ago remarked, hangars were the last places where aircraft were likely to be kept.<sup>(1)</sup> Accordingly it was decided that all the Regular medium bombers, twin-engined as well as single-engined, should have an initial establishment of 18 aircraft each, except the Wellington squadrons which were expected to number eight and which were to remain at an initial establishment of 12 aircraft each.

Scheme F:  
the bomber  
force

On this basis the Air Ministry finally prepared its new bomber programme, to which the other proposals previously made to the Defence Requirements Committee were added, the whole forming the new R.A.F. Expansion Scheme F.<sup>(2)</sup> This Scheme was presented to the Cabinet on 10 February 1936<sup>(3)</sup> and received their approval on February 25<sup>(4)</sup>. Its outstanding feature was, of course, the radical change which it proposed to make in the character of the bomber force. The number of bomber squadrons remained unchanged at 68 plus two of torpedo-bombers. But the 30 light bomber squadrons of Harts, Hinds and Gordons were now to be re-equipped with the new twin-engined Hampden and Blenheim and single-engined Battle medium bombers.<sup>(5)</sup> The medium squadrons were thus increased from 18 to 48. Moreover, 29 of these 48 squadrons were to have an initial establishment of 18 aircraft each instead of only 12, which would increase their first-line strength by 174 aircraft all told. The other 19 medium squadrons, 8 of them Regulars equipped with the 'heavy medium' Wellingtons and 11 of them Auxiliaries armed with the smaller medium types, remained at an initial establishment of 12 aircraft apiece. The two torpedo-bomber squadrons, rated as mediums for bombing purposes, each had their initial establishment raised from 12 to 16. So the total first-line strength of the medium bombers was raised to 50 squadrons of 802 aircraft. The 20 heavy bomber squadrons remained, as under Scheme C, at an initial establishment of 12 aircraft each, giving a total of 240 aircraft, but they were to be armed as soon as possible with

/the

- (1) 6 March 1934 - A.M. File S.32832/I/4.
- (2) Outline of Expansion Scheme F, 24 Feb. 1936 - A.M. File S.22846/IV/1A; revised outline, 7 July 1936 - *ibid.*, enclosure 2A; also below, Appendix III.
- (3) Memorandum by Secretary of State for Air on the Air Striking Force, 10 Feb. 1936 - C.P.27(36).
- (4) Cabinet 10(36).
- (5) Minutes of conference held by C.A.S., 5 Feb. 1936 - A.H.B.V.5/2/14

the new B3/34 and eventually with the still more powerful B1/35 type.<sup>(1)</sup> Thus the Scheme C force of light, medium and heavy bombers in a ratio of 3 : 2 : 2 was to be replaced by a new force of medium and heavy bombers in the ratio of 5 : 2 in squadrons and 3 : 1 in aircraft. The new machines would not only be very greatly superior in range, performance, and striking power, but would also be able - or at the least, those of the medium class would be able - to operate either by day or by night. Compared with anything previously projected, the new force certainly merited Mr. Neville Chamberlain's claim that it was a potential "weapon of aggression with unprecedented powers of destruction". During the next few years, the growing appreciation of the difficulties of a long-range bombing offensive and the continuing progress of technical development were to reveal its very serious limitations: but at least it represented a very great advance over previous plans, an advance which brought the idea of the 'Bomber Command experiment' within the bounds of operational practicability.

Other provisions of Scheme F

The remaining provisions of Scheme F may be briefly summarised. The strength of the fighter force was left unchanged at 420 aircraft, for, although the number of fighter squadrons was reduced a little later from 35 to 30, the initial establishment of each squadron was raised from 12 to 14, a change which allowed them to be organised in flights of 7 aircraft instead of 6.<sup>(2)</sup> When eventually these squadrons came to be equipped with their Hurricanes, Spitfires and Defiants,<sup>(3)</sup> they would provide a defensive force of greatly increased power. Nevertheless, the numerical preponderance of bombers over fighters had been increased as compared with the Scheme C figures and with 1,042 bombers against 420 fighters the proportion now stood at nearly  $2\frac{1}{2} : 1$  instead of  $2 : 1$ . The number of army co-operation squadrons was raised from 5 to 11, of which 4 were to be Auxiliaries and assigned to the Territorial Army; but as the initial establishment of each squadron was lowered from 18 to 12, the total number of army co-operation machines was only increased from 90 to 132. The Coastal forces remained at 7 general reconnaissance squadrons of 126 aircraft and 6 flying boat squadrons of 36 aircraft, as under Scheme C, but the Overseas Commands were to be reinforced by 10 new squadrons, from 27 squadrons of 292 aircraft to 37 squadrons of 468 aircraft and the Fleet Air Arm was to be increased from the Scheme C  $16\frac{1}{2}$  squadrons of 213 aircraft to 26 squadrons of 312 aircraft by 1939 and to 40 of 504 aircraft by 1942. All told, these increases would give the Metropolitan Air Force a first-line strength of 1,736 aircraft in 124 squadrons by 31 March 1939 instead of 1,512 aircraft in 123 squadrons by 31 March 1937 as under Scheme C; and they would give the R.A.F. and Fleet Air Arm a total strength by 31 March 1939, of 2,516 aircraft as against Scheme C's 2,017.

Provision of war reserves

The increase in first-line numbers provided by Scheme F was not therefore very notable. But the increase in strength was very marked. The force that was to be built up would not, when completed, be an 'interim' makeshift, force. Its squadrons, particularly its bomber and fighter squadrons, would be equipped with modern aircraft of very much greater power and effectiveness than those contemplated in earlier schemes. What is more, those squadrons would by the spring of 1939 have behind them a

/fairly

- (1) Ibid.
- (2) A.M. File S.22846/IV/2A; A.H.B.V. 5/4/24.
- (3) A.H.B.V. 5/2/14.

fairly adequate quantity of war reserves. For under Scheme F £50,000,000 was allotted for the provision by 31 March 1939 of war reserves of material on a scale of 150% of first-line strength. These war reserves, together with the squadrons' initial reserves and workshop (or maintenance) reserves amounting to a further 75% of first-line strength, (1) would be sufficient to make good the losses which it had been calculated that they might expect to suffer during the first four months of a German war. By that time it was hoped that industry would have expanded its output sufficiently to keep pace with war wastage. Similar provision was also made for the building up of a larger reserve of trained and partly trained pilots and ground crews. During the next three years 800 more pilots were to be trained than were actually needed to man the Scheme F squadrons and a new R.A.F. Volunteer Reserve was to be established in which a still larger number might learn during week-ends and brief annual camps at least the rudiments of military flying. The Scheme F force should thus be reasonably well equipped at most points and ready for war by the spring of 1939. It was, in fact, to be, in essentials, the force with which the R.A.F. actually went to war in September 1939. That it had by then come to be regarded, in its turn, as little better than a stop-gap force was due to developments which must be studied in later sections of this Narrative.

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(1) A.H.B.V. 5/4/37.





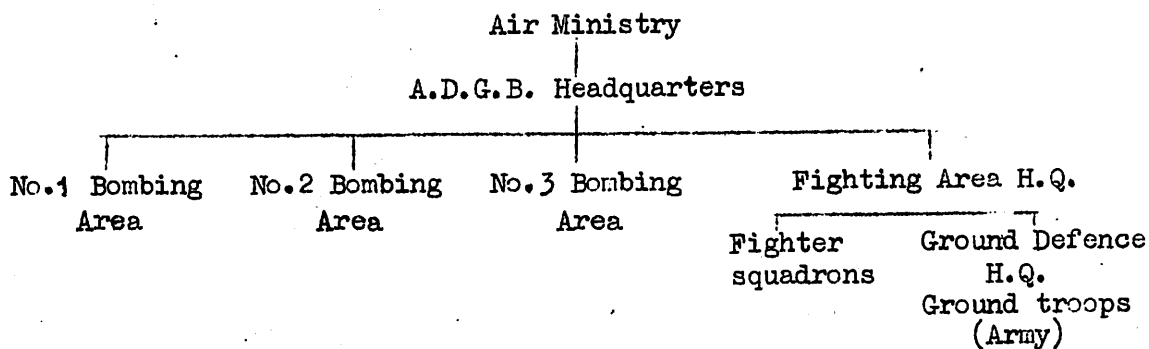
110A.

III. THE ORIGINS OF BOMBER COMMAND(iii) THE ESTABLISHMENT OF THE COMMAND, 1935-6The new  
Commands

With the expansion of the bomber force came also a change in its command organisation. In 1936 the single Air Defence of Great Britain Command, controlling both the metropolitan bomber force and the metropolitan fighter force, was abolished. In its place there were set up two headquarters, a Bomber Command and a Fighter Command, independent of one another and each directly subordinate only to the Air Ministry. The change, however, did not represent any significant alteration in policy. Indeed, it was primarily designed to ensure the continued application of the traditional offensive principles in the new conditions of Expansion. The reasons for it were essentially, almost exclusively, administrative and its origins are to be sought more in the history of the fighter force than in the history of the bomber force.

The  
A.D.G.B.  
Command

It has already been pointed out<sup>(1)</sup> that the A.D.G.B. Command itself was conceived in 1923, and brought into effective existence in 1926, as primarily a bomber command, a bomber command to which the defensive Fighting Area was appended and subordinated. When the full fifty-two squadrons of the 1923 programme were completed, A.D.G.B. was to control thirty-five bomber squadrons and seventeen fighter squadrons. The seventeen fighter squadrons, based on airfields stretching in a continuous belt from the Wash to Salisbury Plain, were to be grouped under a single headquarters, the Fighting Area. The Air Officer Commanding this Fighting Area, though subordinate to the Commander-in-Chief of A.D.G.B., would be almost entirely responsible for diverting and co-ordinating all the fighter squadrons. The Commander-in-Chief and his staff would therefore have to concern themselves only in a general way with the supervision of the defensive activities of the fighters. The thirty-five bomber squadrons, on the other hand, were to be organised eventually under three Bombing Areas - Wessex, Oxford and East Anglia. To co-ordinate and direct the operations and administration of these three Bombing Areas would therefore be the major task of the Commander-in-Chief of A.D.G.B., and of his staff. This would ensure that the Commander-in-Chief and his staff must be concerned primarily with the bomber force rather than with the fighter force; that they would devote their attention principally to the long-range, offensive, side of air warfare rather than to the local and merely defensive side. The eventual lay-out of the command organisation, as determined in the second revise of the expansion scheme issued in June 1924, was thus as follows:-<sup>(2)</sup>



/This

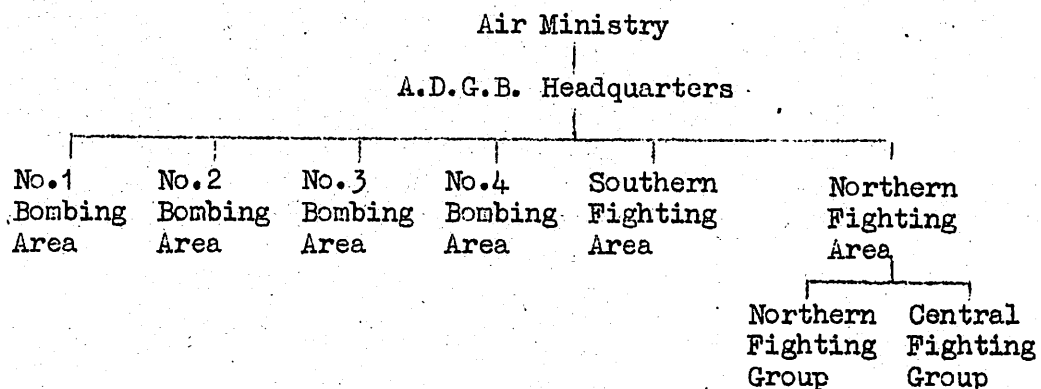
- (1) Above, <sup>CHAP</sup> Part II.ii.pp.24-25.  
 (2) A.M. File S.22846/I/29A

A.D.G.B.  
in 1933

This organisation was only just beginning to take shape when in 1934 Expansion Scheme A was adopted. During the first ten years after 1923 there had been, owing to the delays in the formation of the full number of bomber squadrons, only one of the three Bombing Areas in existence - the Wessex Area. Besides this Wessex Area and the Fighting Area there had been nothing except No. 1 Air Defence Group which looked after the Special Reserve and Auxiliary Air Force squadrons, all of which were then bombers. It was not until October 1933 that the second Bombing Area, the Oxford or Central Area, began to form. This was then given control of most of the Regular and Special Reserve day bomber squadrons, leaving the Regular and Special Reserve night bomber squadrons to the Wessex Area. No. 1 Air Defence Group was now shorn of its Special Reserve squadrons, though still left to look after the A.A.F. squadrons until the third, or East Anglia, Bombing Area should form, in, it was anticipated, about four years' time. The Group headquarters staff would then provide the nucleus of the new Bombing Area headquarters staff.<sup>(1)</sup>

Expansion  
Scheme A  
1934.

The first of the new expansion schemes, Scheme A, in 1934 brought no radical change in this command organisation. It did, however, mean a very considerable increase in size and complexity. The Metropolitan Air Force was to be increased from fifty-two to seventy-five squadrons. There were to be eventually four Bombing Areas instead of the three of the 1923 scheme. More significant, the fighter squadrons were to be increased from seventeen to twenty-five and the Aircraft Fighting Zone which they would have to defend was to be extended northwards from the Wash as far as Middlesbrough. A fighter force of this size and, more particularly, an Aircraft Fighting Zone of this extension could not easily be controlled and directed from a single central Fighting Area headquarters. For these reasons the Brooke-Popham sub-committee was already urging the necessity of creating a second Fighting Area to control the northern part of the defence system.<sup>(2)</sup> Even this might not go far enough to ensure efficient control and the Air Ministry were actually considering the possibility of further subdividing this northern Fighting Area into northern and central Fighting Groups. Thus, as the following diagram shows, the lay-out of the new A.D.G.B. command organisation was, even in Expansion Scheme A, growing too unwieldy and too complicated for direction from a single central headquarters.<sup>(3)</sup>



Moreover, there now seemed to be a real danger that the increased size and complexity of the fighter organisation might distract the A.D.G.B. headquarters staff from concentrating, as originally intended, upon its proper primary function of supervising and co-ordinating the offensive bomber force. As the D.C.A.S. wrote,<sup>(4)</sup> the Air

/Ministry

- (1) Ibid., II/72, 72A, 76A
- (2) A.M. File S.35381/I/2B
- (3) A.M. File S.35510/1A
- (4) A.M. File S.35381/I/18A

Ministry disliked the idea of creating two Fighting Areas because the Commander-in-Chief of A.D.G.B. would then have to spend a good deal of his time in co-ordinating their activities. He would thus be drawn too much to the defensive side of A.D.G.B. and would not be able to concentrate, as he ought to do, upon the counter-offensive, upon the bomber force. Even under Expansion Scheme A, then, A.D.G.B. would speedily grow too big to be effectively controlled from a single centre. Decentralisation of command was already becoming necessary if the emphasis upon the offensive was to be maintained. This decentralisation could only take one of two forms. It could be achieved, as the Director of Operations and Intelligence had suggested in April 1934,<sup>(1)</sup> by creating two or three commands subordinate to A.D.G.B. Or it could be achieved by abolishing altogether the central A.D.G.B. command and creating two or more independent commands, each subordinate only to the Air Ministry.

Expansion  
Scheme C  
1935

With the adoption of Expansion Scheme C in May 1935, this decentralisation of command became urgent and unavoidable. It was the second of the alternative methods that was now chosen. The new Scheme provided for an increase in the Metropolitan Air Force proper to no less than 112 squadrons. Of these seventy would be bombers and thirty-five fighters. Centralised control by a single command over so large a force was now really impracticable. Moreover, with thirty-five fighter squadrons and an Aircraft Fighting Zone likely soon to reach into southern Scotland, the single Fighting Area had to go too. So large a force, stretched over so extended an area, could not effectively be controlled from a single headquarters. The problem of quick communications alone required that some further controlling organisation should be interposed between the central headquarters and the local squadron stations. In fact, with Scheme C, there were to come into existence two, and possibly three, Fighting Areas, a Northern and a Southern or possibly two Northern and one Southern.<sup>(2)</sup> Now these two or more Fighting Areas would need some superior body to control and co-ordinate their operations. Under the existing system that would naturally be the A.D.G.B. headquarters. The A.D.G.B. Command would thus have a great deal of its time taken up with defensive work and less time available for the supposedly more important offensive direction. Yet it would have at the same time a very much larger bomber force - seventy squadrons - to direct on the offensive side. It looked, therefore, not impossible that the Command would either fall between the two stools and control neither the offensive nor the defensive with efficiency; or else that, under pressure of attack upon the United Kingdom, it would concentrate its attention rather upon the fighters than upon the bombers. Yet the doctrine of the offensive remained as dominant as ever in the minds of the Air Staff. It was, too, beginning to captivate Cabinet Ministers, as the discussions on Scheme F were soon to show. Therefore the effect of Scheme C was to produce a new, decentralised, organisation of the higher command of the Metropolitan Air Force.

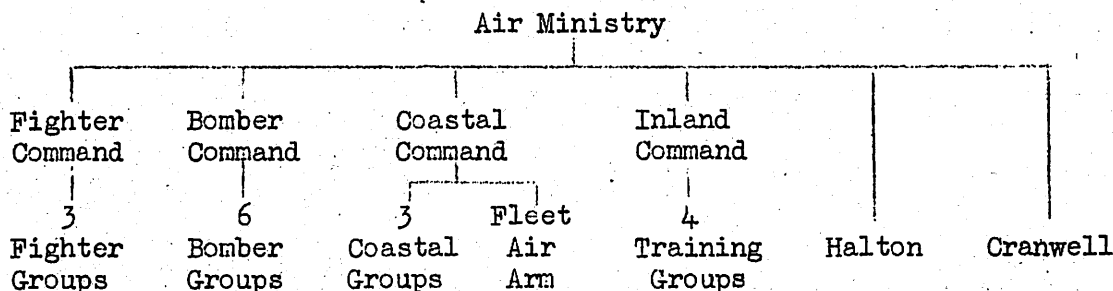
The new  
Command  
organisa-  
tion

This new organisation made few changes in the lower levels of command. The immediate co-ordination of the squadrons and stations was still left in the hands of a number of subordinate headquarters, though these were increased in number and given a new name. Three Fighter Groups headquarters took the place of the old Fighting Area; six Bomber Groups replaced the former three Bombing Areas. But these Bomber and Fighter Groups were no longer controlled by one and the same higher command. Instead, the six Bomber Groups were placed under a new Bomber Command and the three Fighter Groups under a new Fighter Command. Each of these was an independent command, for the central A.D.G.B. Command, controlling both fighters and

/bombers,

(1) A.M. File S.33237/1A  
(2) A.M. File S.34572/III/51A, 66A.

bombers, was now abolished and the new Fighter and Bomber Commands were placed immediately under the Air Ministry. At the same time, to complete the symmetry of the system, the Inland and Coastal Areas were raised to the status of independent Commands, responsible, like the Bomber and Fighter Commands, only to the Air Ministry. The new organisation may be shown diagrammatically as follows:-(1)



Its functional character

From July 1936, when the new Commands first came into effective existence, the control and direction of the expanded Metropolitan Air Force was thus reorganised upon a 'functional' basis. The squadrons were grouped broadly in accordance with their strategical and technical functions. This was, of course, a development quite in keeping with the general trend of air affairs. For by now it was becoming clear that there were four distinct kinds of activity required of the Metropolitan Air Force. The first, and to the Air Staff quite the least important, was that of direct co-operation with the Navy or the Army, those activities which were the especial province of the Fleet Air Arm and of the Army Co-operation squadrons allotted to the Army Field Force. The second was the defensive work of protecting the industry, towns, ports and internal communications of the United Kingdom against enemy air attacks. This local close defence was primarily the fighter aircraft's concern. The third task was again defensive - to assist the Royal Navy in safeguarding the sea communications and shipping of the United Kingdom against attacks by the enemy's surface or underwater craft, and perhaps his aircraft too. This was the main duty of the General Reconnaissance aircraft and torpedo-bombers now allotted to the Coastal Command. Finally, and to the Air Staff supremely important, there was the offensive requirement, of continuous and sustained attacks upon the enemy's bases, communications, and sources of belligerent power.

Reasons for this

By now it was also becoming clear that these four requirements were growing more and more distinct from each other. Direct naval and army co-operation were, as always, regarded as ancillary duties whose nature was defined by the other Services rather than by the Air Staff. The close defence of Great Britain now called for specialised training and specialised equipment, for high-speed, heavily-gunned, single - or two-seater fighter aircraft guided by elaborate systems of ground control. Moreover, with the promising progress of R.D.F. this close defence by the fighters was becoming less dependent for its success upon the counter-offensive of the bombers: it might hope that by its own unaided efforts it would be able to reduce to reasonable proportions the scale of enemy air attacks. The Coastal air forces, too, were developing their own techniques and with them requirements which made their aircraft less suitable as potential reinforcements for the bomber force. Endurance and good facilities for oversea observation counted with them for more than great defensive power or high performance. The General Reconnaissance aircraft were thus becoming less and less

/suitable

suitable for long-range bombing now that more and more emphasis was being placed upon power and performance in the design of bomber aircraft. The increasing size and complexity of the newest designs of bombers similarly made them quite unsuitable as reinforcements for the fighters and uneconomical as reinforcements for the coastal squadrons. Furthermore, as we shall see, the bombers themselves were about to be cast for a role that would make their operations virtually a campaign on its own, one largely independent of the 'counter-air-offensive' requirements of the Air Defence of Great Britain.

Thus by 1936 each branch of British metropolitan air power was clearly acquiring a specialised function which needed specialised training, specialised equipment, and therefore specialised command. The Metropolitan Air Force as a whole was growing too large and too unwieldy to be controlled from a single headquarters; the work of its various branches was becoming too specialised for such a central headquarters properly to co-ordinate them all. Separation of the branches into independent commands, co-ordinated by the Air Staff itself and organised upon a 'functional' basis, was therefore the natural and logical outcome of the expansion and the technical development which the German menace had evoked. The establishment of a separate Bomber Command was the product chiefly of administrative convenience. It reflected no real change in policy. Nevertheless, the emancipation of the bomber force from the control of A.D.G.B. was a change wholly in keeping with those other, more significant and far-reaching developments which made 1936 so important a year in the history of the Royal Air Force.

## IV. PREPARATION FOR A WAR WITH GERMANY

(i) THE DECISIVE YEAR: BOMBING POLICY AND EQUIPMENT, FEBRUARY 1936 to JANUARY 1937.Significance of 1936.

The year 1936 appears to have marked a decisive stage in the evolution of British bombing policy. In that year the clear emergence of a new alignment among the Continental Powers undermined the basic assumption upon which all Britain's rearmament programmes rested - the assumption that her armed forces would not be involved in any major European war before 1939 at the very earliest. At the same time, the growth of a new alarm about the ultimate aims of German air expansion made it seem doubtful whether the R.A.F.'s latest programme, Scheme 'F', would prove adequate even if that basic assumption should prove correct. This alarm, in its turn, provoked a careful examination into the resources of the British aircraft industry and training establishments, which brought into full view the limitations imposed by industrial capacity and man-power supplies upon the expansion of the R.A.F. and the Bomber Force. This conjunction of circumstances drove the Air Staff to put forward a new short-term expansion Scheme H in which parity with the German Air Force was to be attained in 1939 by the desperate expedients of depleting the home-based reserves and weakening the Overseas Command. But it drove them also, as a long-term policy, to press to its logical conclusion the process which had already developed the Bomber Force from the essentially counter-offensive weapon of Schemes A and C into the primarily offensive weapon of Scheme F. It established and defined - at least as an ideal to be aimed at, if not yet as an explicit and avowed principle to be acted upon - the tendency of British bombing policy to concentrate upon developing an all-heavy bomber force as the best instrument for carrying out the experiment of an 'independent', strategical, bombing offensive. It was in 1936 that the Bomber Force of 1942-1945 was first envisaged.

(a) Development of European affairs, 1936.Effects of the League's failure over Abyssinia

During the latter half of 1936 the effects of the failure of the League of Nations Powers to restrain Italian aggression began to work themselves out. To Great Britain in particular that failure had dealt a severe blow. It had seriously weakened her prestige; it had left her with new strategical commitments in the Mediterranean;<sup>(1)</sup> and, while showing once and for all that she could no longer rely to any appreciable extent upon the League of Nations, it had raised serious doubts about the wisdom of depending upon France - even in a quarrel with Germany.<sup>(2)</sup>

German re-entry into the Rhineland, March 1936

Moreover, even before the Italian success in Abyssinia was complete, Germany had demonstrated her eagerness to profit from her neighbours' quarrels. On 7 March 1936 she had denounced the

- (1) Statement by C.N.S., 26 May 1936 - C.O.S. Minutes, 175th Meeting; J.P.C. report on situation in E. Mediterranean and N. Africa, May 11 - C.O.S. Paper 462 (J.P.), and also 465; Memo. by Foreign Secretary, June 11 - C.P. 165 (36); and C.O.S. report on this - C.O.S. Paper 477.
- (2) Above, Part III.ii; also, C.I.D. Paper 1260-B.

Locarno Agreements and sent her troops to occupy the Rhineland zones which had been demilitarised by the Treaty of Versailles. She had, it is true, offered at the same time to sign a new twenty-five years' non-aggression pact with France, Belgium, and Holland, under British and Italian guarantee. She had also offered to strengthen this by a Western European Air Pact and by non-aggression treaties with her immediate neighbours to the east and south. But these specious offers could not disguise her obvious breach of treaty obligations and to the British Government they suggested that Hitler was really aiming to secure himself in the West in preparation for an attack upon France's new ally, Russia. They seemed therefore to hold little promise of Germany's future good behaviour.

Staff talks  
with French  
and Belgians  
April.

Yet the other Locarno Powers felt unable to nip German ambition in the bud by firmly resisting this, her first, attack upon the territorial arrangements of the Versailles Treaty, Italy, of course, would not co-operate with States which were even then enforcing economic sanctions against her; and, although Britain, France, and Belgium held preliminary staff conversations in April 1936, these were limited to an exchange of information about the strength of their respective forces and did not go so far as to consider even in general terms any plans for joint action<sup>(2)</sup>. The truth was that, whatever the French and Belgian views may have been, the British Government was as unready for strong action against Germany in 1936 as the French had been for strong action against Italy in 1935. With the rearmament programmes only just beginning to get under way, the Cabinet had to accept the Chiefs of Staff's warning "that any question of war with Germany while we are, as at present, heavily committed to the possibility of hostilities in the Mediterranean, would be thoroughly dangerous".<sup>(3)</sup>

British  
weakness  
revealed

Certainly the British forces then available against Germany were pathetically small. Assuming that mobilisation was ordered, the Navy could in two weeks provide a Home Fleet of three battle-ships, a battle-cruiser, two heavy and nine light cruisers, and thirty-two destroyers. The Army could send two divisions to the Continent after three weeks, but those divisions would lack their Air Defence Brigade, tanks, anti-tank weapons, and mortars. The R.A.F. could muster seven fighter squadrons, of which three would have obsolescent aircraft and two more could not operate by night; and a striking force of six light and four heavy bomber squadrons, of which the light bombers could reach Germany only if they were based on the Continent and the heavy bombers could do no more than drop twenty-five tons of bombs a day on the Ruhr and Rhineland for a short period. Only one-third of the ground defences needed for London, and none of those needed elsewhere, could be manned. Even if peace in the Mediterranean were assured so that all extra forces could be withdrawn from that area, the Army and R.A.F. would not be able to do much more than this for at least three or four months. "Even then, the total

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- (1) Memo. by the Prime Minister to C.O.S., 9 March 1936 - C.O.S. Paper 437.  
 (2) C.O.S. Minutes, 170th Meeting, March 31; C.O.S. memo. on instructions for talks, April 1 - C.I.D. paper 1224-B; Cabinet ruling, April 8 - Cabinet 28 (36), conclusion 3; Instructions to British representatives - A.M. File S.38004/2A; Opening statement by V.-A. James, - *ibid.*, encl. 3A. Notes of Air Staff's meetings - *ibid.*, encl. 7A.  
 (3) C.O.S. Paper 442 (18 March 1936)



air strength available at home would be quite inadequate for security against air attack or to prosecute successfully an air offensive against Germany." (1) The forces available were, in short, "not only inadequate to render effective support" to France and Belgium, but also - if war broke out in the immediate future - "incapable of assuring our own security". (2)

Belgian  
declaration  
of neut-  
rality,  
October

These facts and figures, which so clearly manifested Britain's impotence, had been communicated to the French and Belgian representatives during the Staff Conversations of April 1936. (3) The revelation, and, later, Britain's reluctance to discuss plans for joint action (June), (4) may well have helped to cause a further weakening in the 'Peace Front' - the defection of Belgium. At all events, on 14 October 1936 the King of the Belgians announced his country's decision to adopt a policy of neutrality. (5) One of the two Low Countries, whose integrity had been pronounced vital to Britain's security, had thus decided that her own professions of strict neutrality would be a better defence against German ambition than such assistance as Britain and France could offer. It would henceforward be impossible to make any arrangements for such assistance unless and until the Germans actually invaded Belgium, a fact which must considerably affect Britain's plans for her own Army and air defence and must put an additional premium upon those types of bombing aircraft which had the range to operate against Germany from bases in the United Kingdom.

The Rome  
-Berlin  
Axis &  
the Span-  
ish Civil  
War

Some time before this, in July 1936, Italy had made clear the futility of any lingering hope that the 'Stresa Front' might be revived, by refusing to agree to a proposal for a meeting of all the Locarno Powers except Germany. The British Government thereupon began in August to press for a conference of those powers and Germany, in the hope of procuring a new Western European agreement (6). This however, served only to reveal a more sinister meaning in the previous Italian refusal. For Germany and Italy were now drawing together. They had patched up their differences over Austria and had begun to co-operate in a new adventure. They were actively supporting General Franco and his faction of military rebels against the Republican government in Spain. The danger of this adventure to France and Britain was plain to see. If Franco were victorious thanks to German and Italian aid, then France might find leagued and hostile dictators threatening her across three of her frontiers. At the same time, with the Italians assured of Spanish goodwill and perhaps occupying the Balearies, (7) Mussolini might endanger from two sides France's vital communications with her North African Empire, just as from Sicily and Libya he already threatened Britain's most important communications with Egypt and the Far East.

Europe  
divided  
into two  
camps

Nor was this all. It soon appeared that the co-operation of Germany and Italy was likely to be not merely local and temporary but general and permanent. On 1 November 1936 the 'Roman-Berlin Axis' was publicly proclaimed; on November 18 the two Powers in

/identical

(1) Ibid.

(2) C.O.S. Paper 452 (1 April 1936)

(3) R.A.F. figures communicated, April 15 - A.M. File S.38004/7A

(4) C.O.S. Minutes, 178th and 179th Meetings, June 16 and 25 - C.O.S. Papers 472, 478.

(5) C.O.S. Minutes, 187th Meeting.

(6) C.O.S. Papers 510 (Aug. 21), 511 (Sept. 1); C.I.D. Papers 1260-B, 1269-B (Oct. 26).

(7) C.O.S. Papers 509, 536.

idential statements formally recognised Franco's government as the lawful government of Spain; and on November 21 Germany and Japan signed the Anti-Comintern Pact which threatened France's ally, Russia, with attack from two sides, much as the recognition of France threatened France herself. The days of 'collective security' were now clearly over. Europe, and the world, was once more aligned in two hostile camps and the balance of power between the two was already approaching that point of uneasy equilibrium at which the aggressive States might find it tempting to risk a general war.

The  
Foreign  
Secretary's  
warning,

Indeed, on November 6 the British Foreign Secretary went so far as to warn the Cabinet that "some challenge was possible at any time from next Spring onwards".<sup>(1)</sup> Thus the rapid worsening of the European situation had by November 1936 once again undermined the basic assumption of Britain's rearmament programmes - the assumption that her armed forces would not be needed for a major European war before the beginning of 1939.

This in-  
creases  
danger of  
German air  
attack

The immediate effect of this warning was to create a new alarm about the condition and strength of the R.A.F. As already shown,<sup>(2)</sup> the 'worst case' against which Britain had to prepare her defences was the possibility that the Germans, doubting their chances of a quick victory over France by land, might make it their first object to cripple or destroy Britain by air. Now, the earlier Germany attacked, the more urgent would be her need of speedy victory and the less adequate the preparation of her armies to achieve it by land. The earlier she attacked, therefore, the more likely she was to stake her fortune upon an air offensive designed to knock Britain out of the war before British strength could be mobilised to assist the French. As the Joint Planning Committee had said in April 1936,<sup>(3)</sup> if Germany were to launch a desperate, 'mad dog', war of aggression before her preparations were complete, she would probably try "to find the weakest spot in the Allied front and attack it with the only forces she has which retain some power of strategical initiative. The most dangerous threat that she could produce against the Allies would be an attempt to defeat Great Britain by combined Air and Naval attack upon her food supplies. In this event her Air Forces might be devoted to unrestricted bombing of ports, ships, and means of distribution without regard for any existing Conventions. In view of the extreme weakness of the air defences of this country at the moment, it is important therefore that any Allied plan should contain, as a major consideration, the measures necessary to provide for the security of Great Britain if the air attack is directed against her". The Foreign Secretary's warning of November 6 accordingly put a still higher premium upon air parity and, by suggesting that war might come before 1939, made the air menace from Germany appear more dangerous as well as more imminent.

/(b)

(1) Quoted in C.O.S. Paper 525

(2) Above, <sup>CHAP</sup> Part III ii.97-8

(3) C.O.S. Paper 460(J.P), approved by C.O.S. May 4 - C.O.S. Minutes, 173rd Meeting (6)

(b) A New Alarm about the aims of German ExpansionScheme F  
assumptions  
about aims  
of German  
air  
expansion

About a month before this warning was given, another of the assumptions which underlay the R.A.F.'s expansion programme had also been upset. When Scheme F was being considered in February 1936, the Air Ministry had forecasted that the German Air Force would probably reach 1,107 first-line aircraft by 1 October 1936, 1,500 by 1 April 1937, and perhaps 2,000 by the beginning of 1939.<sup>(1)</sup>

Now, as 1936 wore on, everything seemed to confirm the accuracy of the first two forecasts. They coincided closely both with the current French estimates<sup>(2)</sup> and with the official figures confidentially communicated by the German Government.<sup>(3)</sup> The Air Ministry even managed to reconcile them with Mr. Churchill's estimates.<sup>(4)</sup> The third forecast, however - of 2,000 first-line aircraft by 1939 - was soon called in question.

Progress  
of German  
expansion

The output of the German factories continued to grow steadily, British estimates of it rising from 260 airframes and 650 engines a month in June<sup>(5)</sup> to 320 airframes and 850 engines in September.<sup>(6)</sup> Moreover, at least one factory was already working double shifts;<sup>(7)</sup> the feverish expansion of the industry's potential capacity still continued; and it was thought to be already capable of producing 1,000 aircraft a month in an emergency.<sup>(8)</sup> The training of pilots was likewise being pressed forward. The training schools were full and, in addition, many pilots were being trained ab initio in their squadrons. This latter device, although it had been tried and found wanting by the R.A.F. in the 1920's and would for a time lower the squadrons' efficiency, might in two years or so produce a considerable increase in the number of trained pilots available for operations. And behind the regular Air Force there were the Air Sports Clubs (D.L.V.) which, though not yet of much military value, might also in about two years' time provide a large number of pilots trained to very little below the regulars' standards. With their help the German Air Force might well "produce a surprise increase in the effective first-line strength immediately before hostilities."<sup>(9)</sup>

New  
estimate  
of German  
aims, Oct.  
1936

All this lent a marked appearance of probability to the rumours and suspicions, which were growing stronger from March 1936 onwards, that Germany's real aim was to push the expansion of her Air Force to the utmost limit, under the cloak of seeking parity with the Russians at 4,000 or 4,500 first-line machines.<sup>(10)</sup> By October the evidence favouring such a suspicion had become so convincing that the Air Ministry felt compelled to revise their forecast of what German strength would be by the beginning of 1939. They now estimated that it was likely to be 2,500, rather than 2,000, first-line aircraft; and of these 2,500 they now expected 1,700 to be bombers.<sup>(11)</sup>

/If

- (1) Above, <sup>CHAP.</sup> Part III, ii. 98-9; also, Air Staff notes of 21 Feb. and 9 June 1936 - C.I.D. Papers 1216-B, 1238-B.
- (2) C.I.D. Papers 1216-B, 1238-B, 1241-B.
- (3) The S. of S. informed the C.I.D. of Gen. Milch's offer to communicate these figures on 10 July 1936 - C.I.D. Minutes, 280th Meeting<sup>(7)</sup>; the figures are analysed in the Air Staff note of Oct. 6 - C.I.D. Paper 1264-B.
- (4) C.I.D. Paper 1241-B
- (5) Industrial Intelligence Centre memo., 24 July 1936 - C.I.D. Paper 1250-B
- (6) Report of Sub-Committee on Industrial Intelligence, 28 Nov. 1936 - C.I.D. Paper 1284-B
- (7) C.I.D. Paper 1265-B
- (8) C.I.D. Paper 1284-B
- (9) Air Staff notes, 12 June & 6 Oct. 1936 - C.I.D. Papers 1241-B, 1265-B
- (10) Memo. by the Prime Minister, 9 March 1936 - C.O.S. Paper 437; Statement by S. of S. for Air, 10 July 1936 - C.I.D. Minutes, 280th Meeting<sup>(7)</sup>; Air Staff note, Oct. 6 - C.I.D. Paper 1265-B
- (11) C.A.S. to S. of S., Nov. 9 - A.M. File S.39676/6A.

Inadequacy  
of Scheme F

If these figures correctly represented German aims, then clearly the existing British expansion programme would be quite inadequate to give the home-based R.A.F. parity with the German Air Force in 1939. For Scheme F would provide a Metropolitan Air Force of only 1,736 first-line aircraft and of these no more than 1,022 would be bombers.<sup>(1)</sup> Moreover, in 1939 402 of these 1,022 bombers would still be Fairey Battles, whose range would hardly allow them to operate against Germany from home bases and whose normal bomb-load would be no more than 1,000 lbs apiece. Another 252 would be Bristol Blenheims, whose range and bomb-load would be but slightly superior to the Battles'. And yet another 32 would be torpedo-bombers, whose utility in an overland bombing offensive would at the best be doubtful. The remainder, the 96 Hampdens and the 240 heavy bombers (108 Whitleys, 36 Harrows, 96 Wellingtons) would be able to reach most of Western Germany from England, but even they suffered from definite limitations both in range and in power.<sup>(2)</sup>

(c) The Limitations set by Industrial Capacity and the  
Supplies of Trained Man-Power

Industrial  
difficul-  
ties of  
further  
expansion

Accordingly, early in October 1936 the Air Staff began to consider how they might by the Spring of 1939 increase the first-line strength of the Metropolitan Air Force and, more especially, how they might increase the striking power of its bomber squadrons.<sup>(3)</sup> At once the limitations set by the nation's industrial capacity were made manifest.

Setback  
to  
Scheme C

The industry could not even complete Expansion Scheme C to time. That Scheme (May 1935) had called for the production of 3,800 aircraft in twenty-two months<sup>(4)</sup> at a time when the British aircraft industry's monthly output had barely reached 150 machines, civil and military.<sup>(5)</sup> It had already become probable by December 1935 that at least 400 of these 3,800 aircraft would not be delivered by the appointed date of 31 March 1937.<sup>(6)</sup> During the next few months this probability grew into certainty<sup>(7)</sup> until in June 1936 the Air Ministry had to postpone by three months the dates originally given for the formation of the last twenty of the Scheme C squadrons.<sup>(8)</sup>

Scheme F  
require-  
ments

By then, however, the new Scheme F had already been super-imposed upon Scheme C (February 1936). This meant that during the two financial years from 1 April 1937 to 31 March 1939 the industry would be called upon, not only to complete Scheme C, but also to produce another 8,009 airframes and 12,750 aero-engines for the Scheme F force and its reserves.<sup>(9)</sup> In other words, in every one of those twenty-four months it had to build more than double the number of aircraft that it had built in August 1935.

/The

- (1) Below, Appendix III
- (2) Forecast by A.M.S.O., 12 Oct. 1936 - A.M. File S.39676/1A
- (3) Ibid. <sup>CHAP.</sup>
- (4) Above, Part III.ii.99
- (5) Report of Industrial Intelligence Sub-Committee, 9 Sept. 1935 C.I.D. Paper 1186-B
- (6) S.9 to D. of E., 24 Dec. 1935 - A.M. File S.37127/1
- (7) C.A.S. to A.M.S.O. 28 April 1936 - A.M. file S.36044/9
- (8) Notes by C.A.S., 17 & 20 June 1936 - A.H.B. V.5/4/27.
- (9) Note for Treasury, 11 March 1936 - A.H.B. V.5/4/21

The  
'shadow'  
factories  
set to  
work

The existing aircraft industry, working under normal conditions, obviously could not satisfy such a demand. Accordingly, the Government had agreed to reinforce it by bringing into operation as soon as possible some of the 'shadow' factories.<sup>(1)</sup> Scheme F could thus be completed to schedule only by mobilising in time of peace part of that 'shadow' industry which Lord Weir and his Committee had designed as a means of expanding output more rapidly in time of war. The R.A.F.'s demands had already outstripped the capacity of the ordinary peacetime industry and had begun to draw upon the nation's industrial war-potential.

Scheme F  
the limit of  
what could  
be done  
without  
changing  
industrial  
policy

In February 1936, then, it had been possible, by making this overdraft on war-potential, to plan for a considerable expansion of the R.A.F. by 31 March 1939. It was, however, exceedingly doubtful whether this overdraft could be so increased as to produce any further expansion within the same period. It took time to get a shadow factory into production. Before work could start, buildings had to be erected or converted, jigs and machine-tools to be manufactured, labour recruited and trained; and it would be extremely difficult to provide all these pre-requisites in sufficient quantities to get into production before 1939 many more factories than those already authorised for Scheme F. The only practicable method of appreciably increasing output before 1939 was to get more out of the existing industrial equipment by double-shift and overtime working. This, however, besides being expensive, would entail a considerable drain upon the limited supply of skilled labour.<sup>(2)</sup> It would therefore clash with the Government's settled policy that "export and commercial business must not be interfered with," with its ruling that the Service Departments should be "without control powers and must not interfere with normal trade."<sup>(3)</sup> So long as this policy prevailed, further expansion of aircraft output beyond that provided for under Scheme F was hardly possible. Indeed, it was improbable that even Scheme F could be completed in the allotted time. The output of aircraft, as forecasted in the autumn of 1936, would supply easily enough by 31 March 1939 the machines required to complete the first-line strength, together with an initial reserve amounting to 25% of that initial establishment. But it would not provide a war reserve of more than 150% of that initial establishment where Scheme F called for 200%.<sup>(4)</sup> Only if the Government were prepared to accept this figure of 150%; could the first-line strength be increased at all before the end of March 1939 - and even this concession would only make possible an increase of some 50 aircraft. This was the "limit of expansion possible before the end of March 1939" and even this could not be attempted before October 1938. "No expansion," the C.A.S. wrote, "not at present authorised can take place until 30.9.38 unless, of course, the output of aircraft and engines here forecasted can be improved. I fear the reverse is likely to be the case."<sup>(5)</sup>

/Thus

- (1) The Air Ministry discussions about the procedure to be adopted in approaching, and later in supervising, these new 'outside' firms are recorded on A.M. File A.37807. They make very clear the extent to which Scheme F had already exceeded the capacity of the existing industry - e.g. especially minute 3.
- (2) "We are faced with a serious (skilled) labour shortage arising largely from limited training since the war" - Minutes by D. of C., 3 March 1936, A.M. File S.37807/3; also 11th Report of Principal Supply Officers Committee, 7 Jan. 1935 - C.I.D. Paper 1108-B.
- (3) Minute by D. of C., 3 March 1936 - A.M. File S.37807/3
- (4) Above, Part III.ii. 108/9
- (5) 18 October 1936 - A.M. File S.39676/1A

Scheme G,  
Oct. 1936

Thus there was only one way - short of a radical change in the Government's industrial policy - of increasing the first-line strength appreciably by 1939. This was to increase it at the expense of its already none-too-adequate reserves. The new Scheme, Scheme G, which the Air Staff now began to investigate, had therefore to be framed upon these lines. It proposed, first, to convert four more of the Auxiliary squadrons from bombers to fighters, so raising the first-line fighter strength from 420 to 476 aircraft. This would permit a strengthening of the Midlands defences and the extension of the Aircraft Fighting Zone to cover southern Scotland. In place of these four squadrons, which as bombers had an initial establishment of 12 aircraft apiece (total, 48) five new regular medium bomber squadrons of 18 aircraft each and one new Auxiliary medium bomber squadron of 12 aircraft were to be raised (total, 102). So the bomber force would be increased, on balance, by 54 first-line aircraft. This, however, did almost nothing to solve the problem of how to attain parity with the Germans. Scheme G therefore contained other proposals, designed to augment more substantially the first-line bomber strength at the expense of the reserves. The five new regular squadrons, and the 29 Scheme F medium bomber squadrons which also had initial establishments of 18 aircraft apiece, were to be converted into 51 squadrons with peace establishments of 12 aircraft apiece. On mobilisation these 51 squadrons and the 5 older Auxiliary squadrons were each to be increased from 12 aircraft to 18 by adding to each six aircraft and six pilots from the reserve. In this way the first-line strength of the bomber force would be increased on mobilisation by a further 336 medium bombers, from the 1,022 bombers of Scheme F to a total of 1,412 bombers under Scheme G. The price of this 'window-dressing' would be to reduce the reserves behind the 1,412 Scheme G medium bombers<sup>(1)</sup> to considerably below 100%, which, according to the accepted calculations, would barely suffice to cover the wastage of the first two months of a German war.<sup>(2)</sup>

Scheme G \*

Scheme G, then, despite its very considerable sacrifice of reserves of first-line strength, would still leave the British Bomber force on April 1939 some 288 aircraft short of the estimated German figure of 1,700. To bridge this gap, the Air Staff considered also how soon it might be possible to carry out a further set of proposals, known as Scheme G<sup>2</sup>. These proposals envisaged the formation of a further 16 medium bomber squadrons, with peace establishments of 12 aircraft each, which on mobilisation would be raised to war establishments of 18 aircraft each (total, 288) by again taking aircraft and pilots from the reserve.<sup>(3)</sup>

Manpower  
limitations  
appear

A new limitation to expansion now appeared, no less strict and compelling than that set by industrial capacity. Even if the aircraft were available, it would be impossible until 1940 or 1941 to find the numbers of trained and experienced flight commanders and maintenance crews required by Scheme G<sup>2</sup>. The supply of ordinary trained pilots might, indeed, become adequate before the end of 1939, but there would be a deficiency of no less than 732 Flight Lieutenants as late as 1 April 1940. This figure, moreover, was some 50 more than the number of Flying Officers of between one and two years' experience in Service units who would then be available. In other words, as late as the Spring of 1940 it would only be possible to provide the number of flight  
/commanders

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- (1) Including two squadrons (32 aircraft) of torpedo-bombers.  
(2) C.A.S. to S. of S., 18 Oct. 1936 - A.M. File S.39676/1A.  
(3) Minute by C.A.S., 4 Nov. 1936 - A.M. File S.39676/5A.

commanders required by Scheme G<sup>#</sup> if about 50 flights were placed under the command of junior officers who had less than one year's experience in Service units, instead of the 3½ years called for even under the existing conditions of accelerated promotion. The deficiency of skilled fitters would be equally serious and proper maintenance of even the first-line aircraft would be impossible.<sup>(1)</sup>

(d) Scheme H : the original proposals, November 1936

Parity can  
be attained  
only by  
raiding  
Overseas  
forces

Scheme G<sup>#</sup>, then, was obviously impracticable as a method of attaining parity with the German Air Force in 1939. Even Scheme G would strain to breaking point "the supervision by experienced personnel" which the Air Staff regarded as vital to the squadrons' efficiency.<sup>(2)</sup> Thus man-power and industry alike imposed "a limit at about much the same point"<sup>(3)</sup> and the shortage of experienced officers and of skilled maintenance crews made it impossible any further to augment first-line strength at the expense of reserves. The Government and the Air Staff were, none the less, committed to a policy of parity with the Germans and could not well renounce this policy so long as there remained any possibility of maintaining it. And there was just one possibility remaining. By annexing to the Metropolitan Air Force the new squadrons designed by Scheme F as reinforcements for the Overseas Commands and the Fleet Air Arm, a semblance of parity with the German Air Force might still be preserved. To this, as a last resort, the C.A.S. turned at the beginning of November 1936.

Scheme H:  
the original  
version,  
Nov. 1936

The first version of these new proposals, known as Scheme H, was presented by the C.A.S. to the Secretary of State for Air on November 9.<sup>(4)</sup> The C.A.S. began by explaining that, if the reinforcements allotted by Scheme F to the Overseas Commands and the Fleet Air Arm were not 'raided', the maximum strength to which the Metropolitan Air Force could be expanded by 31 March 1939 would be 2,182 first-line machines, of which only 1,412 would be bombers. He then went on to argue, as he had argued vainly when presenting Scheme B seventeen months ago, that parity need be interpreted only as applying to the bomber forces. "Equality between Air Forces," he asserted, "is of first importance only in regard to their striking strength". The size of the defensive, fighter, forces and of the Army and Naval co-operation and overseas forces should be governed not by parity but by the requirements of the work they would be called upon to perform. The policy of parity would therefore be satisfied and the Government's pledges implemented if the Metropolitan bomber force could be made equal in numbers to the German bomber force. And this could just be done by 31 March 1939 if Scheme G were adopted and if 10 of the 12 additional squadrons designed by Scheme F for the Overseas Commands and 6 of those designed for the Fleet Air Arm were temporarily kept at home and equipped with medium bombers.<sup>(5)</sup> These 16 squadrons would be given a peace establishment of 12 aircraft each but, like the other 51 medium bomber squadrons under Scheme G, would be expanded on mobilisation to 18 aircraft each by the addition to each of them of 6 machines and 6 pilots from the reserve. Their strength on mobilisation would thus total 288 first-line aircraft. These 288 added to the 1,412 of Scheme G would give the Metropolitan bomber force a first-line strength on 31 March 1939 of 1,700 machines and so achieve parity in numbers with the German bomber force at that date.

/It

(1) Minutes by C.A.S., Oct.7 & Nov.4; by S.7, Oct.30, Nov.3 & 7 - ibid.

(2) C.A.S. to S. of S., Nov.9 - A.M.File S.39676/6A

(3) Note by C.A.S., Nov.11 - ibid. encl.7A.

(4) Ibid. encl. 6A.

(5) He considered it unlikely that the ships for these F.A.A. machines would be ready by 1939.



Its temporary character; plans for 1940 and 1941

It was recognised that these proposals were fundamentally unsound since they would use up a large part of the R.A.F.'s reserves before hostilities had even begun. They were, indeed, explicitly put forward as no more than temporary expedients made necessary because "further peacetime expansion by 1939 is not possible". Beside them the C.A.S. added other proposals for remedying their defects at the earliest date possible after 1939. As soon as possible after March 1939 the peace establishments of the 67 medium bomber squadrons were to be raised to 18 aircraft apiece and the 10 overseas and 6 Fleet Air Arm squadrons were to be restored. This would probably entail continuing expansion into 1940 and 1941 and forming in those years the equivalent of 33 new squadrons of 18 first-line aircraft each.<sup>(1)</sup>

The two sets of proposals

Such was the original form of Scheme H, the form in which in mid-November 1936 the C.A.S. circulated it to his Staff for examination and discussion.<sup>(2)</sup> It consisted of two sets of proposals. The first set formed a short-term and admittedly unsound programme for obtaining a nominal parity in numbers between the British metropolitan bomber force and the German bomber force by 31 March 1939. The other set contained in brief outline a long-term programme, based upon sound principles, for creating by 1941 a metropolitan bomber force of 1,700 first-line machines, the same number that the Germans were expected to possess by 1939.

Air Staff discussions & idea of 'Big Bomber' policy

In the Air Staff discussions, which went on through December 1936 and into January 1937, interest focussed more and more upon the long-term proposals until there emerged a vital new development in British bombing policy. This new development was the acceptance of the idea that the ultimate goal of endeavour should be to create a metropolitan bomber force entirely, or almost entirely, equipped with large and powerful heavy, or heavy-medium, bombers and designed to provide superiority in range and bomb-load rather than mere equality in numbers.

(e) The Antecedents of the 'Big Bomber' policy: discarding the Light Bomber, 1934-5.

The new policy not due to sudden conversion

The conversion of the Air Staff to this new 'Big Bomber' policy did not, however, come in a sudden flash of revelation. On the contrary, it was the final step in a long process of thought whose origins may be traced back to the very beginnings of Expansion in 1934. To understand how the change came about, it may therefore be helpful to look back a little.

The Light Bomber's value first questioned, 1934

The first stage in the Air Staff's conversion had been their abandonment of the Light Bomber, of which in the years before 1934 they had been so much enamoured.<sup>(3)</sup> The first doubts about the usefulness of the Light Bomber began to appear in 1933 and 1934 when Germany replaced France as the potential enemy against whom British preparations had to be directed. For British bombing policy then had to consider as its most probable objectives targets more distant than those in France which it had hitherto chiefly envisaged. This brought to the fore the question of aircraft ranges; and its limited range was one of the most obvious

/weaknesses

(1) A.M. File S.39676/6A, 8

(2) Note by C.A.S., 11 Nov. 1936 - A.M. File S.39676/7A; C.A.S. Outline of Scheme H, Nov. 20 - ibid., min. 8.

(3) Above, Part II, ii. 39-40.

weaknesses of the Light Bomber. Yet, for a variety of reasons which have already been discussed, (1) Expansion Scheme A (July 1934) had retained the Light Bombers in the metropolitan bomber force and had even increased their numbers. (2)

Air Staff  
Memorandum  
on classes  
of aircraft,  
13 May 1935

Nor did the investigation, begun in November 1934, (3) into the classes of aircraft which would be required for a German war, produce any immediate change of policy. It was the first investigation of its kind that the Air Staff had undertaken. (4) They undertook it before any detailed examination had been made of German targets or of the tactics and equipment most suitable for attacking those targets. They completed it before they were in a position to assess with any confidence the effects of the technical revolution which was producing, among other things, the high performance monoplanes of the new Medium Bomber class. Hence the Air Staff Memorandum of 13 May 1935, (5) which summarised the results of the investigation, was tentative, and provisional in character, least definite where it was least conservative.

Attitude  
to the  
Light  
Bomber

The Memorandum gave pride of place among an aircraft's qualities to a high performance. The primary role of the metropolitan Air Force would be "warfare against a first-class air Power", and therefore the "provision of the highest possible performance is of not less than vital importance". This, of course, favoured the Light Bomber, since that was the class particularly designed to exploit the tactics of evasion and in its design all the emphasis was placed upon performance. As it could also be used for dive-bombing, and so seemed to have the best prospects of being able to attack small targets successfully by day; as it was handy for field operations; and was quick to build and to train for it had long been an established favourite. Nevertheless, the Air Staff did now recognise that the Light Bomber, besides possessing an inadequate range and carrying a very slender defensive armament for a German war, had the lowest "output efficiency" of all the classes of bomber aircraft, as the following table showed:-

Class	Initial Establishment				Speed	Squadron
	Aircraft.	Engines.	Men.	Pilots.	m.p.h.	bomb-load
Light (P.4/34)	12	12	95	15	270	6,000 lbs
Medium:						
Single (P.27/32)	12	12	95	15	250	12,000 "
and						
Twin (B.9/32)	12	24	153	24	250	12,000 "
Engined						
Heavy (B.1/35)	10	20	143	23	230	20,000 "(6)
					/If	

(1) Above, Part III.ii.80-83

(2) Above, Part III.ii.82-83

(3) Above, Part III.ii.84-5

(4) "We have not had a careful appreciation of this kind before" - D.D.O.L. to D.C.A.S. 15 Nov. 1934 - A.M. File S.34766/3.

(5) A.M. File S.34766/6B

(6) The B.1/35 had been included in the 1935 programme in order to insure against the Armstrong B.3/34 (Whitley) not proving successful, and to embody the latest information about Heavy Bomber design, stimulated by the American Boeings and Martins & by D.T.D.'s recent visit to the U.S.A. It was to have two of the projected, but as yet untried, Rolls Royce Merlin 1000 h.p. engines. The specification, issued on 25 Mar. 1935, called for a range of 15000 mls. at 195 mph with 2000 lbs. of bombs and a top speed of 230 mph as against the B.3/34's 1250 mls with 1500 lbs and top speed of 205 mph. The B.1/35 was to carry four machine guns (2 in a tail turret, 1 in a nose turret, 1 amidships), giving it an all round defence. Its crew was to be five. Tenders were originally accepted from three firms, but two of these were later cancelled, leaving only Vickers (the ill-fated Warwick) - A.M. Files S.34932/1A, 6A, 11, 12, S.35214 passim.

If therefore the steady progress of aircraft design could produce Medium Bombers of speed comparable to that of the Light Bombers and capable of dive-bombing, there might be much to be said for merging the Light Bombers in the Medium Bomber class. But that time was not yet, for the new Medium Bombers were still untried and their capabilities unknown.

Uncertainty about future evolution of Medium Bomber

Besides, the future progress of aircraft design might well work the other way and cause the Medium Bomber to approximate to the Heavy Bomber rather than to the Light Bomber. It was still the official view that no bomb larger than the 500 lb. need be catered for. So, "unless a very heavy bomb should be found to have a destructive effect greater than the same weight of 500 lb. bombs," it would be better to use any improvement in the Heavy Bomber's design to increase its defensive armament or its speed rather than to augment its bomb-carrying capacity. Hence there was no reason why the Heavy Bomber should increase in size or capacity. On the other hand, it was possible that the Medium Bomber might grow heavier and larger. If it should, then it might eventually merge into the Heavy Bomber class. Thus, while the Air Staff were agreed that their aim should be to reduce the existing three classes of bombers - Heavy, Medium, and Light - to two, they did not yet feel able to forecast how that reduction would be effected, whether by the Light Bombers' functions being taken over by the Mediums or by the Mediums being absorbed into the Heavies. So long as this was uncertain, the Light Bombers must be retained. They could not be discarded until Medium Bombers of comparable speed and capable of dive-bombing could be produced. And even then, the Memorandum concluded, there would probably be need for one or two squadrons of special high performance Light Bombers, including perhaps some specialised high altitude machines able to exploit to the utmost the tactics of evasion by cruising at 40,000 feet and 200 miles an hour with 500 lbs. of bombs.

The Light Bombers in Scheme C, May, 1935

Indeed, so long as it was considered likely that bomber aircraft could be produced with a sufficiently high performance to penetrate deep into hostile and defended territory by employing the tactics of evasion, so long could a case be made for retaining the Light Bomber in the metropolitan bomber force. In May 1935 there still seemed to be a possibility that such penetration might be assured by such tactics. Or, perhaps it would be more true to say: the answer to the problem of how a bomber force was to penetrate deep into well-defended territory was at that time still so much a matter of speculation and guesswork that the possibility of successful evasion could not be altogether ruled out and therefore the Light Bomber could not be altogether discarded. This uncertainty, in combination with other and stronger reasons, helped to justify the retention of the Light Bombers as a substantial element in the bomber force provided for in the new Expansion Scheme C (May 1935), despite ministerial pressure in favour of a more heavily armed force.<sup>(1)</sup>

Attitude to Light Bombers as shown in Air Staff papers for Lord Weir

Nevertheless, the fact that in Scheme C the ratio between Light, Medium, and Heavy Bomber squadrons was altered from 3:1:1 to 3:2:2 showed that the Light Bomber had already fallen sharply from favour. And even this change of ratio did not fully reflect the change in the Air Staff's views. From their Memorandum of May 13 it is clear that they had already begun to think of the new Medium Bombers, the B.9/32 and the P.27/32, as the backbone of the future bomber force, and to anticipate that the Medium Bomber, superior in performance to the Heavy Bomber /and

(1) Above, <sup>CHAP</sup> Part III.ii.92-4

in armament to the Light Bomber, might prove better able than either to penetrate to medium ranges by day, and perhaps even by night.<sup>(1)</sup> In four papers drawn up in answer to questions from Lord Weir's committee on industrial preparations, the Air Staff repeated and elaborated these views in a manner which shows how their policy was moving away from the Light Bomber.<sup>(2)</sup> They admitted that "we have not much experience of long-distance air attacks; and since our war experience, air development has been not less than headlong and revolutionary. We cannot in fact yet say what is the best compromise between the various factors - whether performance or defensive power will best enable the aircraft to get through i.e. whether high speed and light defensive power or lower speed and heavier defensive power will prove the better formula. To concentrate on one design would therefore be most dangerous", however attractive from the point of view of rapid and large-scale production.<sup>(3)</sup>

Doubts  
about  
feasibility  
of evasive  
tactics

Lessons  
of the  
D.H.  
Comet

Notwithstanding these admissions, however, the four papers were largely devoted to expounding the thesis that "bombers, in spite of improvements in speed, climb, and ability to fly through cloud and bad visibility, must expect to be engaged (by fighters), perhaps more often than not, in the course of their missions."<sup>(4)</sup> It was true that the phenomenal performance of the 1934 De Havilland Comet had suggested that a bomber might, by being stripped of all defensive armament, be made so fast as to obviate the need for such armament. The Comet had "a large load-carrying capacity and a performance so high that only the latest fighter then in service in the R.A.F. could catch it". But it had been designed and produced in a few months, and when it was produced "the procedure in the R.A.F. for the development of new types of Service aircraft was based on the need for the most stringent economy rather than on rapidity of evolution of types. Thus the Comet embodied the most modern design features to the end of 1933, while the Service aircraft then in service were of design evolved in 1929. Moreover, by the end of 1933 several important and novel features in design simultaneously reached a culminating point in development. The Comet was strikingly fortunate not only in the time of its birth but also in obtaining success in the initial design. Its remarkable achievement has tended to obscure the fact that, granted equally favourable facilities for development, a fighter could, on knowledge available a few months earlier, have been produced at approximately the same date which would have had very substantially higher performance, the margin of superiority in speed being in excess of about 40 miles per hour. The lesson to be learned from the Comet is not that a bomber can be made, by stripping it of its defence, so much faster than it needs no defence, but that the watch kept upon technical progress must be so close and alert and the procedure for producing fresh designs so rapid that an enemy cannot steal a march upon us in that way."<sup>(5)</sup> The war-time achievements of the De Havilland Mosquitos as adjuncts to the big battalions of Lancasters and Halifaxes may perhaps call in question the soundness of this reasoning, but in the light of the limited experience available in 1935 it sounded convincing enough. At all events, it convinced the Air Staff; and their acceptance of it implied a growing belief that bombers must be adequately armed - and therefore large enough - to fight their way through to their targets and back home again against well-organised fighter opposition.

/By

- (1) A.M. File S.34766/6B
- (2) Papers prepared for Lord Weir at his request, June-July 1935 - ibid., encl. 7A, 7B, 7C, 7D.
- (3) Ibid., encl. 7A.
- (4) Ibid., encl. 7B.
- (5) Ibid.,

Improve-  
ments in  
defensive  
armament  
design

By now, too, new developments in design were making it possible to increase the bomber's defensive armament without so drastically lowering its performance. The new monoplanes had thicker and stronger wings than the biplanes. Machine-guns could be mounted in those wings so that the efficiency of the propellers need not be impaired by the complication of synchronising gear for machine-guns firing through them. Again, the monoplane's cleaner lines gave it a speed which made it impossible to operate its guns from cockpits. Gun turrets were therefore being developed and these turrets could be 'faired in' to the lines of the fuselage in a manner which prevented them from offering undue resistance to the air and acting as a serious brake upon the aircraft's speed.<sup>(1)</sup>

Difficulty  
of  
improving  
Light  
Bomber  
defence

It did not, however, seem possible to fit turrets to the Light Bomber without so increasing its size that it became in fact a Medium Bomber.<sup>(2)</sup> Hence the Light Bomber could hardly be made capable of fighting its way to and from its target. Since, therefore, it was believed that under ordinary conditions all bombers must expect to be intercepted, it seemed improbable that the Light Bombers would be able to satisfy the major requirements of a bombing offensive.

Possibility  
of high or  
low level  
tactics:  
objections  
to them

It was, of course, possible that the Light Bombers might still be able generally to evade interception by adopting specialised tactics, by confining themselves to very high or very low altitude operations. Yet the former would raise a serious problem of navigation and target location; and the latter would expose the aircraft to the more accurate and rapid fire of low-altitude anti-aircraft guns and deprive their bombs of the penetrative power needed to destroy the more substantial kinds of targets. Above all, to equip the bulk of the bomber force with aircraft capable only of specialised tactics would be to forfeit much of that flexibility which gave such an ascendancy to the offensive in air warfare. "This asset possessed by the offensive in air warfare is a main element in the struggle for air superiority between one country and another. The other side must be forced to devote as much as possible of the air resources, which he can afford to provide, to the defensive. In order to do so we must make full use of this ability of aircraft to move in three dimensions. If the enemy knows that we can bomb accurately from high altitudes, he is thereby obliged to provide means of defence to reach us there. He will have to provide patrols, or be prepared to intercept, at two or even three altitudes". Hence the bulk of the bomber force must so far as possible be equipped with machines capable of bombing from all altitudes. The Light Bomber could not retain its place as a primary weapon of that force by adopting specialised tactics, even if those tactics should enable it to improve its performance notably.<sup>(3)</sup>

Objections  
to escorts

Lord Weir had one further suggestion which might perhaps save the Light Bomber. Might it not be possible to use mixed formations of bombers without guns and fighters without bombs? But this challenged the long-established Air Staff dislike of fighter escorts and once again all the old arguments were brought out. To provide escorts would be to ignore the cardinal principle of putting into the offensive everything that could be spared. Besides, the tactical and technical difficulties of effectively escorting bombers, even if their formation did not get broken up, were still considered insuperable - and the French

/were

(1) Ibid.

(2) Below, p.25

(3) A.M. File S.34766/7D

were also coming round to this view. Single-seat fighters with their fixed forward-firing guns would have to turn to deal with attacks from the flank or rear: and so they would be easily drawn away from the bombers and, once drawn away, they would hardly be able to regain station, since, if they had a range equal to that of the bombers, they could have no marked margin of speed over the machines they were escorting. Twin-seat fighters might perhaps stay close, but, if they did, they would then merely be doing what the bombers might equally well do for themselves.<sup>(1)</sup>

Prospects  
for Light  
Bombers  
deterior-  
ate,  
late 1935

These papers suggest, then, that Expansion Scheme C by no means revealed the full extent of the Light Bomber's fall from official favour. Within a few more months that fall was complete. It was hastened by the Italo-Abyssinian crisis, which placed so sharp an emphasis upon the need for aircraft of adequate range.<sup>(2)</sup> It was further encouraged by the growth of the idea, both among the politicians and in the Air Staff, that the bomber force ought to be regarded as primarily an offensive rather than a merely counter-offensive weapon: for this, while again emphasising the importance of adequate range, emphasised equally the importance of an adequate bombload.<sup>(3)</sup> Above all, it was brought within the range of practical possibility by the progress of the new Medium and Heavy Bomber designs and by the fuller knowledge of their potentialities that was by now available.<sup>(4)</sup>

The C.A.S.  
minute of  
8 Nov.  
1935

The question of the Light Bomber was thus ripe for final decision when, on November 8, the C.A.S. circulated to his Staff his minute about the future composition of the bomber force, to which reference has already been made.<sup>(5)</sup> Sir John Ellington began his minute by saying that "it seems to me doubtful whether in reality the Light Bomber, with its short range and small load, has any value in a European war against such a country as Germany". He was "inclined to think that a single-engined Medium Bomber will replace the Light Bomber as a home-defence weapon and that the number of Light Bombers will be confined to those which have to be maintained for our strategical (i.e. imperial) reserve purposes and such subsidiary duties as dive-bombing, attacks on ships, medium reconnaissance for military purposes, and perhaps "for low-flying attacks". The Air Staff were, however, to consider the question "from the broad point of view. The effort required to produce and maintain a squadron of Medium Bombers, both in man-power and, production of aircraft, must be compared with the bombing results to be expected; as well as the tactical aspects of such advantages in performance and the use of guns which the Light Bomber still has over the Medium Bomber: nor must the financial aspect be overlooked". By thus applying the principle of economy of effort in so precise a manner to a particular class of bomber, this minute started an important development in the traditional search for the 'all-rounder' aircraft. The ideas of those concerned with bomber design were henceforward directed much more consciously towards evolving aircraft that could strike the heaviest possible blows with the lowest possible losses and for the least possible expenditure in maintenance and in industrial and financial effort. The search for the 'ideal bomber' had begun.

/This

- (1) Ibid., encl. 7C.
- (2) Above, Part III.ii.101-2
- (3) Above, Part III.ii.102-4
- (4) Above, Part III.ii.104-5
- (5) A.M. File S.37679/1; also, above, <sup>Chap</sup> Part III.ii. ~~104-5~~ pp.105-106.

Answer  
from  
O.R.2.

This dealt the Light Bomber its death-blow and all the replies which the C.A.S. received to his minute confirmed his opinion. The first answer came from O.R.2. and dealt with the possibility of improving the Light Bomber's defence.<sup>(1)</sup> The governing factors here were the increased speed and range of the Light Bomber and the increased speed and gun-power of the modern fighter. From the bomber's point of view, there was one slight advantage resulting from the increase in its speed. It would be slightly more difficult to intercept, since its increase in speed would correspondingly magnify any error the fighter pilot might make in laying course to intercept it. The bomber would also, of course, cover the ground more quickly and so the time in which it might be intercepted would be shorter. But this gain would be offset if the bomber made use of its increased range to effect a deeper penetration - if it operated to a range of 750 miles at 250 m.p.h., it would be in the danger area for the same time as it would be if it operated to a range of 450 miles at 150 m.p.h. The gain was further offset by the fact that increased aircraft speeds were likely to simplify the fighters' tactics and cause them to make most of their attacks from slightly below and astern, where the Light Bomber was practically defenceless. Moreover, the new 8-gun fighter would be able to achieve a 'lethal density' of fire in two seconds and would stand a fair chance of scoring an immediate success from 400 yards' range, a range at which the effect and accuracy of a bomber formation's mutually supporting cross-fire would not be very great. It seemed, then, that the chances of a formation of Light Bombers avoiding interception were, at best, only very slightly enhanced and that, if they were intercepted, they "cannot beat off or survive an attack by eight-gun single-seat fighters of the modern era". It was impossible to give the Light Bomber the rearward and downward defence that was essential if it was to 'live' with the 8-gun fighter and it therefore seemed inevitable that the class "must 'grow up' to something resembling the Medium Bomber class, which fits well with our ever increasing requirements of load and range".

Answer  
from  
D.D.Plans

The next answer to the C.A.S. minute was even more decisive against the Light Bomber. It came, significantly for the future, from Group Captain A.T. Harris, then Deputy-Director of Plans.<sup>(2)</sup> Taking, somewhat unfairly, the Hind rather than the P.4/34 as the typical Light Bomber, he contrasted its ability to carry 500 lbs. of bombs for 500 miles at 150 m.p.h. with the new Medium Bomber's capacity to carry 1,000 lbs. of bombs for 1,000 miles at 200 or more m.p.h. He then pointed out that the Germans were believed to be aiming at including in their Air Force, when it reached 2,000 first-line aircraft, no less than 1,053 Heavy Bombers as against only 162 Light (dive) Bombers and 132 reconnaissance machines. Even their Medium Bomber types did not appear to be issued to squadrons. "In fact, Germany's effort to compress the maximum range and hitting power within a given numerical total of aircraft has eliminated even the Medium Bomber class". The British bomber force, Group Captain Harris believed, would have to move in the same direction. Adequate range was vital to it, whether for European operations or for Imperial reinforcement. It could not afford a larger proportion of short-ranged aircraft than its potential enemies possessed. Admittedly, a Medium Bomber cost about twice as much to build as a Light Bomber. But the expense and man-power needed to maintain it once it was built did not increase in direct proportion to its size. Nor need a Bomber take twice as long to produce if its size were doubled, for on a larger machine there would be room enough for more men to be working simultaneously.

/The

- (1) The defence of the Light Bomber, 15 Jan.1936-A.M. File S.37679/1A  
(2) Bomber Squadrons policy, by D.D.Plans, 16 Jan.1936 - A.M.  
File S.37679/2A.



The mobility and striking power of the Medium Bomber were, the D.D.Plans went on, greatly superior to those of the Light Bomber and its greater range gave it the power to choose its targets more widely and so approach "strategical ubiquity". Most of the Medium Bombers could be used for dive-bombing, so there was no need to retain the Light Bombers for that duty. The Medium Bomber could not, perhaps, operate as a fighter-bomber, but it was doubtful if this requirement was strong enough to justify the retention of a class of aircraft solely to meet it. And for Army Co-operation work, where the Light Bomber's manoeuvrability would be a real asset, it ought to be possible to merge the existing Light Bomber and Army Co-operation types into a single class. Everything else, Group Captain Harris thought, favoured the Medium Bomber, and especially the twin-engined Medium Bomber. With two engines it would possess something like the airworthiness and the reliability essential to all-round-the-clock operations in all weathers and over both sea and land. In armament, certainly, and perhaps even in speed, it was superior to the Light Bomber. It could provide, as the Light Bomber could never do, adequate space for the provision of proper navigational facilities and it would make more economical use of the man-power available than the Light Bomber with its small load.

In sum, then, "the conclusion appears to be that we are not warranted in retaining the Light Bomber; that it is in fact a matter of emergency to place ourselves on a level with our potential enemies by adopting a policy of the maximum range and/or bomb-carrying capacity obtainable within the limits of our first-line numerical strength. As a corollary, it seems apparent that even the Medium Bomber will tend to disappear and that eventually a 'most economical' size and type will be evolved, on the basis of the Range and Total Striking-Power factors, into which all the existing categories of bombers will tend to merge in order to obtain the maximum striking-power within the limits imposed by agreement or by resources."

Answer  
from  
D.C.A.S.

These arguments were reinforced in a third paper, from the D.C.A.S. (1) He pointed out that the Bristol 142, even though it was a twin-engined machine, had a better performance than the single-engined P.4/34 Light Bomber - it could carry 1,000 lbs. of bombs for 1,000 miles at a speed that was likely to approach 300 m.p.h., as against the P.4/34's 500 lbs. for 850 miles at 230 m.p.h. when overloaded. In any case, a bomb-load of 500 lbs. and a range of 600 miles (the range of the P.4/34 at normal load) were useless for the home-based bomber force: the minimum should be at least 1,000 lbs. and 1,000 miles. The Light Bomber could not hope to satisfy these requirements. Nor would its small size allow any adequate strengthening of its defensive power. With a crew of two and no automatic pilot - the Light Bomber could not afford the weight for that - it was difficult to combine proper bomb-aiming with proper rearward defence, for, if the pilot aimed the bombs, he could not at the same time fly the aircraft, and the observer, while he was attending to the rearward defence, could not also be aiming the bombs. Even the Light Bomber's superiority in dive-bombing was likely to be cancelled by the growth of aircraft speeds, which would probably make really steep dive-bombing impossible for all types, small or large, and compel the adoption of more moderate diving angles which the larger machines could tolerate. All things considered, then, the D.C.A.S. also concluded that "there is no justification whatever for keeping the Light Bomber in its present form".

/The

C.A.S.  
ruling  
eliminating  
Light  
Bombers,  
29 Jan. 1936

The condemnation of the Light Bomber was, indeed, overwhelming as well as unanimous. So, on 29 January 1936 the C.A.S. ruled that "we are agreed on the gradual elimination of the present Light Bomber for European warfare".<sup>(1)</sup> His ruling coincided, as already shown, with the views of the ministerial Committee on Defence Policy and Requirements, whose report was circulated on February 6.<sup>(2)</sup> The first fruit of this coincidence appeared in the new Expansion Scheme F (February 1936), which provided for a metropolitan bomber force composed entirely of Medium and Heavy Bombers.<sup>(3)</sup> The first stage in the conversion of the Air Staff had then been accomplished.

(f) The Antecedents of the 'Big Bomber' policy: the 1936 design programme

The Air  
Staff's  
draft of  
the 1936  
design  
programme

The second stage in the Air Staff's conversion to a 'Big Bomber' policy had begun even before the first - the elimination of the Light Bomber - had been completed. It had begun when in August and September 1935 they had first started seriously to consider the experimental aircraft programme for 1936<sup>(4)</sup> - for, under the arrangement made in the previous year, it was now the Air Staff who provided the preliminary draft of this programme.<sup>(5)</sup> Now, under normal conditions their draft would probably have contained only six or seven items and only one of those items would have been a bomber design. In 1936 the bomber design would have been for a Medium Bomber to replace the B.9/32 - a replacement for the P.4/34 Light Bomber would not have been due until 1937, nor one for the B.1/35 Heavy Bomber until even later.<sup>(6)</sup>

Factors  
affecting  
its  
composition

In 1935, however, conditions were not normal and the Air Staff soon found themselves departing from normal courses. The Italo-Abyssinian crisis and their own investigations into the classes of aircraft which they would need for a European, home-defence, war, had made them at once aware of new requirements and ill-content with the ability of their present designs to satisfy older requirements. Above all, an entirely new urgency had been given to all questions of design and equipment by the Government's decision, taken at the end of July 1935, that the Services were to aim at being reasonably ready for war by 1 January 1939.<sup>(7)</sup> This decision made it seem imperative to put in hand at once the designing and manufacture of the best machines that, upon present knowledge, could be produced by that date or as soon as possible after it.

Size of  
this  
programme

In the autumn of 1935, therefore, the Air Staff wanted a good deal more than they might have asked for in normal circumstances. Some of their requirements, it is true, called only for research development. Such were the proposals for engine development to "ascertain the possibilities of a bomber or fighter to operate at an altitude of 40,000 feet or above" and to ascertain the possibilities of using special high octane fuels in a high performance low altitude fighter or bomber.<sup>(8)</sup> Yet without counting these research proposals, the provisional list of Air Staff requirements for new aircraft designs contained no less than twelve items

/instead

- (1) Ibid., min. 3.
- (2) Above, ~~Part~~ <sup>chap.</sup> III.ii.102-6
- (3) Above, ~~Part~~ <sup>chap.</sup> III.ii.107-8
- (4) A.M. File S.35008/1 to 6A
- (5) Above, ~~Part~~ <sup>chap.</sup> III.ii.84
- (6) A.M. File S.34932/1A. For the B.1/35, see above, p.18, note 2.
- (7) Above, ~~Part~~ <sup>chap.</sup> III.ii.107
- (8) A.M. File S.35008/15A appendix B

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instead of the usual six or seven.<sup>(1)</sup> Of these twelve, three were for new bombers. The Air Staff now wanted a new Heavy Bomber to replace the B.1/35 and a new Light Bomber to replace the P.4/34 as well as a new Medium Bomber to replace the B.9/32.

Tendency  
towards  
larger  
bombers

This addition of a Heavy and a Light Bomber design was a direct result of the experience and the investigations of the preceding months. And all three bomber items showed very clearly how the development of offensive requirements was compelling the Air Staff to enlarge their ideas about the size and power of the bombers needed for the metropolitan force. For their Light Bomber, they now wanted a machine capable of carrying 1,000 lbs. of bombs for 1,000 miles at normal loading, instead of the P.4/34's 500 lbs. for 600 miles. For their Medium Bomber, they wanted a development of the largest and most powerful of the B.9/32 designs, the Vickers' Wellington, and they wanted it to be capable of carrying 2,000 lbs. of bombs for 1,000 miles as against the original B.9/32 requirement of 1,000 lbs. for 1,000 miles. For their Heavy Bomber, they now had in mind a large four-engined machine, superior in performance and carrying capacity to the B.1/35 and, if possible, to the American Boeing.<sup>(2)</sup>

Revival  
of idea  
of a  
'giant'  
bomber

With this Heavy Bomber, the Air Staff fully recognised the need for high performance as well as for a big load and a long range. It was this which made them favour a four-engined aircraft. For the calculations of Dr. Coales of R.D.A.3 suggested that a large bomber, weighing about 36,000 lbs. might with four Merlin engines (when these were ready) be capable of carrying 2,000 lbs. of bombs for 1,500 miles at 230 m.p.h. and of reaching a maximum speed of 275 m.p.h. Moreover, if it could be allowed a longer taking off run than the normally stipulated 500 yards, or if its taking off could be assisted by a bi-fuel system or by catapult launching, its bombload might be appreciably increased without serious loss of speed or range.<sup>(3)</sup> Clearly, the Air Staff no longer felt, as they had felt so recently as May 1935,<sup>(4)</sup> that little or nothing was to be gained by increasing the size of the Heavy Bomber. They now felt that it too, like the Light and Medium classes, must 'grow up' into something still larger. Thus the idea of a 'giant Bomber', which had lain dormant since 1923, was now revived.

Difficulties over  
this  
programme

The presentation of the Air Staff's draft programme to the Directorate of Technical Development, however, produced a crop of difficulties and revealed a certain divergence of opinion between the two parties about the future course of bomber design. The chief difficulty was that neither the Directorate's design staff nor the design staffs of the available aircraft manufacturing firms were big enough to cope with the twelve new specifications suggested by the Air Staff. With an effort, the Directorate could manage eight, though its normal capacity was only six. The fourteen available firms were little better placed: their total design capacity was sixty-eight, and as they already had forty-five designs in hand and there were another thirteen still to be issued under the 1935 programme, they could not tackle more than ten new designs in 1936.<sup>(5)</sup> Something like one-third of the twelve items must therefore be cut out.

/One

(1) A.M. File S.35851/2A

(2) Ibid., encl.14A; S.35008/15A appendix B

(3) Estimates by R.D.A.3, - A.M. File S.35851/11A & B; minutes of preliminary conference on 1936 programme, 4 Oct.1935 - ibid., encl. 13A.

(4) Above, p.122

(5) A.M. Files S.35851/18; S.35008/12A appendix B

D.T.D.'s  
dislike  
of 'giant'  
bomber

One item that the Director of Technical Development (Air Commodore R.H. Verney) was particularly eager to cut out was the proposed four-engined Heavy Bomber. At the preliminary conference on October 4 he "said that he thought that the Heavy Bomber position was well met by the B.1/35" and he confessed "that he was very chary of supporting projects for very large aeroplanes, as he thought that making aeroplanes too large for the purpose for which they were required had been one of our faults in the past".<sup>(1)</sup> His attitude seems to have been based upon his belief - no longer shared by the Air Staff - that "the idea of a bomber defended only by its speed does seem to be a future possibility which we cannot afford to ignore". Recent consideration by the Royal Aircraft Establishment of one of the research items in the 1935 programme had again suggested that a bomber might after all, be made as fast as its Fighter contemporaries. It would, however, have to be a Heavy Bomber, not a Light Bomber, if it was to combine such superlative performance with a worthwhile bombload and range. And the great difficulty with such a machine would be to get it off the ground when it was loaded.<sup>(2)</sup> With this problem in mind, the Director of Technical Development had, a year ago, included in the 1935 programme provision for research into the possibility of assisting the take-off of a Heavy Bomber by some method of catapult launching. It was the Royal Aircraft Establishment's favourable reception of this idea which inspired his present optimism.<sup>(3)</sup>

The  
catapult  
project

It also meant that he was reluctant to accept the Air Staff's proposed giant. If the catapulted Heavy Bomber could be developed, it might, he suggested, meet any Air Staff Heavy Bomber requirements beyond the B.1/35. It would produce an aircraft just as powerful and just as far-ranging as the giant and one which would be faster through the air. The catapulted Heavy Bomber would also be smaller - too great weight was obviously a disadvantage for catapulting - and therefore easier and cheaper to manufacture. And, incidentally, since it would have to be designed anyway under the 1935 programme, its adoption would relieve the designing staffs of one of the twelve designs suggested by the Air Staff.<sup>(4)</sup>

A.M.R.D.'s  
conference  
Oct.30:  
deadlock  
between  
Air Staff  
and D.T.D.

The Air Staff representatives at this preliminary conference showed themselves very much interested in this favourable report on the catapulting project and eager to learn more about its possibilities. But they were not prepared on its account to sacrifice their own four-engined proposal, nor, indeed, to sacrifice any of their other demands. As a result, the preliminary conference on October 4, and also the full conference on the 1936 programme held by the Air Member for Research and Development (Air-Marshal Dowding) on October 30, both ended in deadlock.<sup>(5)</sup> On the Air Staff side, the D.C.A.S. then reconsidered the whole problem with his subordinates, but these discussions only strengthened his conviction that he must adhere to his original demands. "If," he wrote, "we are to be in a satisfactory position to meet an emergency by 1939, every effort must be made to improve the performance of the various important classes of aircraft, particularly those required for Home Defence, in order to have better aircraft available for production at the beginning of the 'emergency'; otherwise, we open the emergency period with nothing behind the production designs of 1934 vintage".<sup>(6)</sup> That was, indeed, the  
/crux

- (1) A.M. File S.35851/13A
- (2) Ibid., encl.4A, 6A, 10A.
- (3) Ibid., encl.13A.
- (4) Ibid.,
- (5) A.M. File S.35008/12A.
- (6) Ibid., encl.15A, appendix C.

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crux of the matter. The Government's decision that the Services should aim at being reasonably prepared for war by 1 January 1939 meant that the Air Staff could not rest content with existing standards of design. Nor could they afford to wait upon as yet unproven experiments. They needed urgently the most effective weapons that could, upon present knowledge, be put in hand at once. So the D.C.A.S. and his staff felt unable to make any substantial concessions. They agreed to count the new Heavy Bomber design as coming under the 1935 programme. They were eager to investigate and develop the catapulting project. But they were not prepared to abandon their own four-engined Heavy Bomber specification unless they could be sure of having something equally good and equally certain by the same date. They seem to have been prepared, reluctantly, to consider modifying their Light Bomber requirement by reducing its bombload from 1,000 lbs. to 500 lbs.; and their Medium Bomber requirement by reducing its bombload from 2,000 lbs. to 1,000 lbs. and by making it a development of the Bristol 142 rather than of the larger Vickers Wellington. But they insisted upon keeping both items in the 1936 programme and, as they were equally reluctant to abandon any of their other items, the deadlock continued. (1)

Its  
solution

It was not resolved until on November 8 the Admiralty decided that the Fleet Air Arm needed only two new designs, instead of the four originally asked for. (2) With the Heavy Bomber reckoned as part of the 1935 programme, this reduced the twelve items to nine and on November 9 the D.C.A.S. agreed with the A.M.R.D. to sacrifice the least essential one of these nine. (3) The 1936 programme was thus reduced to the eight items that were within the design staffs' capacities, although the Air Staff had sacrificed almost nothing of their demands.

Changed  
conditions,  
1936.

The Air Staff then settled down to preparing their detailed requirements for each of these eight items. Long before the detailed specifications for the three new bombers were ready, however, changes had occurred in the general situation which swept aside any idea of modifying the requirements in regard to range and load and therefore in regard to size. On 29 January 1936 there came the C.A.S. ruling that the present class of Light Bomber was to be gradually eliminated from the metropolitan bomber force. The reasoning, moreover, which had led to this ruling raised doubts about the future of the single-engined Medium Bomber. For, the D.C.A.S. had suggested that the minimum requirement for a home-based bomber ought to be a 1,000 lb. bombload and a 1,000 miles range, (4) whereas the Fairey Battle single-engined Medium Bomber built to the P.27/32 specification would be unable to carry 1,000 lbs. of bombs more than 750 miles. Group Captain Harris, the Deputy Director of Plans, had, too, gone even further than the D.C.A.S. for he had envisaged the possible supersession of the twin-engined Medium Bomber. (5) In short, the Air Staff's increasingly detailed appreciation of the operational requirements for a bombing offensive against Germany were already driving them fast towards the 'Big Bomber' policy.

/At

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- (1) Ibid., encl. 15A, appendices B & C.
  - (2) Ibid., encl. 14A
  - (3) Ibid., minute 16.
  - (4) 18 Jan. 1936. - A.M. File S.37679/2
  - (5) Above, p.127.

Political conditions also favour a 'Big Bomber' policy

At this time, too, developments of a more political nature allowed, nay, encouraged, the Air Staff to move towards such a policy. The Ministerial Committee on Defence Policy and Requirements in their Report of 6 February 1936.<sup>(1)</sup> had recommended the adoption of Scheme F. This meant the eventual elimination of the Light Bomber from the metropolitan bomber squadrons and the building up of a far more powerful force composed wholly of Medium and Heavy Bombers. Moreover, the Cabinet's approval of the Committee's Report established as the accepted policy that from henceforward the home-based bomber force was to be regarded as an offensive and potential war-winning weapon rather than merely as an instrument for reducing the weight of enemy air attack by counter-offensive measures. This placed the emphasis in bomber development squarely upon hitting power-upon range, bombload, and fighting capacity. It therefore encouraged concentration upon larger and more powerful aircraft. And the Air Staff was now given full authority so to concentrate its efforts by the Cabinet's approval of the Ministerial Committee's further recommendation "that the Air Ministry should have latitude to vary the R.A.F. programme so as to improve its offensive power and constitute the most effective deterrent against German aggression". This, it was recognised, must entail the introduction of "larger and more powerful machines".<sup>(2)</sup> Armed with this authorisation, the Air Staff proceeded to elaborate the specifications B.12/36 and P.13/36 from which were eventually to come the Stirlings, Lancasters, and Halifaxes of 1942-5.

Effects on the 1936 programme

The authorisation given to the Air Ministry to improve the offensive power of the bomber force bore fruit almost at once in the preparation of the detailed type requirement specifications for the 1936 programme. The overburdened design staffs abandoned - or at least postponed indefinitely - any attempt to specify for a Light Bomber to replace the P.4/34, or even for one to 'grow up' into a single-engined Light Medium Bomber to take the place of the P.27/32.<sup>(3)</sup> They now concentrated their efforts, so far as bomber types were concerned, wholly upon the medium and heavy designs. And here they showed a very marked tendency towards greater size and power. The strategical requirements - a worthwhile bombload and a range sufficient at least to reach any part of western Germany from bases in the United Kingdom<sup>(4)</sup> - by themselves made such a tendency almost inevitable. But tactical investigations and technical progress were pressing almost as strongly in the same direction. It is true that the investigations of the Bombing Committee had not, even by the autumn of 1936, resulted in anything more than very tentative conclusions upon a few of the tactical problems involved on a long-range bombing offensive.<sup>(5)</sup> But, as already shown,<sup>(6)</sup> upon the central question of defence versus evasion the Air Staff had by now come to the firm conclusion that the bombers must depend upon their ability to fight their way through to their objectives rather than upon their capacity to evade the enemy's defences.

/Almost

(1) Above, <sup>encl.</sup> Part III.ii.103 off.

(2) Ibid.

(3) Work not yet begun, 23 May 1936 - A.M. File S.35008/26A; D.C.A.S. agreed to delete this item from 1936 programme, 19 Dec. 1936 - ibid., min.29,30.

(4) Memo. by S. of S., 10 Feb. 1936 - C.I.D. Paper 1215-B, encl.3 (C.P.27/36)

(5) 1st Interim Report of Bombing and Air Fighting Committees, Sept. 1936

(6) Above, pp.123-4.

Tactical  
& technical  
reasons  
for bigger  
bombers.

Almost every aspect of the technical progress that had been made during 1935 and 1936 seemed to confirm and strengthen this conclusion. The first experiments in radio-location had already succeeded by February 1936 in detecting aircraft up to a distance of 60 miles and seemed likely soon to reach to 100. This made it probable that the defending fighters would generally be given sufficient warning of the bombers' approach to enable them to reach operational height in adequate time to make an interception.<sup>(1)</sup> The development of radio-telephony had already made it possible to control fighter aircraft from the ground up to a radius of fifty miles<sup>(2)</sup> and so to guide them with some accuracy to within sight and striking distance, at any rate by day.<sup>(3)</sup> And the success of the prototypes of the new fast eight-gun monoplanes, the Hurricanes and Spitfires, provided fighter aircraft which had the fire-power to kill in a single stoop and the speed and climbing power to repeat their attack if they missed their prey at the first attempt.<sup>(4)</sup> Admittedly, foreign air forces were believed to lag notably behind the R.A.F. in these three vital developments of air defence. But it would be folly to assume that the Germans, with all their scientific skill, would never evolve such assets for themselves. When they did, then the British bomber's chances of evading interception must, it seemed, be largely destroyed. The bomber must therefore be prepared, upon most occasions, to fight its way through. It must be prepared to defend itself against fighter aircraft of appreciably greater speed, armed with eight machine-guns instead of four, and capable of developing 'lethal' fire from ranges up to at least four hundred yards. It must further expect these fighters, owing to their high speed, to attack from its own 'blind spot', astern and a little below. The effect of this on the technical problem of bomber defence has already been shown.<sup>(5)</sup> It meant that each bomber must have at least four guns that would bear in the rearward hemisphere. Investigation of this problem had by now shown fairly conclusively that the solution must be to fit the bomber with a rear turret, situated for preference aft of the tail-plane, and probably also with an under-turret amidships.<sup>(6)</sup> But such a turret or turrets, with their guns, gunners, and ammunition, must add very appreciably to the weight which the bomber must lift and the space which it must afford. They could not possibly be fitted to the Light Bombers, probably not to the single-engined Medium Bombers, and not very easily even to the smaller twin-engined Medium Bombers. Thus the necessity for improved defensive power alone would have forced the Air Staff to push up the size and power of their new Medium Bomber requirement until it was almost as great as that for the existing Heavy Bombers.

/But

- (1) Statement by Mr. H.T. Tizard, 16th Meeting of Reorientation Sub-Committee., 8 April 1936 - A.M. File S.34572/III/92A
- (2) C.A.S. Air Letter to Dominions, 25 June 1935 - A.M. File S.25873/VI/12B.
- (3) In an experiment from Biggin Hill, fighters were guided to within sight (1 mile or less) of 7 out of 15 raids in Feb.-March 1936; they failed entirely to intercept another 4, and were guided to within distances greater than 1 mile of the remaining 4 - A.M. File S.36896/15A.
- (4) C.A.S. Air Letters to Dominions, 31 Jan., 8 May, 12 Sept. 1936 - A.M. File S.25873/VI/45A, 54A, & VII/19A.
- (5) Above, pp.126.
- (6) Experiments were also being made with synchronised batteries of remotely-operated tail and backward-firing wing guns. But this idea presented considerable difficulties and was already being abandoned in favour of tail - and midships-turrets directly operated - A.M. Files., S. 35273, 35584, passim.



New and increased operational requirements.

But other technical considerations, too, were forcing up the weight and size in both the Medium and Heavy Bomber classes. All the new aircraft would be required to operate over long distances by night as well as by day. They must therefore be equipped with night-formation keeping lights;<sup>(1)</sup> they must carry automatic pilots; they must provide adequate space and instruments for accurate long-range, high altitude, navigation in darkness and over cloud; they must carry a crew of three at the very least and probably more - a pilot if not two pilots, a navigator and bomb-aimer, and one if not two air-gunners. When to all these additional requirements is added the demand for an increased bombload - even though the use of any bomb heavier than 500 lbs. was still not anticipated - then it becomes readily apparent that bomber design in 1936 was already being driven towards much larger, heavier, and more powerful machines.

The new 1936 specifications

By then, too, sufficient experience had been gained with the first of the new twin-engined monoplane designs for those designs to be regarded as starting-points instead of as goals.<sup>(2)</sup> Hence, while the Light Bomber specification for the 1936 programme was tacitly dropped, the Heavy Bomber specification, as finally elaborated, embodied the Air Staff's ambitions for a large and powerful four-engined machine and the Medium Bomber specification, making a long stride forward from the largest of the existing designs, outlined an aircraft that would equal in size and surpass in power any of the Heavy Bombers previously envisaged.

(g) The B.12/36 and P.13/36 Specifications

The B.12/36

The Heavy Bomber specification, B.12/36, was the first to be completed.<sup>(3)</sup> Born of discussions between the Operational Research branch and the Director of Technical Development's department,<sup>(4)</sup> it embodied the main requirements of the former's original four-engined proposal combined with certain features of the latter's catapulting project. Its wing-span, largely from considerations of hangar space, was to be kept down to 100 feet, only three feet more than that of the B.1/35. Its all-up weight, however, was to be 31,000 lbs. at normal loading and 47,000 lbs. at maximum loading as compared with the 23,500 lbs. and 28,200 lbs. of the earlier design. The difference in maximum loadings was the measure of the advantages that the B.12/36 was expected to derive from catapult launching. Its normal bombload, from the standard taking-off run of 500 yards, was to be 2,000 lbs. for a range of 1,500 miles out and home. This might be increased by extending the run to 700 yards to 4,000 lbs. for 2,000 miles. By catapult launching in the maximum load condition the aircraft was to be enabled to exploit even more fully the alternatives of long range or Heavy load, for when catapult launched it was to be able to carry either 8,000 lbs. of bombs for a range of 3,000 miles out and home or 14,000 lbs. for 2,000 miles. This heavy bombload and long range were to be matched by high performance and strong defensive power. The B.12/36 was to cruise at 231 m.p.h. and to have a top speed of 245 m.p.h. It was also to carry the fullest and latest navigational equipment, a crew of six, and an armament of eight machine-guns mounted in power-operated turrets - a two-gun nose turret, a two-gun midships turret, and a four-gun tail turret.

/The

- (1) C.A.S. ruling that all Heavy and T.E. Medium Bombers to be equipped with station-keeping lights, 14 Feb. 1936 - A.M. File S.32234/30.
- (2) The Wellington and Hampden prototypes began their flight tests in August 1935 - A.M. File S.30373/97, 98A; they and the Whitley prototype flew at the 1936 R.A.F. Display - A.M. File S.25873/VII/9A.
- (3) A.M. File S.38147, passim; also S.25873/VII/9A.
- (4) A.M. File S.35851/32.

SECRET

Its  
Importance

The B.12/36 was thus to possess a bombload and a range far in excess of those possessed by any existing British or European Heavy Bomber and able at the least to challenge comparison with the American Boeing. With this bombload and range, it was to combine, as the Boeing did not, a defensive power that should enable it to 'live' even against the latest eight-gun fighter; and a performance only slightly inferior to that of the new British Medium Bombers whose prototypes were just taking the air. The approval of this specification by the C.A.S. in July 1936 thus marked a long step towards providing such a deterrent against German aggression as even the Ministerial Committee had hardly dreamed of when they advised in February that the Air Ministry be given latitude to improve the offensive power of the R.A.F.

The  
P.13/36

Nor did the prospective improvement stop at the one class. For the new Medium Bomber specification, P.13/36, which followed it in August 1936, represented an advance in the power of the Medium Bomber class even greater than that introduced into the Heavy Bombers by the B.12/36.<sup>(1)</sup> For here again the recent political and technical developments made a considerable increase in size and power seem essential. The Italo-Abyssinian crisis had shown the desirability of bomber reinforcements being able to fly from their home bases to the Near East via Gibraltar and Malta.<sup>(2)</sup> It had also revealed how, when the offensive arm of the R.A.F. was outranged by that of its potential enemies, the Army might be forced to adopt strategical dispositions which they considered unsound and even dangerous.<sup>(3)</sup> The growing likelihood that Belgium would declare for a policy of neutrality and the doubts which had arisen about the strength and reliability of the French Air Force gave an additional emphasis to the importance of adequate range in continental warfare by calling in question the possibility of even the Medium Bombers being able to operate against Germany from continental bases.<sup>(4)</sup> Thus the Italo-Abyssinian crisis and its repercussions - however much the Commander-in-Chief of A.D.G.B. (Air-Marshal Sir John Steel) might think its problems abnormal and their present influence exaggerated<sup>(5)</sup> - had convinced most of the Air Staff of the need for long range even in their Medium Bombers. The need for increased bombload to meet the requirements of the wider role envisaged for the bomber force by the Ministerial Committee was hardly less apparent, although on this point, too, Sir John Steel thought a load of 1,000 lbs. still quite adequate for any one Medium machine. Moreover, it seemed obvious that there was no possibility of the Medium Bomber being able to rely regularly upon its capacity for evasion rather than upon its ability to defend itself. Therefore all the tactical and technical arguments, which necessitated a strengthening of the Heavy Bomber's defensive armament, applied with almost equal force to the Medium Bomber. Yet, the Medium Bomber, having less lifting power and less disposable space, could hardly carry quite so many guns as the Heavy. It must accordingly compensate for this by superior performance.

The  
specifi-  
cation

Such were the basic conditions governing the new Medium Bomber specification. It must be a machine "for world-wide use", able, like the B.12/36, "to exploit the alternatives between long range

/and

- (1) A.M. Files S.38148 passim, 25873/VII/19A.
- (2) A.M. Files S.37679/2A, 38148/4A.
- (3) Above, Part III.ii. ~~100~~ pp. 101-102.
- (4) Above, p. 113.
- (5) A.M. File S.38148/4A.

and very heavy bombload which is made possible by catapult launching in a heavily loaded condition". It must have good all-round defence from power-operated nose and tail turrets. It must have high speed and performance and be equipped for all-weather, all-round-the-clock operations. On these premises the Air Staff framed their draft operational requirements<sup>(1)</sup> which were discussed at a meeting of the Operational Requirements Committee on June 22.<sup>(2)</sup> At this meeting the aforementioned doubts of Sir John Steel, supported in the matter of range by the A.M.R.D., and a general desire to secure the highest possible performance, led to a few modifications in the original Air Staff proposals. The aircraft's speed was increased at the expense of reducing its normal bombload from 1,500 to 1,000 lbs. Nevertheless, the specification, as finally approved by the C.A.S. on August 1,<sup>(3)</sup> provided for a Medium Bomber superior in almost every respect to even the B.1/35 Heavy Bomber and 'grown up' quite out of the old Medium Bomber class. For the P.13/36 specification called for an aircraft of 80 feet wide-span, with an all-up weight of 23,000 lbs. at normal loading and 34,500 lbs. at maximum loading. From the standard 500 yards taking-off run, it was to be able to carry its normal load of 1,000 lbs. of bombs for a range of 1,500 miles out and home. By increasing the run to 700 yards, it was to be able to carry 3,000 lbs. for 2,000 miles; and when catapult launched it was to be capable of taking either 4,000 lbs. for 3,000 miles or 8,000 lbs. for 2,000 miles. For its defensive armament it was to have six machine-guns mounted in two power-operated turrets - two guns in the nose and four in the tail. It was to carry a crew of four - two pilots, a wireless operator, and an air-gunner; the fullest and latest navigational and anti-icing equipment; cameras and oxygen supplies; and the most up-to-date conveniences for the crew, even including, for the first time in a Medium Bomber, a lavatory. It was to be capable of dive-bombing to an angle of 20, as well as of high altitude operations. Its cruising speed was to be 275 m.p.h. and its top speed 317 m.p.h.

Its importance

The P.13/36 specification thus represented an advance upon the B.9/32 designs hardly less striking than that of the B.9/32 over its predecessors. With it, the Medium Bomber had undeniably 'grown up' into, if not indeed beyond, a new Heavy-Medium Bomber class. The improvement which this new design would introduce into the offensive power of this, the most numerous, class of the striking force would be no less great than the improvement in the Heavy class represented by the B.12/36.

(h) Scheme H: the later discussions

Scheme H

Such, then, was the bomber design position when, in November 1936 the Air Staff began to consider the original proposals for Expansion Scheme H. That Scheme, it will be remembered,<sup>(4)</sup> consisted of two sets of proposals. The first set provided a short-term and admittedly unsound programme for obtaining a nominal parity with the German bomber force at 1,700 aircraft by 31 March 1939. This was to be achieved by diverting to the Metropolitan Bomber Force ten of the new Scheme F squadrons from Overseas Commands and six from the Fleet Air Arm, and by adding on mobilisation six machines and six pilots from the reserve to the twelve of the initial establishment of each of these sixteen squadrons and to the twelve of the initial establishment of each of the other 54 Medium

/Bomber

- (1) A.M. File S.38147/1A
- (2) Ibid., encl.4A
- (3) Ibid., encl.8A, min.10.
- (4) Above, pp.120.

Bomber squadrons envisaged for the metropolitan force by Scheme G. The second set of proposals outlined a long-term programme, based on sound principles, which would provide this expanded bomber force of 1,700 first-line aircraft with its full 225% of reserves by 31 March 1941.

First discussions

It was upon these two programmes - the 'interim' and the 'final' - that the Air Staff discussions at first centred. Detailed examination confirmed that the men and machines could just be provided, though at an alarming cost to the reserves. The shortage of experienced pilots for flight-leaders would be acute in the early part of 1939 but would ease considerably by the end of that year. The supply of junior pilots would also suffice, provided that the shortened training syllabus and the scheme for training 'one-year reservists' were continued for another year, until 31 March 1939. The fitter requirements could also be met by the further expansion of Halton and the adoption of 'a huge programme' of training some 3,000 semi-skilled direct entry 'garage-hands' each year. But if these things were done and if war broke out in the spring of 1939, the reserve position might rapidly become disastrous. At the anticipated rates of wastage, the R.A.F. might then expect to have its first-line strength reduced by the equivalent of some seventy squadrons after no more than one month of war. This loss might be limited to sixty squadrons by not introducing the proposed war-time training scheme and by operating only the normal peacetime training programme. But such an expedient would deprive the R.A.F. of all real means of restoring its strength. It "would, in fact, be 'used to destruction', and such of the fighting part as was left after two or three months would apparently provide not even a sufficient shield behind which to start to create an Air Force anew".<sup>(1)</sup>

The three lines of approach

A prospect such as this was not one which the Air Staff could view with any approach to unanimity. They therefore began to reconsider the methods that were open to them for implementing the Government's avowed policy of parity with the German Air Force. A number of suggestions were put forward by which the limited supplies of aircraft and trained man-power might be eked out to the uttermost. In the discussions which during December 1936 centred upon these suggestions, three distinct lines of approach early defined themselves. Those three lines were (1) what was the best that could be done by 31 March 1939 to achieve at least an appearance of parity with the German Air Force in numbers of first-line bomber aircraft; (2) in what ways and how soon could the first-line strength thus obtained be backed by the full 225% of reserves; and (3) the possibility of a long-term programme which would eventually abandon altogether the ideal of mere numerical parity and seek instead, by re-equipping the bomber force with the new B.12/36 and P.13/36, to build up an immense superiority in total bombload, even at the expense of a reduction in the total numbers of aircraft. For the sake of clarity it will perhaps be well to begin by examining the first two of these lines, since it was they alone which reached the Cabinet in the final version of Scheme H.

Scheme H: the revised version

It is not necessary here to describe the details of the various new suggestions that were put forward, early in December, 1936, for obtaining a nominal numerical parity with the German bomber force by 31 March 1939 and for supplying the full quota of reserves as soon as possible afterwards. In general, they all sought to meet the shortage of experienced flight-leaders and fitters by increasing the number of aircraft in each flight.<sup>(2)</sup> The suggestion

/finally

(1) Note by S.9, 27 Nov. 1936 - A.M. File S.39676/9A  
(2) A.M. File S.39676/10a, 11A.

The 1939  
or 'interim'  
Force

finally chosen by the C.A.S. on December 4 for further examination was framed upon this basis. It provided for an 'interim' force, to be made up on 1 April 1939 as follows. There were to be 20 Heavy and 8 Heavy Medium Bomber squadrons, each organised on a peacetime initial establishment of two flights of seven aircraft each (in all, 280 Heavy and 112 Heavy Medium Bombers); and 7 A.A.F. Medium Bomber squadrons and 2 Torpedo-Bomber squadrons, each organised on a peacetime initial establishment of three flights of seven aircraft each (147 A.A.F. and 42 Torpedo-Bomber aircraft in all). The establishments of these squadrons would remain unchanged upon mobilisation. Besides them, there were to be 50 regular Medium Bomber squadrons, (1) each organised on a peacetime initial establishment of three flights of six aircraft each (900 aircraft in all). To each of these 50 squadrons, however, there would be added on mobilisation three aircraft and three pilots from the reserve, bringing the initial establishment of each of them up to 21 instead of 18 (three flights of seven instead of three flights of six), and giving them a total first-line strength of 1,050 machines. This, with the 280 Heavy, 112 Heavy Medium, 147 A.A.F., and 42 Torpedo-Bombers, would give the home-based Bomber force a first-line strength of 1,631 aircraft in all. (2) Its weakness in total numbers, as compared with the 1,700 provided in the original version of Scheme H, would be compensated for by its higher proportion of Heavy and Heavy Medium Bombers - 392 out of 1,631 as against 336 out of 1,700. Here already, then, there appears the tendency to tip the scales towards the heavier squadrons, a tendency which was soon to produce a momentous step in the direction of a 'Big Bomber' policy.

The 1941  
or 'final'  
Force

In the 'final' programme, which was suggested along with this 'interim' programme and which was to be completed by 31 March 1941, that tendency was even more marked. This 'final' programme provided for the raising of five new Heavy or Heavy Medium squadrons to bring the force up to 1,700 first-line machines in 92 squadrons and for this force to be supported by full reserves of pilots, ground crews, and aircraft. Of the eventual 92 squadrons, 33 were thus to be Heavy or Heavy Medium Bombers, each squadron organised in two flights of seven aircraft each, giving a total of 462 heavy machines out of the 1,700.

Scheme H  
presented  
to the  
Cabinet,  
14.1.37

A detailed examination confirmed that the supply of trained pilots and ground crews could just be stretched to cover these proposals. It showed, too, that it would be feasible to organise each of the Heavy and Heavy Medium squadrons in two flights of seven on the ground, giving two flights of six in the air; and the Medium Bombers of the present and the immediate future in three flights of seven on the ground, giving three flights of six in the air. (3) The discussion of these revised 'interim' and 'final' programmes, which continued throughout December 1936 and the first days of January 1937, (4) did not therefore produce any further serious modifications and Scheme H, as finally submitted by the Secretary of State to the Cabinet on 14 January 1937, was substantially the same as the proposals of December 4. (5)

The Scheme  
not adopted

Now this Scheme did not lead to any immediate developments. By the time it came up for discussion before the Committee of Imperial Defence on February 2, the situation had changed. (6) For

/General

- (1) Obtained by retaining at home the 10 Scheme F overseas squadrons and raising a further 11 new squadrons, the Scheme F 6 Fleet Air Arm squadrons being now left untouched.
- (2) A. M. File S.39676/11, 11A.
- (3) Ibid., encl. 12A, 14A, 14B.
- (4) Ibid., nos. 11 to 20.
- (5) Memoranda on Scheme H by S. of S. and by Air Staff, 14 Jan. 1937 - ibid., encl. 21B.
- (6) Minute by C.A.S., 2 Feb. 1937 - ibid., min 24.

General Milch had assured the D.C.A.S. that the current German programme aimed at a first-line strength of no more than 1,620 first-line aircraft of all classes by the autumn of 1938. If this statement were true - and, as previous German communications of this kind seemed accurate so far as they could be checked, there was some reason to believe the General on this occasion also - then the current British Scheme F would secure numerical parity with a 'time-lag' of only six months. In view therefore of this welcome assurance and of the difficulties, both industrial and training, which any increase or acceleration of Scheme F would entail, the Committee of Imperial Defence advised the Cabinet not to adopt Scheme H at this moment, though they recommended "that such measures as are necessary to enable it to be begun at short notice should be taken now". These measures included the recruiting of pilots and semi-skilled mechanics up to the full capacity of the existing training establishment; the immediate training of the full number of skilled men suggested by Scheme H; and the provision of landing-grounds, though not of buildings, for thirteen extra stations. These recommendations were finally approved by the Cabinet on 24 February 1937 and the expansion of the first-line bomber strength proposed by Scheme H was thus shelved for the time being.<sup>(1)</sup>

Importance  
of the  
discussions  
on Scheme H

Scheme H, then, so far as it resulted from the first two of the above-mentioned lines of approach, bore no immediate fruit. None the less, it did emphasise most strongly the extreme difficulty of maintaining the official policy of parity in numbers with the German Air Force. Indeed, it frankly abandoned the ideal of overall numerical parity - "it would be unreasonable to regard our parity pledges as compelling us to equip our Metropolitan Force with a number of machines equal to that of the German Air Force irrespective of circumstances (e.g. to ignore the fact that a great German Army requires more Army Co-operation machines or to take no account of our own Fleet Air Arm's strength as against German machines intended for Fleet co-operation)". Instead, it aimed at only "(a) a striking bomber force not inferior to that of Germany; (b) a fighter force of a strength requisite to meet the probable scale of attack". For the bomber force, numerical parity was thus still the professed aim - "the effective strength of a bomber force, of course, depends not merely on numbers but also on range, performance, and load; but unless we can guarantee superiority in these respects, which we cannot, we must, I suggest, aim at an equal number of first-line bomber machines with adequate reserves". Yet even this could not be attained, except in a purely nominal sense by 31 March 1939, if the forecast of German expansion upon which Scheme H was based were to prove more accurate than the present assurances of General Milch. It had been found impossible, "without a complete dislocation of industry to increase (the Scheme F) programme by 1939" and the lack of trained crews was an obstacle equally great. So, as has been shown, the Scheme H 'interim' programme had to adopt the unsound method of temporarily drawing upon reserves and overseas Commands to create an appearance of greater first-line bomber strength at home. Not until 1941 could this first-line force be supplied with its proper quota of reserves. In other words, the utmost that could be done would still leave the British home-based bomber force in 1941 lagging two years or more behind the German in its race to achieve numerical parity.

/ (i)

(1) C.P. 9(37).

Possible advantages of a 'Big Bomber' policy

(i) The formulation of the 'All-Big-Bomber' Ideal

The situation so clearly emphasised by the discussions on Scheme H naturally led the Air Staff to turn more and more to the third line of approach. For, although numerical parity might appear almost unattainable, the development of the B.12/36 and the P.13/36 designs seemed to open a fair prospect of attaining not merely parity, but even superiority, in total bombload. So far as was known, the Germans had no comparable designs in hand. Why, therefore, should not Britain abandon the ideal of mere parity in numbers and aim instead at the crushing superiority in bombload which might be obtained by re-equipping all her bomber squadrons with these two new giants? Their striking power would eclipse that of their predecessors and rivals in the air as completely as in 1906 the Dreadnought had eclipsed all other battleships on the sea. The equipment of the whole of the bomber force with them might thus engender a revolution in air affairs as great as that brought about thirty years earlier by the Dreadnought in naval affairs and one much more obviously beneficial to the cause of British supremacy.

Formulation of tentative plan of re-equipment to big bombers, Dec. 1936

It is not surprising, then, that the idea of an all-big-bomber force began to be seriously discussed as soon as the proposals of December 4 came to be examined. On December 18 the A.M.S.O. was writing that the present Heavy Bomber squadrons might begin to re-arm with B.12/36 aircraft about June 1939; that by 31 March 1941 they might be made up of 16 B.12/36 and 17 B.1/35 squadrons; and that the squadrons of Battles and Blenheims might re-arm with B.9/32 and P.13/36 machines at the rate of 20 squadrons a year from April 1939 onwards.<sup>(1)</sup> The C.A.S. thought these forecasts unduly optimistic. He did not expect any B.12/36's to be ready before January 1940 and feared that the Blenheims would have to stay in service until 1941.<sup>(2)</sup> Nevertheless, even upon his more cautious forecasts, it was possible already to envisage a scheme "of reequipping with very large machines, which is to start before 1.4.41 but is not to be complete till 1.4.43."<sup>(3)</sup> Admittedly, such a scheme might well mean a considerable reduction in first-line numbers, for the D.C.A.S. and his staff were agreed that the new large machines would probably have to be organised in two-flight squadrons of 14 instead of in three-flight squadrons of 21. The problems of hangar accommodation and of bombing-up, as well as the fact that it might be uneconomical to send more than two flights of such machines against some targets and undesirable to split up the squadron, all suggested this.<sup>(4)</sup> But such a reduction in the number of flights would, in the existing shortage of experienced flight-leaders and fitters, be rather a recommendation than an objection. The scheme would, in fact, need very few more men than Scheme H.<sup>(5)</sup> Yet it would provide a force which, whilst numbering only 1,300 first-line aircraft, would be capable of carrying a total bombload of no less than 5,100 tons as compared with the 900 tons of the Scheme H force.<sup>(6)</sup> Here, indeed, would be 'deterrence' with a vengeance - and yet with no very marked additional strain upon the available manpower of the country.

/Thus

(1) A.M. File S.39676/15A

(2) Ibid., min. 16

(3) Memo. by S.7, 13 Jan. 1937 - ibid., encl. 16A.

(4) Ibid., encl. 14A, 14B.

(5) C.A.S. to A.M.P. & A.M.S.O., 15 Jan. 1937 - ibid., min. 17

(6) Ibid., encl. 16A



This plan  
not  
mentioned  
to Cabinet

Thus by the end of 1936 the idea of an 'All-Big-Bomber' force had crystallised into something approaching a definite project. That project was not at this time laid before the Cabinet, for it went "beyond the scope of Scheme H."<sup>(1)</sup> It lay still too far in the future and was still too indefinite to be presented to the Government. It also went beyond the avowed aim of parity, for there was no reason at all for believing that the bombload of the German bomber force would reach anything like 5,100 tons by 1943. Furthermore, the execution of such a programme when the temporary expedient of the Defence Loan could no longer be resorted to, would raise financial questions of the first magnitude.<sup>(2)</sup> The project was not therefore mentioned in the Secretary of State's memorandum to the Cabinet of January 14, in which the Scheme H proposals were outlined.

But it is  
tacitly  
accepted  
as an ideal.

Without Cabinet sanction, it could not, of course, be regarded by the C.A.S. or the Air Staff as a definite and formal statement of their bomber policy. It had, nevertheless, been now distinctly formulated and tacitly accepted as a promising, if still distant, ideal. Throughout the expansion schemes and design programmes of 1937 and 1938 its influence was, as will be seen below, to grow increasingly apparent until the Munich crisis brought it final approval and committed Bomber Command to the momentous decision of placing all its eggs in these very large baskets. From the beginning of 1937, in short, the all-heavy-bomber force of 1942-3 was already in distant view and British bombing policy had practically committed itself to the thesis that such a force was likely to prove the most effective instrument for carrying out the 'experiment' of an 'independent', strategical, bombing offensive.

(1) Ibid., min.17.

(2) Note by S.7., 13 Jan.1937 - ibid., encl.16A.



IV. PREPARATION FOR A WAR WITH GERMANY(ii) OPERATIONAL PLANNING: BOMBER COMMAND IN THE WESTERN PLANS, TO SEPTEMBER 1938

Character  
of the period  
Feb. 1937  
to Sept. 1938

After the momentous developments of the year 1936 and the early weeks of 1937, the next phase in the history of British bombing policy, lasting until the Munich Crisis of September 1938, wears a good deal the appearance of an anti-climax. For it was a phase of gradual movement towards the long-term 'Big Bomber' policy already visualised in December 1936. It is a story which has already lost much of its novelty before it comes to be told, one whose denouement has already been foreseen. Nevertheless, that denouement can hardly be fully understood without some study of the circumstances in which it had been slowly maturing during the one and three-quarter years preceding the Munich Crisis. Some of those circumstances had already become apparent before the end of 1936 and now merely gathered weight. Such were, the difficulties placed in the way of further expansion by limitations in industrial capacity and trained man-power; the growing prospect that, thanks to scientific and technical progress, a successful air defensive might after all prove possible and the steady tendency of bomber requirements and bomber design towards greater size and increased power. There were other circumstances, however, which only began to exercise a compelling influence during the course of these one and three-quarter years. Such were the reiterating of the financial limitations on expansion; the effects of the elaborating of preliminary operational plans for the Services in a German war; and - for perhaps it is not unfair to include this among them - the study and evolution of tactical methods. Accordingly, the reasons why and the manner in which the Munich Crisis marked a new turning-point in the evolution of British bombing policy may be more easily appreciated if the developments and circumstances of the period from February 1937 to September 1938 are first analysed. In the present chapter, therefore, the evolution of operational plans - part of the 'Western (Air)' or 'W.A.' plans - for a bombing offensive against Germany and the progress of policy and investigations in the matter of target intelligence and bombing tactics will be traced. Then in the following chapter, the projects of expansion and the progress of equipment during the period will be considered.

(a) The Origin of the W.A. Plans, 1933-6

The 1933-4  
discussions

The basis of all the operational plans for a bombing offensive against Germany is to be found in the first discussions upon rearmament, which took place in 1933 and 1934. In those discussions, it will be remembered,<sup>(1)</sup> the nature of the defence problems which a German war would create had been analysed and the part which the bomber force would be called upon to play in solving them had been outlined roughly. The broad principles then established could not, however, be immediately

/translated

(1) Above, <sup>CHAP.</sup> Part III.ii.

translated into detailed operational plans. Before such plans could be drawn up, it was necessary to frame a general war-plan in which each of the three Services would be allotted its appropriate functions.

Instructions  
to the  
J.P.C.  
9 Oct. 1934

This was an inter-Service task, a task for the Joint Planning Committee. Accordingly, on 9 October 1934, the Chiefs of Staff instructed the Joint Planning Committee to begin considering plans for a possible German war. They were to assume that the "Low Countries (Belgium and Holland) are vital to our security from the point of view both of naval and Air defence" and "that our forces might have to be employed in five years, i.e. the end of 1939". But apart from these two assumptions, their terms of reference were drawn upon very general lines, for the international situation at this date was still too fluid, and the information about Germany's eventual strength and aims too uncertain, for anything of a very precise nature to be done. (1) On November 22 the Committee of Imperial Defence approved these instructions with the proviso that the Chiefs of Staff were to bear in mind that a European conflict might possibly break out earlier than the end of 1939.

First  
provisional  
Report by  
J.P.C.  
1 Aug. 1935

Thereupon the Joint Planning Committee went to work. Their progress was frequently interrupted by other demands upon their time, (2) but by 1 August 1935 they were able to submit for the approval of the Chiefs of Staff their Provisional Report upon 'The Courses open to Germany'. This report has already been discussed. (3) Its most important contribution was to make clear that the 'worst case' which British preparations must reckon with was the possibility that the Germans might occupy the Low Countries by a swift land and air campaign so as to be able to launch the heaviest possible bombing attacks against the United Kingdom from the shortest possible range. The Chiefs of Staff, in giving their general approval to this Provisional Report, (4) sanctioned also its conclusion that "no matter which course is considered the most likely for Germany to adopt, our own plans must be capable of meeting this 'worst case'".

The aims  
and objects  
clarified

This gave a clear indication as to the primary objects of the 'course open to us', which the Joint Planning Committee were now instructed to consider. The indication, so far as it concerned the bomber force, was clarified still further by the circulation of the Air Staff's Note of 20 July 1935 on the vulnerability of German industry to air attack (5) and by the emergence during the discussions upon Expansion Scheme F of the idea of using the bomber force as a deterrent and 'stopper' to any attack by the German army upon the Low Countries. (6) The need for such action was re-emphasised in the lengthy discussions which continued throughout 1936 and into 1937 upon the protection of British trade in the event of a war with Germany. For in these discussions it was generally recognised that, if the Germans were to launch heavy and sustained air attacks upon British shipping, ports, and inland communications targets, and if such

/attacks

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- (1) C.O.S. Minutes, 133rd Meeting; also Memorandum by C.I.G.S., Oct. 4 - C.O.S. Paper 350; Note by Acting Secretary of C.O.S., Sept. 28 - C.O.S. Paper 340.
  - (2) e.g. C.O.S. Minutes, 143rd Meeting; C.I.D. Paper 1183-B.
  - (3) Above, <sup>CHAP</sup> Part III.ii.97-99; C.O.S. Paper 401.
  - (4) C.O.S. Minutes, 153rd Meeting.
  - (5) Above, <sup>CHAP</sup> Part III.ii.102-3.
  - (6) Above, <sup>CHAP</sup> Part III.ii.102-4.

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attacks were not "reduced to manageable proportions" within three weeks or a month, "we might be faced with defeat". And it was also generally agreed, even by the Admiralty, that the best method of reducing this menace to manageable proportions would be a bombing counter-offensive against the Germans' aircraft industry and naval bases, combined with the mining by aircraft of the approaches to German harbours.<sup>(1)</sup> In fact, before the end of 1936 the idea that Germany might attempt a 'knock-out blow' by air against the United Kingdom had already come to dominate British planning. In the matter of anti-aircraft defence this was indeed formally stated when on 29 October 1936 the Committee of Imperial Defence approved "the principle that our plans for anti-aircraft defence, in the event of a 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".<sup>(2)</sup>

The primary  
tasks of the  
bomber force

By implication, then, the first task of the British air offensive, of the bomber force, must be to reduce the weight and duration of this attack by itself delivering the heaviest and most sustained bombing attacks that it could manage against the German Air Force's bases, communications, and sources of supply. Next in importance must come operations designed to stop, or at least to slow down and keep as far to the eastward as possible, any attempt by the German Army, with air assistance, to invade and occupy the Low Countries. Besides these two tasks of the highest defensive urgency, it would be necessary to have plans for a war-winning air offensive against industrial and transportation bases of Germany's belligerent power as a whole, and for an effective air counter-offensive against the harbours, dockyards, and communications of her naval forces.

(b) J.P.C. Paper 155 (October 1936): the Statement  
of the Problem

J.P.C. 155:  
its  
assumptions

These, then, so far as the bomber force was concerned, were the principles and priorities which had been established by the time that the Joint Planning Committee, on 26 October 1936, presented to the Chiefs of Staff their second "Appreciation of the situation in the event of a war against Germany in 1939", dealing with "the courses open to us".<sup>(3)</sup> The Appreciation was preceded by a covering note which seems to bear impressed strongly upon it the ideas of the Air Ministry representative on the Joint Planning Committee, Group-Captain A.T. Harris. The note first explained the premises of the Report - it assumed that British preparations would have followed the terms of the Defence Policy and Requirements Committee's report of February 6<sup>(4)</sup>; it assumed that France and Belgium would co-operate with Britain but regarded the effectiveness of their assistance as "an unreliable quantity"; it hoped for at least the initial neutrality of Italy; it did not allow for any early Russian help to Britain or Spanish help to Germany or for any actual alliance between Germany and Japan. It presented broadly, therefore, "a picture of our 'worst case'".

/From

- (1) For these discussions, see the Narrative of Naval Co-operation prepared in this Branch; also, in particular, C.O.S. Papers 488 (J.P.), 504, 535 (J.P.), 542 (J.P.), 552; C.O.S. Minutes 190th Meeting; C.I.D. Paper 1276-B.
- (2) C.I.D. Minutes, 283rd Meeting (1).
- (3) J.P.C. Paper 155 or C.O.S. Paper 513 (J.P.)
- (4) Above, Part III.ii.102-3; C.I.D. Paper 1215-B

Its  
emphasis  
upon the  
air menace

From these premises, the Committee went on, "our study of this war has brought us to the conclusion that in 1939 Germany would be able to deliver air attacks on this country which, if made with the object of demoralising our people and/or disorganising our food supplies, might well succeed..... In particular, our appreciation has shown the very great importance to the security of this country of all measures designed to meet and defeat air attack. It has confirmed the necessity for the steps recently initiated for increasing the scale of anti-aircraft defences hitherto contemplated and has also emphasised how severely we are handicapped in developing adequate air counter-offensive measures. We take the view that the most immediate menace to this country, in the circumstances we are considering, would arise if Germany were to concentrate her air striking force against us, and adopt unrestricted air attack as a method of warfare".

Possible  
extent  
of this  
air menace

Just how deadly this menace might be, was made clear in Appendix II to the Report. On Air Ministry data the scale of attack was assumed to be 400 tons of bombs every twenty-four hours over a limited period of perhaps thirty to forty days. If this weight of attack were directed against ports and communications with the object of disorganising the receipt and distribution of food, it would be serious enough. For in the first twenty-four hours the handling of cargoes in the Port of London, for example, might be reduced to a mere 25 or 30% of normal and practically all the stocks in the Port of London Authority's stores and warehouses might be destroyed by fire. Attacks on the same scale during another three days might produce comparable effects in all the ports from the Tyne to Southampton; and all the other ports in the United Kingdom might be equally blasted within another ten days of such raiding. Yet the danger might be still greater if the attacks were directed towards demoralising the people by creating havoc and terror in the great centres of population. "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 intensive forms that can be achieved through air attack, the majority would insist that surrender was preferable to continuation of the attacks." There was perhaps little in British history or experience to support this view, but the exact effects of such an ordeal, being psychological rather than material, were impossible to calculate. And certainly the ordeal would be a searching one. On the basis of the Air Ministry's present anticipations and the assumed scale of attack, casualties of the order of 20,000 might be expected in London within the first twenty-four hours. "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 disorganised telephone and telegraph communications throughout the country, and to a varying degree dislocated railway, postal, and electrical services, and the distribution of food. A very high standard of organisation 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". The second week would be as bad and would be "a crucial period for national morale. The first frantic exodus would be over and it would be seen whether re-organisation began to deal effectively with the

/problems

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problems of feeding and administering the scattered population". If demoralisation had not set in by the end of this second week, then further attacks of this sort would hardly be likely to bring the Germans success, and they might then concentrate upon the interruption and destruction of Britain's food supplies.

An air counter-offensive the only real answer

Such a picture, which even H.G. Wells could hardly have made more frightening, established the reality and extent of the air menace. "Each and every form of defence must be developed to the highest degree of efficiency possible." But, the covering note went on to say, not only would Britain's defensive preparations in 1939 fall far short of perfection, but also, "unfortunately we have been unable so far to discover any method of direct defence sufficiently effective to guarantee the security of objectives in this country". They were therefore "forced to admit that the only real answer lies in a counter-offensive of at least similar effectiveness". Here, however, Germany possessed a considerable advantage in that "her industries are less vulnerable than ours" (though the position might be reversed by the adequate development of war industry in Canada and the other Dominions). Hence, something more than mere parity in first-line bomber strength was needed to afford an adequate guarantee of security. "So long as we are compelled to adhere to the theory of the counter-offensive, we should invest it with the power of striking relatively so hard against the enemy that this threat will, in effect, offset our greater vulnerability". Here incidentally, was another argument for the 'Big Bomber' policy, for aiming at superiority in bombload rather than mere equality in numbers, even though the equipment required for the execution of such a policy could not be provided by 1939.

Assessment of German strength

After stating these general governing considerations in their covering note and its supporting appendix, the Joint Planning Committee proceeded to hammer them home in Part II of their Report where they compared the problem forces of the two sides in a German war starting towards the end of 1939. The comparison covered not only naval, military, and air forces, but also economic resources and geographical factors. For "the forces which a nation employs in war are no longer limited to those of the fighting Services, but include the whole of the industrial resources, the man power and the morale of the people". At the moment this was a fact telling doubly in Germany's favour. The expansion and preparation of her industry for war had already begun in peace upon a scale which the democratic countries could not emulate. Also, "it is by no means certain that in face of air attack similar development (of economic effort after the outbreak of war, such as occurred in 1914-8) would again be possible, even if, despite our comparative unreadiness, we defeated the attack Germany could deliver as the culmination of 'peace' preparations". And in economic matters those preparations would make Germany far more self-supporting in 1939 than she had been in 1914. She could produce already 80% of the food and fodder she required; by using substitutes and reserve stores and by careful regulation to avoid waste, she could postpone for a considerable time any real shortage of raw materials; and even with oil "the measures which Germany is taking will probably ensure adequate domestic supplies of all petroleum products except aviation spirit, but she is arranging to store the latter on a very large scale" and in underground tanks.

/Maritime



Forces for  
the air  
offensives

Maritime blockade, such as the Anglo-French naval superiority might be reasonably expected to ensure, thus could not have any material effect upon German strength during those decisive early weeks when the aerial 'knock-out blow against Britain or the land offensive against France and the Low Countries was being attempted. Nor would Britain and her allies then possess the military strength to affect the issue by invading western Germany - indeed the most that they could hope for was a slight superiority in land forces after the end of the third week of war. The only effective remedy was the air counter-offensive. Yet here, too, - assuming that the Germans had 2,500 first-line aircraft with 100% reserves, all trained and equipped up to British standards, by 1939 - the position would not be encouraging. For of the 2,500 German machines, 1,700 would probably be bombers. Against these, Britain under Scheme F could set only 990 and the French under their expansion scheme only 775. Moreover there was good reason to fear that the French programme would not in fact produce so many as 775 bombers by that date. Even if it did, "the French, in so far as can be ascertained, have made little or no study of the technique of air warfare except where air fighting is concerned: their bombing methods are both inaccurate and primitive, and at present their aircraft maintenance is inferior to our own."

German  
geographical  
advantages

To all this must be added the fact that geography favoured a German air offensive against Britain more than a British air offensive against Germany. The British aircraft factories were more concentrated and situated in more vulnerable areas than the German. Too much of Britain's industry was concentrated around London or in the Midlands or North, within 400 miles of German bases. Admittedly, a great deal of German industry was in the Ruhr and Rhineland and Saar, within 300 miles of the United Kingdom: but the rest was scattered widely and well back in the interior of the country. Besides, the network of railways and roads in Western Germany was too elaborate to be easily put out of action, for even the German Rhine was crossed by no fewer than 49 bridges - and bridges were notoriously difficult targets. Finally, the Baltic, across which Germany could draw large supplies of raw materials from Scandinavia, was not a sea where the British Navy could effectively operate and it would be at extreme range (if not beyond reach) for the British bombers of 1939, though these bombers might seek to drive the German fleet out of its western bases and to shut it into the Baltic altogether by blocking the Kiel Canal. Part II of the Joint Planning Committee's Report was thus again, if again incidentally, an impressive argument for the greater range and bombardment that a 'Big Bomber' policy would give to Bomber Command.

(c) J.P.C.155 (October 1936): the role of  
the British fighting Services

Probable  
courses of  
German  
action

With Part III of their Report the Joint Planning Committee came again to the probable courses of German action and then to the counter-measures which the British Services should be ready to adopt. Germany, the Committee thought, would take the offensive and seek a quick decision, for she would not desire a long war and she would have the advantage at the outset. She would "not initiate a war unless her responsible statesmen believed that she would win. Her prospects of victory would certainly be greatest during the first few months of war. We are therefore convinced that

/Germany

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Germany would plan to gain her victory rapidly. Her first attacks would be designed as knock-out blows." For this, two courses seemed open to her. She might concentrate all possible land and air forces for a decisive attack upon France through the Low Countries, which would enable her "subsequently to direct an offensive against us from a most advantageous position". Or she might at once launch all her air and sea forces against Great Britain in an effort to gain a decisive victory over that country before it could be organised for war. The vulnerability of the United Kingdom and German knowledge of how greatly British power could develop as the war went on, might well tempt her to try this second course, though with it she might perhaps combine a limited offensive against France with a part only of her land forces.

Primary tasks  
of the  
British forces

The first and most essential problems for British planning must therefore be, in order of importance, (1) to provide for the repelling of an immediate German air offensive against the United Kingdom; (2) to prepare measures to help Britain's potential allies to repel an immediate land and air offensive against themselves; and then, (3) to provide for a counter-offensive that would bring defeat to the Germans in the second phase of the war, which would only begin after their immediate onslaught had been beaten off. The first, and to a considerable extent the second, of these problems must be primarily the concern of the R.A.F. and in especial the concern of the bomber force. For "in the present state of development local defence cannot provide the full measure of security which we require and it is mainly by the counter air offensive that the German air attack will be defeated. The offensive employment of our own and allied bombers is the only measure which could affect the issue during the first few weeks of the war, since neither the Navy nor the Army has the power to impose upon Germany any form of immediate pressure".

Objectives of  
the air counter-  
offensive:  
primary aim

The pre-eminent importance of the bomber force and the primary aim of its operations during the opening phase of the war were thus clear. But how could that aim be achieved? Only three classes of objective seemed open - (1) to demoralise the German people; (2) "to discover and attack some target, the security of which was regarded by Germany as vital to her survival during the limited period within which she hoped to gain a decision over us" - this would force her to divert her attacks on to the British airfields and maintenance organisation; and (3) to direct the attacks upon the bases, communications, and maintenance organisation of the German bomber force. The first of these was ruled out as impracticable, for there was no real German equivalent to London. The second was also ruled out, for again the Joint Planning Committee could find no such vital target in Germany and "mutual air attack, even at equal intensity, upon each other's vulnerable points would only lead to a far quicker reduction of the war effort in England than in Germany", whilst attacks upon German industry, even in the Ruhr, "could not adequately affect the issue during the early weeks of the war". The Committee were thus driven back upon the third course. They fully recognised that airfields and air force maintenance organisations were targets of considerable difficulty, but they were compelled to recommend that to attack such targets offered the best hope that they could devise for reducing the duration and intensity of the German air offensive. This then, must be the primary aim of the British bomber force during the opening phase of the war.

/Second

The second aim

Second only to this came the task, which was primarily the role of the Royal Navy, of keeping open Britain's sea communications against German sea and air attack. Here, too, the R.A.F. must give vital assistance not only by providing reconnaissance and local defence but also by counter-offensive measures against the German naval and air bases and communications. This, then, must be the second aim of the bomber force.

The third aim

The third and last main task which might fall to the British Services during the opening phase was to help the French and Belgians in repelling a German land and air offensive against their countries. This would be primarily a matter for the Army's Field Force, but here, too, the R.A.F. would have an important part to play. Besides supplying the normal services of army co-operation, it would be called upon to interrupt by bombing the concentration and advance of the German army and the offensive of the German Air Force. Hence, then, was the third aim of the British bomber force, and one almost as vital as the other two.

The aims in the 2nd phase of the war

Once, however, the second phase of the war began, the bomber force would be called upon to play another and equally important part. It must then strike at the sources of Germany's belligerent power as a whole, "with the object of curtailing the output of her war industry". For, the Committee went on, "we have assumed that so long as we are much more vulnerable than Germany and also have a smaller air striking power, for the purpose of decision in air warfare we may be forced to direct our initial air offensive towards trying to reduce the scale of German air attack quickly by counter-attacks on her air striking organisation. Such action is, however, a purely defensive strategy and, since we cannot apply effective pressure on Germany until we attack her vulnerable points, it is essential that at least a portion of our air striking force should take the offensive against such objectives as soon as possible. When this occurs, we shall in effect have reached phase two and our air action will be the first step in the preparation for a counter-offensive." A counter-offensive on land, might well still be necessary to bring final victory, but the air offensive must be an essential preliminary to it. Here, then, was a fourth task for the bomber force for which plans must be laid. It was a task which, in view of the size and distribution of German war industry, would call for a great weight of attack. It was a task not easily to be accomplished in a short time and one which must continue during the long period while Britain was building up the great mobile mechanised land forces which she alone of the potential allies could produce and which were perhaps essential to final victory. Here, again, then, was a further incidental encouragement to the development of the 'Big Bombers' which might begin to take their places in the bomber squadrons two or three years after 1939.

(d) C.O.S. Paper 549 (February 1937): the Outline of the General War-Plan

D.C.O.S. report on J.P.C. 155

The Report of the Joint Planning Committee was first considered by the Deputy Chiefs of Staffs Sub-Committee. They, on 5 January 1937, pointed out that Parts I and II - the statement of the problem and the comparison of forces - were by now out of date at some points and open to differences of opinion upon others. In particular, they thought that it over-emphasised

/Germany's

Germany's advantages and said too little about her difficulties and disadvantages. Therefore, although they endorsed the general conclusions reached there, they recommended that these two parts should not be sent forward to the Committee of Imperial Defence. The rest of the Joint Planning Committee's Report, they recommended should be sent forward. Moreover, as the international situation made it urgent that detailed planning should be put in hand without delay, the Deputy Chiefs of Staffs drew up a series of recommendations specifying more precisely what plans each of the three Service Departments should now be instructed to examine and prepare. (1)

C.O.S. Paper  
549

These recommendations were endorsed by the Chiefs of Staff in their discussions which went on for the next five weeks. The outcome of those discussions was C.O.S. Paper 549 on 'Planning for a War with Germany', signed by the Chiefs of Staff on 15 February 1937. This is one of the most significant and most important defence documents of the inter-war years, for it summed up the considered views of the Services upon the character of British defence policy and laid down clearly the broad lines which British strategy was to follow after 1939.

The air  
warfare and  
the air  
counter-  
offensive

The Report began by repeating the Deputy Chiefs of Staff's recommendations about the urgency of beginning at once to frame detailed plans and by requesting the Government's approval of the general policy now suggested. It then briefly re-stated the two most probable courses of German action - either concentrated air attacks on the United Kingdom, together with naval and air attacks on British trade and possibly accompanied by a land attack upon France and the Low Countries; or a full land and air offensive against France through the Low Countries. Then, after outlining briefly the plans required for the defence of overseas trade and as precautions against Japanese hostility, it proceeded to discuss, on lines similar to those of Part III of the Joint Planning Committee's report, the methods of repelling the expected German air offensive against the United Kingdom. Here it endorsed the conclusions of the Joint Planning Committee. It recognised that chief reliance must be placed upon the British air counter-offensive. It admitted that the enemy's air striking force and its airfields were "not a very satisfactory target for air attack". But it agreed that "as an initial plan, the bombing of the enemy striking force would have the advantage of reducing the scale of attack upon our own vitals and of directing our offensive against an unmistakably military target, thus leaving to the enemy the odium of the initiative in bombing places where large populations are concentrated". On balance, therefore, this might be the most suitable plan for the air counter-offensive to follow, though it was useless to make hard and fast decisions on this matter at the present time.

The role of  
the R.A.F.

From this the Report went on to outline the roles of the three Services. Naturally, but very significantly, it began with the R.A.F., the Service upon which would fall most of the burden of repelling Britain's gravest menace, the German air offensive. Here, as with the other Services, it repeated the recommendations of the Deputy Chiefs of Staff. In general, it advised "that the Air Staff, in consultation with the Naval and General Staffs where necessary, should draw up a series of plans for attacks on different objectives,

/thus

(1) C.O.S. Paper 540 (D.C.)

thus taking full advantage of the great mobility and flexibility of air forces. The arrangements should be worked out in the fullest detail and when approved should be communicated in the form of numbered plans, accompanied by all necessary intelligence, to the units who would be responsible for carrying them out. The selection of the plans actually to be adopted in different circumstances would be left to the decision of the Chief of the Air Staff, in consultation with the Chief of Naval Staff and the Chief of the Imperial General Staff according to the needs of the moment. The plans should include those which could be better undertaken by our prospective allies, including not only France, Belgium, and Holland, but also Poland, Czechoslovakia, and Russia. At the present stage it is not possible to draw up a complete list of the plans required and all we can do is to suggest a preliminary list of the headings under which they should be studied. Under some headings a large number of detailed plans may be required. For example, the attack on the Ruhr, the Rhineland, and the Saar will require to be worked out systematically."

Outline of  
R.A.F.  
plans

After these general considerations, the Report repeated the more precise proposals made by the Deputy Chiefs of Staff. "Subject to the above, preliminary headings of the plans to be drawn up by the Air Staff would include the following:-

A. Plans to assist the Navy

Plans drawn up in concert with the Naval Staff for the co-operation of shore-based aircraft with Naval forces in ensuring the security and control of sea communications. These would include:-

- (i) Plans for North Sea and other reconnaissance and for co-operation in convoy protection.
- (ii) Plans for putting the Kiel Canal out of action at such moment as the Naval Staff may desire and the Air Staff may deem practicable.
- (iii) Plans for attacking the German fleet or a section thereof by air or in concert with the Navy, either in harbour or at sea.
- (iv) Plans for the destruction of the shipping and facilities in German mercantile ports within range of our aircraft.

All plans must include the necessary Intelligence arrangements.

Such plans might become of decisive importance if Japan and/or Italy appeared likely to enter the war, and a re-disposition of the fleet became necessary.

B. Plans to assist the Army

- (v) Plans for limiting the enemy's air offensive against the ports and lines of communication to be used by our army, in case it is necessary to send it abroad.
- (vi) Plans for attacking the concentration areas of the German army and the interruption of its communications in an advance into Belgium, Holland, and France in case the main attack is directed against these countries.

C. Royal Air Force Plans

- (vii) Plans for the attack of the main aerodromes and satellite aerodromes likely to be used by the enemy.
- (viii) A series of plans to be concerted eventually with our Allies, for attacking the enemy's resources in the Ruhr, the Rhineland, and the Saar.
- (ix) Plans for the attack of the enemy's manufacturing resources, especially for aircraft, outside the above regions. These should include plans for the offensive employment of the Air Forces of possible Allies in Central and Eastern Europe in order that their resources may be best utilised for the common object.
- (x) Plans for the attack of especially important depots or accumulations of warlike stores in the enemy country. All the resources of our intelligence system should be used to obtain this information.  
The number of plans under the above headings is likely to be considerable."

Roles of  
the Navy  
and Army

After the R.A.F., came the role of the Royal Navy and then that of the Army. With regard to the Army the Chiefs of Staff concurred with the Joint Planning Committee -

"That while the crisis remained centred in Great Britain, the employment of our Field Forces on the Continent would be of less importance than the defeat of the German air attack. The Field Force could only be moved to the Continent if all the army assistance necessary to maintain order and essential services in this country could be afforded by other troops."

"If, however," the Chiefs of Staff went on, "the enemy should launch the main attack on France, through Belgium and/or Holland, the Government might well decide to send the Field Force, as well as appropriate air forces, to the Continent. There is also the possibility that the Government, while retaining the Field Force in this country, might decide to despatch certain air forces to the Continent, accompanied by certain army units, for base and L. of C. duties. We recommend therefore that the General Staff and Air Staff, with the assistance of the Admiralty and Mercantile Marine Department, Board of Trade, as required, should work out all the details of (i) a plan for sending the Field Force to the Continent, whether at the outset of a war or at some later period, and (ii) a plan for the despatch of certain air forces to the Continent, together with a proportion of army units for base and L. of C. duties. These plans should be capable of being put into effect concurrently." In short, if the initial German offensive were concentrated upon the United Kingdom, the Field Force would probably not be sent abroad until that offensive had been defeated; if it were concentrated upon France, the Field Force must be sent over at once; and in either event, the R.A.F. must be prepared to launch an immediate air counter-offensive.

/Finally,

Co-ordination  
of plans

Finally, the Chiefs of Staff made the following recommendations to ensure a proper co-ordination of plans.

"All plans, when completed, should be communicated to the Joint Planning Sub-Committee, which should be treated as a clearing-house and co-ordinating authority for war plans. The Joint Planning Sub-Committee should submit a quarterly report to the Chiefs of Staff Committee showing what progress has been made up to date. The first Progress Report should be submitted on or before the 1st March 1937. The Joint Planning Sub-Committee should compile and keep up to date in convenient form a master-copy of all the plans, showing in each case whether it is one of the plans which would be carried out automatically on the outbreak of war, or whether it requires a decision by the Chiefs of Staff Committee, a particular Chief of Staff, or by the Government. An index to the master-copy should be prepared and issued to all Departments concerned. This index would indicate the nature of each plan, and, in summary, the action required by the Department or Departments concerned to give effect to them. This index would thus provide in the region of war planning a document comparable to the War Book in the region of administrative planning, the whole constituting a national plan of defence".

Significance  
of C.O.S. 549

The attachment of Parts III and IV of the Joint Planning Committee Report as an Annex to the Chiefs of Staffs Report completed this outline of "a national plan of defence" within which each of the Services could begin to frame its own detailed operational plans. The significance of the whole document will already be so obvious that further comment is hardly necessary. It may, however, be worth while to point out once again how it emphasised the pre-eminence of the air menace; of the role of Bomber Command in repelling it; and of the part which a bombing offensive would also play during the second phase of the war in 'softening' German resistance preparatory to the final allied offensive by all arms. The need for parity, or rather for superiority, in bomber strength was thus reiterated just at the time when the discussions on Scheme H had shown how unattainable was equality in numbers. It was reiterated just at the time when the Air Staff had clearly grasped the possibility of attaining a crushing superiority in total bombload by the adoption of a 'Big Bomber' policy. It was therefore another powerful argument in favour of such a policy, an argument that was to be made still more powerful by the detailed examination of the plans which the Chiefs of Staff's Report outlined.

(e) The Evidence and Equipment for detailed Planning:

Information about the future Strength and  
Organisation of the Bomber Force

C.O.S. 549  
sent to Air  
Ministry  
for action,  
13 May 1937

On 13 May 1937, after C.O.S. Paper 549 had been considered and approved by the Cabinet sub-committee on Defence Plans (Policy), instructions were sent to the Air Ministry to begin at once the preparation of the detailed operational plans for the R.A.F. outlined therein. With the instructions were also sent extracts of all the passages relating to the R.A.F., emphasising the supreme importance of preparations for repelling any German air offensive against the United Kingdom. (1)

/ Before

(1) A.M. File S.41432/5A, 5B.



The back-ground to detailed planning

Before considering the action which followed upon these instructions, however, it will be well to pause and review the evidence upon which detailed operational planning could be based in the second half of 1937, - to outline briefly the information available about the future organisation, strength, and equipment of the British bomber force; to summarise the tactical ideas then prevailing upon how that force should be handled in its operations; and to indicate the progress made towards providing intelligence about its probable targets.

General organisation and command

Since Bomber Command had come into active existence in July 1936, the character and general organisation of the instrument by which the operational bombing plans would have to be executed was tolerably clear. (1) All but one of the 68 bomber squadrons of Expansion Scheme F were now formed or had begun to form. (2) All were now controlled by the single independent Bomber Command, subordinate only to the Air Ministry. This Command was sub-divided into six Groups (3) and each Group would, it was hoped, be made up by 1939 of squadrons equipped with machines of the same class, though not always of the same type. Each Group was further sub-divided into a number of Stations, each station housing on its main airfield and its satellite landing-grounds either two Heavy or Three Medium or Light Bomber squadrons. Each squadron was eventually to contain, according to its class, either two or three flights of six aircraft apiece and was eventually to be backed by reserves amounting to 225% of its initial establishment. So, broadly speaking, the administrative and operational organisation and the chain of command of the bomber force were sufficiently well defined for planning to begin, on this side, from firm general premises.

Strength and equipment

So far as more detailed information was concerned, Expansion Scheme F, of course, provided figures for the strength which the bomber force was designed eventually to reach and for the proportion of the various classes (and even types) of aircraft with which it was eventually to be equipped. (4) And, by the summer of 1937, it was becoming possible to make rough forecasts as to when these intentions might be realised and as to what might be reasonably expected of the newer types of machines that might then be in service. For orders had been placed during the spring of 1936 for the numbers of these newer types that were required by 1939, both for first-line and reserve, under Scheme F. (5) Most of the machines were thus now beginning to go into quantity production. Some were even beginning to take their place in the bomber squadrons, for by the autumn of 1937 there were already three squadrons equipped with Whitleys, three with Harrows, four with Blenheims, and two with Battles. (6) It is true that hardly any of these squadrons could yet be regarded as mobilisable, since the first deliveries of the new aircraft usually lacked their gun turrets, their bomb-racks, their bomb-sights, and parts of their wireless equipment and automatic controls. (7) Nevertheless,

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- (1) Above, <sup>CHAP</sup> Part III.iii.  
 (2) By June 1937. The last squadron to form was No.185 in March 1938 - see below, Appendix II.  
 (3) The last Group to form was No.5 in July 1937.  
 (4) Above, <sup>CHAP</sup> Part III,ii.107-9.  
 (5) A.H.B. V.5/4,21 to 25, 31, 34, 36; V.5/5.  
 (6) These figures are for September 1937. By the end of the year there were 3 Whitley, 4 Harrow, 7 Blenheim, and 5 Battle squadrons - see below, Appendix II. The Wellingtons and Hampdens had then only recently gone into quantity production.  
 (7) Minutes of 13th, 14th, 15th Meetings of Mobilisation Committee, 14 April, 11 June, 22 Sept. 1937 - A.M. File S.37140/41, 43A, 49A.

by the end of 1937 some Service experience had been gained with them and a rather better idea could be formed of their true capabilities. It was also becoming easier to predict how many of them might be expected to come from the factories during the next twelve or eighteen months - in other words to estimate the numbers of first-line and reserve aircraft likely to be available at any given date in the immediate future.

Work of the  
Mobilisation  
Committee

All this provided very useful indications about the eventual character of the Scheme F force and about its probable progress towards completion. It did not, however, properly fill in the details of the organisation which had been merely outlined by the establishment of Bomber Command and the adoption of Scheme F. For these details the operational planners had to rely upon the administrative preparations, covering a shorter period of time, made by the various branches of the Air Ministry and co-ordinated and digested by two special Air Ministry committees, the Mobilisation Committee and the War Organisation Committee. The first of these committees had come into existence in the autumn of 1935 to co-ordinate and perfect the mobilisation arrangements somewhat hastily improvised to meet the Italo-Abyssinian crisis. (1) During the next eight or nine months those arrangements for meeting a 'Mediterranean emergency' had been expanded into administrative arrangements for meeting any major European 'emergency' (2) and in April 1936 they had been given the generic name of the 'Western' or 'W' Plan. (3) This Plan - not to be confused with the W.A. operational plans deriving from C.O.S. Paper 549, though forming the administrative and organisational basis upon which these latter were to be built - could not, of course, be given a final and settled form until Expansion Scheme F was within sight of completion. That could hardly be earlier than the spring of 1939 at the very best. Accordingly the W Plan was given the form of a provisional arrangement, covering only the immediate future but revised and brought up to date at regular intervals. For this purpose the period down to April 1939 was divided into six six-month phases. (4) Every quarter the Mobilisation Committee met "to agree a temporary arrangement of war stations, moves, disbandments, etc., which would be carried out in the event of any home defence emergency in the ensuing quarter." In this way it would be able to take stock "of the personnel and equipment position, determine the mobilisable strength of the Metropolitan Air Power for the ensuing period, and improvise such arrangements for mobilisation as are found practicable." One meeting of the Committee in each six months was devoted to preparations for the ensuing six-months Phase; the other was used for checking and adjusting the arrangements for the current Phase. (5)

/From

- (1) 1st meeting, 16 Sept. 1935 - Minutes at A.M. File S.36151/9A
- (2) A.M. Files S.36260/32A, 35A; S.37140/1,4,6,7,12.
- (3) Approval by D.C.A.S., 30 April 1936 - A.M. File S.37140/14; Special Organisation Circular No.22, 5 May 1936 - ibid., encl.15A.
- (4) The Phases were:- Phase I, April to Oct. 1936; Phase II, Oct.1936 to April 1937; Phase III, April to Oct.1937; Phase IV, Oct.1937 to April 1938; Phase V; April to Oct. 1938; Phase VI, Oct. 1938 to April 1939.
- (5) Note on nomenclature for Western Plan, 4 June 1936 - A.M. File S. 37536/39A.

The War  
Organisation  
Committee

From March 1936 onwards the work of this Mobilisation was supplemented by the activities of the War Organisation Committee, (1) whose duties were "to consider and make recommendations on the organisation to be adopted for the control, operation, and movement of the forces at home and in the field in war in accordance with Air Staff plans, and for their administration, maintenance, and supply". (2)

Their  
progress  
by 1937

The details of the work performed or co-ordinated by these two Committees lies outside the scope of this Narrative, for they were concerned with administration and organisation rather than with bombing policy. (3) Broadly, however, they had by the summer of 1937 defined the administrative and organisational framework of the bomber force and filled in at least the more essential details. Good progress had been made, despite hesitations in higher policy regarding the Army, towards elaborating plans for organising and despatching during the first two months of war an Advanced Air Striking Force of twenty Light or Medium Bomber squadrons, in two echelons of ten squadrons each, to advanced bases in France or Belgium. Plans for organising other advanced landing-grounds in south-eastern England and for re-fuelling some of the home-based squadrons at continental landing-grounds had also been sketched out. The war stations of most of the home-based squadrons had been determined. Station organisation had been defined somewhat more exactly by the decision to adopt in war a policy of dispersing aircraft around the main airfields and on satellite landing-grounds within a few miles radius. Signals and maintenance organisation had been looked to. Some at least of the war establishments of squadrons and other units had been reconsidered to meet the increase in Medium Bomber initial establishments introduced by Expansion Scheme F. Arrangements for reserve aircraft parks and acceptance parks, for mobilisation pools, and for bomb storage, had been approved at least in principle, even though some of these things, as bomb storage, remained no more than paper arrangements. A provisional edition of 'Mobilisation Instructions under the Western Plan' (S.D.107) had been prepared and this was supplemented periodically by the Special Organisation Circulars which described in detail the forces available, their dispositions, and so forth, during each current or immediately ensuing Phase. As a result, detailed and fairly reliable information was at all times available, for one Phase of six months ahead, about the number and organisation of mobilisable squadrons, the stations where they would be located in war, the types of aircraft with which they would be equipped, the extent of their reserves of man and material, and the state of training of their crews and readiness in armament and other equipment of their machines. (4) Thus, after the Mobilisation Committee's fifteenth meeting on 22 September 1937 full information of this kind was available

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- (1) Minutes of first meeting, 12 March 1936 - ibid., Encl.17A.
  - (2) Ibid., encl.1A.
  - (3) For their work in this period, see especially A.M. Files S.36151, 36260, 37140, 37536, 37613, 38213, 38217, 38466.
  - (4) For particularly good examples, see the minutes of the 13th and 16th meetings of the Mobilisation Committee, 14 April and 1 Dec. 1937 - A.M. File S.37140/41A, 58A.

for the period of Phase IV, that is until April 1938; (1)  
after its seventeenth meeting on 10 March 1938, for the  
period of Phase V, that is down to October 1938. (2)

The  
administrative  
frame-work

Indeed, when in May 1937 the Air Ministry first began to consider the elaboration of detailed operational plans, the D.D.W.O. felt called upon to point out that "the circulation of C.O.S. 549 does not initiate a new plan as far as the Air Force is concerned, but merely marks a stage in the development of a plan to which we have been working for the past two years. I make this point", he went on, "because it is important that we should all realise how far the administrative side of the plan has progressed during the expansion period ..... We cannot lightheartedly make any change in our plans which would involve an increase in the proportion of the Metropolitan Air Force to operate outside the United Kingdom. The administrative ramifications - extending beyond the Air Force - are too great". (3) In short, by the summer of 1937 the administrative and organisational framework within which the W.A. Plans must be prepared had already reached a stage where it, after its own fashion, could guide and govern operational planning almost as clearly, at least for the immediate future, as did the general framework of policy outlined in C.O.S. Paper 549.

(f) The Evidence and Equipment for detailed Planning:  
Tactical Experience and Doctrine

Tactical  
needs of  
planners

Besides knowing the administrative organisation of the instrument by which the general bombing strategy outlined in C.O.S. Paper 549 would be executed, the operational planners also needed to know the tactical principles upon which its operations would be conducted. Here, progress had been considerably slower, conclusions were less assured, and experience much less informative.

Expansion  
and  
training

Since the beginning of Expansion in 1934 the Service squadrons had had only very limited opportunities for experiment and advanced practice in bombing tactics and technique. The immediate effect of continuous expansion, as was foreseen when Scheme C was introduced, was inevitably to reduce the standard of experience and efficiency. Until the end of June 1937 new squadrons were continually being formed and this entailed the continual transfer of trained crews from those already established to form the nuclei of the new squadrons. Even after all the Scheme F squadrons had begun to form these transfers still continued as new flights were added to bring them up to their appointed initial establishments. In the old squadrons the places of these transferred crews had to be taken by officers from the Flying Training Schools and in the new all but the experienced nuclei had also to be drawn from this same source. Now, there were no operational training units in those days and the shortened courses given in the Schools could provide only a limited instruction. Accordingly the whole burden of the operational training, and a good deal of the burden of completing even the initial training, of these new men fell upon the squadrons.

/The

(1) Ibid., encl. 49A.

(2) A.M. File S.37643 (file not paginated).

(3) Minute of 4 June 1937 - A.M. File S.41432/3.

Resultant  
low  
standard  
of  
squadron  
efficiency

The details of this work, and the system of decentralising responsibility for its planning and execution to Groups, Stations, and Squadrons, lie outside the scope of this Narrative and will be found in the Narrative of R.A.F. Training. But, in assessing the operational efficiency and tactical progress of the bomber force, it must be remembered that the Bomber Command Operational Training Instructions, issued in January 1937, laid a very heavy burden of training upon Groups, Stations, and Squadrons. "During the process of expansion and re-armament, and pending the completion of the new scheme in the Flying Training Schools, it will be necessary for squadrons not only to convert their new pilots to Service types, but also to consolidate and complete the flying and ground training given to pilots and air observers that form part of the Training School Syllabuses. With this in view all units will be supplied with a copy of the syllabus of the Flying Training and Air Observer Schools and will have to test the individual on arrival in the various aspects of his initial training and to supplement it where necessary". To do this, they must give the new crews "ground training in all essential subjects" - armament, navigation, signals, photography, airman-ship, operations and tactics, reconnaissance reports, and station ground defence. Along with this, they must teach them to fly the new Service types of aircraft, for most of which there were at present no equivalent training types. This conversion training, particularly with the twin-engined machines, was in itself a considerable task, hardly to be accomplished in less than two months. (1)

Lack of  
operational  
training

Yet only when all these other things had been done, or largely done, could the new crews begin their operational practices in high and low level bombing, high and low dive bombing, air fighting, night operations, night and poor visibility flying, reconnaissance and photography. Meanwhile, the more experienced members of a squadron found that most of their time was occupied in instructing their less highly trained comrades. The Squadron as a whole was therefore very slow in approaching the standard of operational efficiency prescribed in the Command Operational Training Instructions - of being in "a state of readiness to undertake efficient and sustained operations by day and night against targets at the maximum radius of action of their aircraft, and to defend themselves effectively against enemy attacks", of being able "individually or in formations to navigate accurately to the target both in good and in bad visibility or poor meteorological conditions, ..... to locate the target and to attack it by any appropriate method of bombing". It was much farther still from being able to practise or experiment with any but the more elementary and well-established forms of bombing tactics and bombing technique.

The new  
types and  
their  
problems

Nor was this all. In the second half of 1937, as already mentioned, the new types of fast monoplane bombers - all, except the Battles, twin-engined - were just beginning to come into service. With them, particularly with the Medium Bombers, came all manner of new problems, for they represented what was virtually a revolution in bomber design. Their greater speed, their slower deceleration and turning capacity, their new need for adequate defence against attack from astern and below by even faster eight-gun monoplane fighters, their crews of three or more instead of a pilot and an observer - all these raised a host of questions about the soundness and practicability of accepted tactics and technique and about 'crew policy' (the very phrase was then a new one, not hitherto needed.)

/These

Their lack  
of proper  
equipment

These questions even the more experienced pilots had as yet had little opportunity to investigate. For it was only during the spring and summer of 1937 that the first deliveries of these new aircraft began to reach the squadrons. And, as already mentioned, even then they arrived in a condition of equipment so very incomplete that operational practice with them was almost impossible. How impossible, may be gathered from the report on Bomber Command's preparedness for war written by its new Commander-in-Chief, Air Chief Marshal Sir E. Ludlow-Hewitt on 10 November 1937, (1) a report which repeated and elaborated the representations made two months earlier by his predecessor, Air Chief Marshal J.M. Steel. (2)

Report by the  
C.-in-C.,  
10 Nov. 1937

The real obstacles, he found, were not so much "the lack of experienced personnel, a shortage of airmen in certain important trades, and the lack of amenities and accommodation". These were serious enough. Many junior officers had been compelled, almost immediately after joining the Service, "to assume responsibilities normally reserved for officers of six or seven years' seniority." There were in the Command, for example, 38 Pilot Officers commanding flights in Service squadrons. But in general all, officers and airmen, had "met their difficulties and risen to responsibilities for which they are not really ready in a most commendable manner". The real obstacles were lack of essential equipment, in particular the lack of navigational aids, safety devices, and safety arrangements needed to allow of war training in all weathers.

"In any North European theatre of war bad weather conditions involving cloud, fog, snow, sleet, and heavy rain are prevalent. On the other hand it has long been recognised that decisive air action will ultimately depend upon the power of the Air Force to maintain sustained attack. Sporadic attacks may have a temporary influence upon the conduct of local operations but are unlikely to have any decisive effect on the result of the War, whereas sustained attack directed against well-chosen objectives is the recognised means employed by air forces to achieve decisive results. It follows therefore that an air force can only expect to have a decisive effect in War if it can maintain its operations in all weathers by Day and by Night. A fair weather air force is relatively useless and is certainly not worth the vast expenditure now being poured out upon the air arm of this country. And yet to-day our Bombing Force is, judged from a War standard, practically useless and cannot take advantage of the excellent characteristics of its new and expensive aircraft. It is not too much to say at this moment that Bomber Command as a whole is unable to operate in anything but fair weather, and, moreover, it is not only unable to do so now but little real progress can be made in training Bomber units to operate under the conditions under which they must operate in War until adequate provision is made for the reasonable security of the aircraft and crews undertaking this training, and until the organisation for navigational aids from the ground is adequate to deal with the traffic now maintaining  
.....

The problem facing the Bomber Command is not just to go up over the aerodrome and fly about in a cloud. The Command has to be able to send its units by Day and Night over great distances for anything from five to ten hours, in the air, making the maximum use of cloud to cover their movements, to

/find

(1) B.C. File S.20711.

(2) B.C. File 7813.

find and attack a small and inconspicuous objective situated in the heart of a strange and hostile country. This calls for a high standard of navigation and the utmost confidence not only in flying under the most adverse conditions but also in each individual aircraft being assured that it can find its way safely back to its base. In recent years Civil Aviation has made remarkable progress in providing for the navigation of aircraft through every kind of weather, and to-day the airline pilots of all the leading European and American airlines are capable and accustomed to flying their aircraft for long periods and for great distances through thick clouds, fog, snow, and other adverse conditions. But these pilots depend upon navigational aids and homing devices, combined with an efficient and adequate D/F, meteorological, and control organisation on the ground, which are at present far from being available to Royal Air Force pilots ..... All this is common knowledge and the Air Ministry are well aware of our requirements but it cannot be repeated too often that until these requirements are met the Command cannot begin to get itself up to an adequate standard of War efficiency.

Essential requirements include:-

- (a) The new instrument panel complete in all aircraft.
- (b) A thoroughly reliable energising medium for the instruments.
- (c) Adequate W/T equipment and a W/T operator in every bomber aircraft.
- (d) A homing D/F system from which frequent bearings can be easily and quickly obtained by a pilot or navigator at any time.
- (e) A district meteorological broadcast, reporting at short intervals the height of clouds and the meteorological serviceability of the aerodromes in each district.
- (f) Arrangements to ensure the pilot adequate visibility through the windscreens to enable him to make a safe landing in the worst conditions of weather.
- (g) Adequate accommodation and provision for a navigator and for navigation in all bombing aircraft.
- (h) Arrangements at night to enable any pilot to call for and obtain adequate landing lights to permit him to make a safe landing in emergency at any Service aerodrome in the U.K.
- (k) De-icing.
- (l) A blind landing system such as the Lorenz.

The first five of these items ((a) to (e)) were the most urgently essential."

The new instrument panel, in itself a very great step forward, still lacked some of its instruments. What was more serious, it lacked a reliable energising medium, one that would be safe against freezing and would operate during take-off. Until these items were complete and reliable, it was

/impossible



impossible for crews to practise long distance flights even in fair weather for fear of a sudden deterioration in conditions such as had already caused a number of fatal accidents. Blind flying practice on instruments was still further handicapped by the fact that no aircraft of the new types had yet been fitted with automatic pilots or seemed likely to be fitted in 1937 and that "no blind flying hoods have been fitted or developed for any of the new types of bombers" despite reminders sent from Bomber Command for at least the past year.

The existing General Purpose W/T set was also quite inadequate - if the operator was, for example, engaged in getting meteorological information, no D/F bearings could be obtained. Until this was remedied, it was not possible with safety to send an aircraft to fly above cloud and out of sight of the ground except when it was obvious that there was no danger of the clouds coming to earth on high ground.

The direction-finding organisation was equally inadequate. It was limited to two groups of medium-frequency stations covering between them the whole country, serving all Commands, and already heavily overloaded. No bombers were yet fitted with D/F loops which would make them partially independent of D/F ground stations. The R.A.F. was, in fact, lagging behind civil aviation in these matters and was "a long way from providing facilities in any way adequate to deal with the number of aircraft operating in War nor yet requiring D/F for peace training".

So far as item (e) was concerned, a conference held at Bomber Command on 23 September 1937 had sketched out a scheme for district meteorological broadcasts, giving current weather conditions in each district. But at present only half the bomber stations possessed the necessary meteorological sections and those at reduced establishment; the landline communications were still inadequate even for the present normal traffic; and reliable W/T or R/T communication with aircraft in the air could still not be guaranteed.

Of the other items, the aircraft with which the Command was equipped were dangerously deficient in the matter of the pilot's view from his cockpit and means of keeping the windscreens clear of frost, rain, etc., were still lacking. All the new types of aircraft were very ill-provided with accommodation and facilities for navigation - the Wellesleys, Battles, and Blenheims being especially bad. Night flying equipment such as beacons, floodlights, electric landing T's, and comprehensive obstruction markings, were very slow in coming through and the policy for a system to deal safely with emergency landings quite undecided. Some progress had been made with de-icing devices and towards the preparation of a blind landing system, but neither had yet reached a practical stage at which they could be made available to squadrons.

At the end of 1937, in fact, Bomber Command was still "entirely unprepared for war, unable to operate except in fair weather, and extremely vulnerable both in the air and on the ground". And, as Air Chief Marshal J.M. Steel had remarked at the close of his report, this unpreparedness must continue "until Air Staff at the Air Ministry can co-ordinate the development and experimental work on equipment and arrange for standard equipment to be issued at regular stages to

/meet

meet the present needs of operational units. For this purpose", he had concluded, "I strongly suggest that Air Staff should decide now those items of equipment which are considered necessary for the progress of training, and to make every effort to issue to units the equipment as it stands at present and to avoid further experiments and prolonged delays by specialists."

An example  
of slow  
progress:  
night  
formation

Under these conditions tactical and technical experiment and even practice by the Service squadrons as a whole was certainly not more, and was at many points considerably less, advanced than it had been at the beginning of the Expansion period.<sup>(1)</sup> The story of the development of formation flying by night may be taken as an example. It will be remembered<sup>(2)</sup> that by the summer of 1933 a satisfactory form of station-keeping light had been evolved for such flying. On August 17 of that year Group Captain A.T. Harris, then D.D.O.I., had urged that all night bombers should begin to practise such tactics. He argued that in war, when casualties would soon deprive the bomber force of a large proportion of its trained 'peace' crews, it would be "quicker to teach wartime crews formation flying than to impart the necessary high standard of navigation and night airmanship"; that "formations may be necessary to penetrate well-lighted defences areas wherein the need for heavy development of defensive fire-power may become as real as in daylight"; that on short nights there might not be time or room in a confined area to exert maximum effort if aircraft were sent singly and at intervals; and that, in any event, peacetime practice would ensure readiness to use these tactics if war experience should prove them useful.<sup>(3)</sup> With these views the D.C.A.S. had concurred, stressing especially the third argument from his recollections "that during the war in France one of the strictest limitations to the weight of night bombardment was the impossibility of sending aircraft at greater speed than a minimum of five minutes' interval and even this was generally considered unsafe."<sup>(4)</sup> The Commander-in-Chief of A.D.G.B. however, had entirely different memories of the last War - he did not recollect any occasion "when there was any difficulty in concentrating as many bombers as we required against any target for fear of overcrowding at the objective". He also thought that in war "careful timing, routeing, and allotting different heights to different aircraft will provide the solution to the problem" and at the present he was loath to add to the already serious volume of training work in the night bomber squadrons.<sup>(5)</sup>

1934-7

As a result, on 3 February 1934 the C.A.S. ruled that a single squadron should be assigned to continue the experiments<sup>(6)</sup> and in 1934 No. 58 Squadron (with Virginias) and in 1935 No. 99 Squadron (with Heyfords equipped with automatic

/pilots)

- (1) Above, <sup>CHAP.</sup> Part II.ii. 43-53.
- (2) Above, <sup>CHAP.</sup> Part II.ii. 46-7.
- (3) A.M. File S.32234/1A.
- (4) Ibid., Min.7.
- (5) Ibid., Encl.11A.
- (6) Ibid., Min.14.

pilots) had investigated the more elementary aspects of the matter.<sup>(1)</sup> They had no time to investigate the more advanced problems of flying in formation in or through cloud, of target illumination, and of actual bombing technique. But at least they proved that, at any rate with Virginias or Heyfords, night formation flying was quite practicable in fairly cloud free conditions; that training for it was not difficult for efficiently day-trained crews; and that the lights did not seriously betray the bomber. On 14 February 1936 therefore the C.A.S. ruled that all the new twin-engined types of bomber were to be fitted with station-keeping lights.<sup>(2)</sup> Yet, owing to the training burden already laid on squadrons by expansion and the resultant "dilution of experienced personnel",<sup>(3)</sup> it was not until 24 October 1936 that Bomber Command, at their own request, were allowed to include night flying in formations of not more than three aircraft (and these must be equipped with station-keeping lights) in the normal training programme of all their squadrons<sup>(4)</sup>. Even now another year passed before any training of this kind actually began. Even squadrons equipped with the obsolescent single-engined two seater Hind Light Bombers did not reach until August 1937 a level of proficiency from which they could proceed to practise night formation flying.<sup>(5)</sup> With the new types of single and twin-engined monoplanes just then coming into service, that level was not reached until many months later. For instance, by September 1937 these squadrons were still barely capable of flying in formation even by day<sup>(6)</sup> and even in April 1938 Bomber Command confessed that its Heavy and Medium Bomber squadrons "have not yet reached a sufficiently high standard of training to carry out formation flying at night and that the equipment of squadrons with station-keeping lights has only just commenced."<sup>(7)</sup>

Lack of tactical practice

This story provides a very fair example of the obstacles placed by expansion and re-armament in the way of tactical and technical practice and experiment either by the Service squadrons as a whole or by single squadrons specially assigned. Nor was there any other unit suitable for such work. The experimental establishment did, as will appear later, carry out a few experiments, but they lacked the numbers of up-to-date aircraft and were themselves too busied by the routine work of expansion to do very much. And as yet there was no Bomber Development Unit to do for Bomber Command the work which the Fighter Development Unit did for Fighter Command or the Coast Defence Development Unit for Coastal Command.

Development of tactical theory: the work of the Bombing Committee, 1934-1937

Such tactical and technical progress as did occur during the years between the beginning of Expansion and the Munich Crisis was therefore largely theoretical. Reference has already been made to the establishment and the terms of reference of the Bombing Committee in January 1934.<sup>(8)</sup> By July 1937 this Committee had held fifteen meetings.<sup>(9)</sup> Most of its discussions, however, had related to tactics and

/technique

- (1) Ibid., Encl.17A, 27B.
- (2) Ibid., Min.30.
- (3) Ibid.
- (4) Ibid., Encl.44A, 48A.
- (5) Ibid., Encl.59A, 70.
- (6) Ibid., Min.66.
- (7) Ibid., Encl.113A. A new type of light and a new position for it in the aircraft had had to be designed for these monoplanes - ibid., 61A, 68, 69, 71A.
- (8) Above, ~~Part~~ III.ii. 84-5.
- (9) 1st, 2nd, 3rd and 4th Interim Reports of the Bombing and Air Fighting Committees, upon which, together with the references cited below, the following paragraphs are based.

technique with twin-seater single engined Light Bombers and their somewhat elementary equipment that were fast becoming obsolescent by the second half of 1937. And even so most of their recommendations were both provisional and tentative. They had agreed that bombing methods could be broadly divided into level, pattern, dive, gliding, and 'B' (attack on ships by the projected 'B' bomb exploding below the waterline). They had broached the question of whether the pilot in a two-seater aircraft might not also do the bomb-aiming, so as to leave the observer free to handle the guns. They had recommended that for high level attacks the automatic bombsights, when eventually they came into use, should be scaled for heights up to 25,000 feet and speeds up to 300 m.p.h. and that the course-setting bombsight should be re-scaled for speeds up to 240 m.p.h. They had discussed pattern bombing in the light of trials carried out by Harts against the old Battleship Centurion in 1934 and against motor-boats in 1935, but had come to no conclusion except that the theoretical aspects of the subject needed more thorough investigation before they could decide its real value or the appropriate occasions for its employment. They had formed a fairly firm impression that for dive bombing, at least with Harts, the dive must start from at least 4,000 feet, that its best angle was  $55^{\circ}$ , that the best height for release of the bombs was between 1,500 and 2,000 feet. Their Dive Bombsight sub-committee (eventually merged in a new Bombsight sub-committee in May 1938) had evolved a simple form of sight for this purpose and was considering a more complicated version for which the Admiralty were pressing. These results, however, were largely inapplicable to the new Medium Bombers whose maximum angle of dive was nearer  $20^{\circ}$  than  $55^{\circ}$  and to which the new form of simple sight could not be fitted. The fact that accurate dive bombing appeared to become very difficult when the cloud base was lower than 4,000 feet, had also led the Committee to investigate the possibilities of low level attack - and even of trailing a bomb at the end of a long cable, a method quickly dismissed as impracticable. The preliminary trials of low level bombing by No. 12 (B) Squadron in 1935 and by the Air Armament School in 1936 had evolved methods of approach, aiming, fusing and release which the Committee felt able to recommend for more general use at least by existing types of bomber aircraft and until some better way could be devised.<sup>(1)</sup> Gliding and 'shallow dive' bombing, the methods most likely to be practicable with the newer aircraft, had hardly yet been considered. There had been some discussion about 'B' bombing, based largely upon exercises carried out by Harts against the old Centurion in 1934. No very firm conclusions had, however, resulted, for there were then no 'B' bombs in existence and, if there had been, the Harts could not have carried them.

The Bombing  
Committee  
and night  
bombing

Besides these matters the Committee had also examined (in 1937) the problems and recommended the necessary equipment for bombing up certain types of bombers. It had also had a single discussion, on 5 April 1937, on methods of night bombing and of illuminating the night bombers' target. Here, again, only very tentative conclusions were reached, for there was little experience to go upon. The subject of target illumination had been under desultory discussion between Air Ministry and A.D.G.B. since at least 1932. But severe safety restrictions,

/allowing

(1) A.M. File S.35130 passim.

allowing the dropping of flares only over the sea and with an off-shore wind, had prevented more than a very few flares being dropped. A few trials in 1933 and 1934 had served only to show that the existing 4" practice flare was quite inadequate and further limited experiments with the new 5.5" Service flare in the autumn of 1935 and in 1936 had made clear the problems involved rather than the means of their solution. (1) The Committee could therefore only recommend further investigation, if possible over land, into the possibilities of various types of flare and photographic flash and of using incendiary bombs as ground markers to provide aiming-off points, (2) the latter an idea which Group Captain A.T. Harris claimed to have put forward as long ago as 1921 and which the Germans were thought to be adopting in the Spanish Civil War. The difficulty of finding a 'safe' land area and crews sufficiently experienced - in April 1937 "in 50% of the squadrons there were less than three experienced pilots" (3) - delayed further trials, even with pairs of the 4" flares until January 1938 (4) and the information then gathered was too inconclusive to justify another meeting of the Bombing Committee to consider it. (5) In view of this lack of data about target illumination, the Committee's meeting on 5 April 1937 had produced very little definite progress towards the elucidation of night bombing tactics and technique. The possibility of one aircraft dropping flares for the following aircraft to bomb by and the feasibility of dive bombing by night with the help of flares were referred for further investigation. It was decided to revive the idea and to investigate the practicability of 'aim-off' bombing by night, of taking the aim from some visible object whose position relative to the perhaps invisible target was definitely known. But it was agreed that all these questions and also the questions of low approach to the target and of simple sights for night dive bombing, must be considered and investigated afresh in relation to the high speed mono-planes which in April 1937 were hardly yet beginning to come into service. (6)

Provisional  
nature of  
all the  
Committee's  
conclusions:  
effect of the  
revolution  
in aircraft  
design

This was, indeed, a factor which called in question the validity of all the tentative conclusions so far reached by the Bombing and Air Fighting Committees. The new types of aircraft which were coming into service in 1937 represented, as this Narrative has repeatedly emphasised, a veritable revolution in aircraft design. Their speed, approaching 300 m.p.h. as against the 150 m.p.h. of the Hart; their slower deceleration and shallower diving angle; their considerably increased range; their larger crews; and the new lay-out of their defensive armament - all raised questions which cast upon the suitability to them of the hitherto accepted tactics and technique doubts no less sharp than those raised by the parallel revolution in the design of fighter aircraft and by the improvement in the methods of detection and defence against air attack. Until those questions could be answered, firm

/conclusions

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- (1) A.M. File S.32229/1A to 97A.
  - (2) Trials of these were made at Martlesham in June and July 1937, with inconclusive but not very encouraging results - 3rd Interim Report (quoting A.M. File S.39009).
  - (3) A.M. File S.40568/7A.
  - (4) A.M. File S.32229/134A, 137A to C.
  - (5) Ibid., encl. 152A, 154A, 159A
  - (6) A.M. File S.40568/7A.

conclusions upon bombing tactics and technique could hardly be established. And they could not be answered satisfactorily until the new types of aircraft had come into general use and their capabilities had been tested in practical exercises which very few crews in the bomber squadrons were as yet sufficiently well trained to undertake. The severity of the handicap imposed upon the development of sound tactical theories by the lack of a bomber development unit cannot be better made manifest. Of this handicap the Bombing Committee themselves were well aware for they had already pressed for such a unit at three separate meetings - the second, third, and tenth.<sup>(1)</sup> Without it, they could only with great difficulty and delay test such theories as they did discuss, and on many points they could hardly theorise at all.

Misdirection  
of tactical  
theorising

The theorising of 1934-7 was thus severely handicapped by the problems which the new types of aircraft created and by the lack of a bomber development unit. But it seems clear also that this theorising was to some extent misdirected, or at least directed too exclusively towards a single narrow aspect. In the first place, as Mr. H. Tizard remarked as late as November 1938, "relatively too much work has been put into what you do when you find the target and too little on the actual finding of the target".<sup>(2)</sup> It is difficult, looking back, not to feel that some better employment might have been found for the Bombing Committee, or for some alternative to it. For example, it might well have considered, from a theoretical point of view but in the light of what was already known about the probable speed, range, and performance of the new types of aircraft, the problems of accurate long-range navigation, of navigational aids for all-weather operations at maximum range, of speeding up the technical aids to accurate target location by night and examining more thoroughly the best tactics for ensuring it by day.

Neglect of  
navigational  
problems

It is hardly wisdom after the event to suggest that the Air Staff and its subordinate branches showed in this matter a marked lack of imaginative forethought. By a little hard and logical deduction from their often repeated strategical doctrines and from what they knew about the new aircraft already, they might well have anticipated and provided in time for most of the urgent requirements which the Commander-in-Chief of Bomber Command had to demand in November 1937. Considerable thought and experiment were, of course, being devoted to these matters. But as a rule, the thinking was the product of pressure from practical necessity rather than of intelligent anticipation and forethought. It had begun too late and its results were not available by the time the squadrons were beginning desperately to need them.

As late as September 1937 the C.A.S. could note that "during the last six months ..... greatly increased attention has been given to navigational problems."<sup>(3)</sup> It was only at the beginning of that year that the courses at the School of Air Navigation had been re-organised to provide eventually one specialist navigation officer for each bomber flight.<sup>(4)</sup> It was, again, only then that the first doubts had arisen about

/wireless

- (1) Minutes of 2nd., 3rd., and 10th Meetings; also A.M. File S.43442/25A.
- (2) A.M. File S.47632/8A.
- (3) A.M. File S.40110/11A.
- (4) A.M. File S.25873/VIII/9A.

wireless aids as a panacea for all the night bomber's navigational difficulties. It was only in June 1937 that these doubts led to the establishment at the School of a three weeks' course in astro-navigation for all bomber pilots; to the production of astronomical ready reckoning tables; and to the decision to order hatches for astronomical observation in all the new bomber aircraft. (1) Modifications to secure a better view from the aircraft had also to be made once navigational problems began to receive attention. As a result, the production of Hampdens had to be retarded by three months to allow the design and fitting of a new nose. (2) Other modifications to improve navigational facilities in other types had also to be made after they were already in full production: the first models had to be accepted unimproved and with some types, such as the Battle, improvement was almost impossible.

It was the same story with navigational instruments and aids. By the end of 1937 the new instrument panels were still incomplete and their energising medium unreliable. Only a few of the new Battles possessed any blind-flying equipment. (3) The inadequacy of the ground installations and aircraft sets for wireless and direction-finding has already been referred to, D/F loops, though their general adoption had been decided upon in 1935, were not sufficiently perfected to be ordered in quantity until the summer of 1937 and had not yet been fitted to any bomber aircraft by the end of the year. (4) Experiments in blind landing by radio had been made in 1936, specifications had been prepared in the summer of 1937 for equipping a dozen stations with the Lorenz apparatus, but there seemed no prospect of its general installation before the autumn of 1938. (5) Schemes for the development of a system of landing lights on runways to work in conjunction with the Lorenz beacons were only just beginning to be considered. (6) The slow progress in discovering methods of illuminating the night bomber's target and the patent inadequacy of the existing flares, have already been referred to.

Much of this delay was admittedly due to the growing congestion of technical production and design. But it seems hardly less true that, as the Commander-in-Chief of Bomber Command remarked, (7) this congestion itself was in a large measure the result of faulty planning and unco-ordinated thinking. It is, in fact, difficult not to agree that much of the Bombing Committee's work had been misdirected. Its time had largely been devoted to discussing tactics in the narrowest sense, to considering methods for the final approach to the target, for bomb-aiming and release, and for bombing and defensive fighting formations - the very questions upon which theories were most liable to be upset by the introduction of the new types of aircraft. As a result, the wider and more profitable problems, of how to find the target rather than of how to attack it when found, tended to receive adequate and co-ordinated attention only when they were at last thrust under the very nose of higher authority by the approach of Bomber Command's squadrons to the level of proficiency required for operational exercises of a realistic nature. And by then it was too late for timely action to be taken to solve them.

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- (1) *Ibid.*, encl. 13A.
  - (2) A.M. File S.40110/4A, 10A.
  - (3) Minutes of 16th meeting of Mobilisation Committee, 1 Dec. 1937 - A.M. File S.37140/58A.
  - (4) A.M. Files S.25873/VI/12B, 32A; VIII/29A; S.37140/58A.
  - (5) A.M. Files S.25873/VIII/9A, 29A; S.37140/58A.
  - (6) A.M. File S.25873/IX/8A.
  - (7) Above, p. 163.



Neglect of  
bomb  
problems

In the second place, there seems to have been much truth in a remark made by the Deputy Director of Plans in October 1937, that "we appear to be neglecting practical research and experiments bearing on the relative vulnerability to air bombardment of various kinds of targets and on the types of bombs and tactics which will bring about the destruction with least expenditure of effort of each type of target".<sup>(1)</sup> It is true that the Bombs sub-committee of the Bombing Committee had reviewed the classes of targets likely to be met with and the types of bombs most likely to prove effective against each class; that its recommendations had been approved by a conference held by the C.A.S.;<sup>(2)</sup> and that by the middle of 1937 most of the bombs which it had recommended were beginning to become available. But that conference had taken place on 30 September 1935. In 1937 its decisions still governed most of the Air Staff's bomb policy, despite the changes of the past two years. The 500 lb. bomb was, for example, still regarded as the largest that would be needed for any target except a well-armoured battleship, against which it might be necessary to employ the 2,000 lb. A.P. of which designs, but no actual bombs, existed thanks to the insistence of the Admiralty.<sup>(3)</sup> Moreover, nearly all the conclusions of the sub-committee and the conference were theoretical. There had been little or no attempt to determine by practical experiment whether, for instance, two 250 lb. bombs would - as in 1935 the Commander-in-Chief of A.D.G.B. had maintained and the Air Staff had denied - would do more damage to a factory building than four 120 lb. bombs.<sup>(4)</sup> It was, again, only in May 1936 that a small committee was set up - by the Home Office and at the instance of Sir Maurice Hankey! - to plan experiments to test the effectiveness of incendiary bombs against oil-storage tanks.<sup>(5)</sup> Such examples might be multiplied, but these two will serve to show how little practical experimenting there had been even in matters which did not require the actual dropping of live bombs by skilled crews from up-to-date aircraft.

Weaknesses  
of British  
tactical  
problems

The Bombing Committee had started off full of quite good intentions, to take matters in their logical priority by studying the character of the probable targets first, the kinds of bombs best suited to each of them second, and the aircraft required third.<sup>(6)</sup> But in the event its attention had been largely absorbed by problems of tactics in the narrowest sense and of these tactics chiefly on relation to existing and obsolescent aircraft. As a result, British bombing policy at the end of 1937 was still a curious mixture of sound strategical generalisations with somewhat vague and ill-tested notions upon the exact methods and equipment required for their tactical execution. It was only just beginning to show a real understanding of the true nature and full magnitude of its

/problems.

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- (1) A.M. File S.42731/1.
  - (2) A.M. File S.35247/14A and B.
  - (3) A.M. File S.35247/14B.
  - (4) *Ibid.*, encl. 1A., 5B., 11A., 12A., 14B.
  - (5) C.O.S. Minutes, 175th Meeting (2).
  - (6) A.M. File S.35247/3.

It had shown hitherto a marked slowness in settling down to hard, precise, and co-ordinated thinking about the detailed implications of its somewhat magniloquent premises. The broad strategical aim was clearly seen; the tactical and technical means and methods needed for its accomplishment had not been so clearly thought out.

The Manual  
of Air  
Tactics

This does not, of course, mean that the R.A.F. had no definite tactical doctrine for a bombing offensive. On the contrary, the new Manual of Air Tactics and the revised editions (May 1937 and January 1938) of Air Staff Memorandum No. 57, now known as Secret Document 116, laid down a very clear doctrine. The primary role of the Bomber squadrons was there defined as "the attack by high level bombing of targets on land". In addition, all squadrons were to be capable of carrying out low level and high or low dive attacks. They were to be prepared to attack in these various ways either individually or in flight or squadron formation, by day or by night, in good weather or poor weather. The Manual laid down fairly exact rules for each form of attack and specified in some detail the types of target against which each form would be most suitable and effective. The exact nature of the bomber formations had also been settled in 1937 - box formations of five aircraft each for the old biplane types; 'vic' formations of three aircraft each, or double 'vic' formations one slightly astern and above the other, for the new monoplanes. (1) It is true that the Bomber Command Instructions for Operational Training in 1938 had to make certain exceptions to these general rules. Both high and low dive bombing were for that year to be regarded as only experimental methods for the new monoplanes. The obsolescent Hind Light Bombers and, pending further experience, the single-engined Battle Light Medium Bombers and even the twin-engined Blenheims were to bomb only by day, though they were to be able to take off, fly, and land in darkness. The old Heyford and Hendon Heavy Bombers were not to be used by day against well defended targets. These, however, were only temporary exceptions to be permitted during 1938 because re-equipment with modern machines was still not completed and because experience with those new machines was still very limited. The general tactical doctrine of the Manual was in no way impaired by them. It stood as a clear, detailed, statement of the various methods by which the general strategical aim should be accomplished against various kinds of targets.

Uncertain  
foundations  
of these  
doctrines

At the end of 1937, then, the R.A.F. Bomber Force apparently possessed a coherent tactical doctrine. But that doctrine lacked firm foundations. It was based neither on adequate practical experience nor on thorough scientific investigation. There was no bomber development unit. Bomber Command had been expanding too fast to spend much time in experimenting with tactics and equipment and its training had been too limited for its squadrons to discover or investigate any but the more elementary tactical problems. Meanwhile, theoretical investigation had been too narrowly focussed upon a single aspect, the actual process of bombing a target when found. And there had been little attempt to give to the problems of air offence the concentrated and co-ordinated scientific study which had for several years been devoted to the problems of air defence.

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(1) A.M. File S.25873/LX/8A; 3rd Interim Report of the Bombing and Air Fighting Committees.

The  
Committee  
for the  
Scientific  
Survey of  
Air Offence

It was only slowly that the need was realised - or the means and time became available - to remedy these weaknesses. The first step was the establishment in January 1937 of a Committee for the Scientific Survey of Air Offence, parallel to the Committee for the Scientific Survey of Air Defence and under the same chairman, Mr. H. Tizard. (1) That Committee, however, could hardly make great progress until the Service authorities began to get a clear idea of problems which needed investigation. What was required now was some co-ordinating and guiding body, equivalent on the offensive side to the Home Defence Reorientation sub-committee on the defensive side. It was not until March 1938 that this was provided, in the new sub-committee on Bombing Policy which was then brought into existence.

The Bombing  
Policy sub-  
committee  
March 1938

This new sub-committee was composed of the Deputy Director of Operations and representatives of the Directorates of Supply and Development, Armament Development, and Training, of the Deputy Directorate of Operational Research, of Bomber Command, and of the Armament Group. It was "to consider from the tactical standpoint, the policy which is to be adopted in regard to different methods of bombing, taking into consideration the characteristics of modern aircraft; the end in view is the guidance of research into, and the technical development of, the most suitable aircraft and apparatus for the satisfactory execution of the methods of bombing decided upon". (2)

Air Staff  
Note on  
Bombing  
Policy

'Precise  
targets' and  
'Target  
groups'

These terms of reference clearly imply that the tactical doctrines and the technical requirements of the British bomber force were at the beginning of 1938 less firmly founded than the Manual of Air Tactics might suggest. This becomes even more clear when we examine the minutes of the sub-committee's first meeting (22 March 1938) (3) and the Air Staff Note on Bombing Policy (4) which served as its agenda. The Air Staff Note started from the premises that the R.A.F.'s primary role was the destruction of an enemy nation's war-making power and that its primary weapon for this purpose was the bomb. The enemy nation's war-making power would depend on three vital factors - (1) 'morale', with its material bases in houses, in water and gas and electricity and food supplies and in social and medical and sanitary services; (2) economic and industrial organisation; and (3) armed forces, with their bases and lines of communications. Broadly, therefore, there were two types of objective for the bomber force - 'precise targets' and 'target groups'. A target group would be the easier to deal with. Whatever it was - docks, an industrial town, part of a large city, a military concentration area, or a storage or distributing area - it would be of considerable size. In it there would be "many targets of equal or nearly equal importance on which accurate bombing is not necessary in order to achieve valuable hits". 'Precise targets', on the other hand, would be small - a power station might be, say, 100 x 65 yards, a bridge 100 x 10, a ship 200 x 30. Direct hits would be needed to put them out of action and "this is our hardest task". Yet such targets were of the highest importance. Successful attacks upon them were essential whether the aim was to weaken 'morale', to disrupt economic and industrial organisation, or to impede the enemy's armed forces. The final test of the bomber force's tactics and equipment must therefore be its ability to encompass the destruction of 'precise targets'.

/Would

- (1) A.M. File S.40130/1., 10A.
- (2) A.M. File S.43442/1, 5A.
- (3) Ibid., encl. 25A
- (4) Ibid., 20F.

Precise  
targets  
considered  
too  
difficult  
for high  
level attack

Would the established tactics and equipment of the British bomber force pass this final test? To this question the Air Staff Note returned a very doubting answer, an answer which shows how uncertain were the foundations of the established doctrine. That doctrine, it will be recalled, laid down that the primary task of all the bomber squadrons was "the attack by high level bombing of targets on land", and it was for this task that the bomber force had been primarily designed. But the Air Staff Note expressed the opinion that "high level bombing, after many years of development, has failed as an effective and economical means of destroying the 'precise target' and as such should be discarded by the Air Striking Force. The Air Striking Force should therefore be trained and equipped in high level bombing to attack the 'target group' only, with incidental simplification and saving in tactics, training, and equipment". In support of this opinion, it was pointed out that, to judge from recent experience at Armament Training Camps and in Combined Exercises, even day bombers were unlikely to achieve an average error of less than 150 yards - in the 1935 Exercises it had been 508 yards. With the night bombers the error was sure to be much greater - indeed, in 47 raids made during the 1937 Combined Exercises, only one sashalite had been fired near enough to the target to be plotted at all and even then the point of impact of this attack had been calculated to be 1,890 yards wide of the mark. There seemed no prospect that improved equipment, such as the automatic bombsight, would appreciably reduce this margin of error, especially now that much faster aircraft were coming into service and the improvement in the accuracy of anti-aircraft gunfire was threatening to make necessary a shortening of the run-up to the target. Therefore, although development must go on and some squadrons at least must still be trained in high level attacks on 'precise targets', it seemed doubtful whether "we can afford the bombing effort in war, and time required, to destroy the 'precise' target by adopting this method of attack".

The  
Bombing  
Policy  
Committee  
not willing  
to abandon  
high level  
attacks on  
'precise  
targets'

Hopes of  
improvements  
in accuracy

The Bombing Policy sub-committee was reluctant to endorse these pessimistic conclusions, not because it failed to recognise the force of the arguments behind them, but because it felt that the possible means of improving high level accuracy had not been by any means properly investigated. It was agreed that improvements in instruments and improvements in the bomber's view would probably be cancelled out by future developments in aircraft speeds and so forth. But the worst errors at practice camps were known to be due to faulty target identification and to incorrect wind-finding. Might it not be possible, therefore, as Air Chief Marshal Sir E. Ludlow-Hewitt (who himself represented Bomber Command at this first meeting) suggested, to reduce these errors by a proper system of 'briefing' before a raid? Certainly, "an Intelligence Officer at each station was badly needed for this and other allied purposes". Again, might not a single aircraft be sent ahead of the bombing formation, as the C.A.S. had suggested, to locate the target? Admittedly, the timing of this would be difficult and the single aircraft would be very vulnerable. It might also prove to be rather like the idea of one night bomber dropping a flare for a following machine to bomb by - "theoretically it seemed promising, but it did not work out in practice".<sup>(1)</sup> Nevertheless, the idea of a single target-finding aircraft going on ahead had never been tried in practice. The sub-committee agreed therefore that Bomber Command should put it to practical test and until that test was made, it could not be entirely ruled out. Here then, were two ways, both still untested, by which greater accuracy might be secured.

/Nor

(1) A.M. File S.32229/152A. See also Bomber Command Final Report on trials by Hinds with pairs of 4" practice flares, 14 April 1938.

Nor were these the only possibilities. Parachute bombs, with a trajectory nearer to the vertical, might also assist. Experiments with small bombs of this sort were already producing promising results. Above all there was the possibility of 'pattern' bombing. It is true that Mr. R. S. Capon, representing the Deputy Directorate of Research and Development (Armaments), showed by his attitude that his Branch had little use for and less faith in this device. But pattern bombing had as yet been neither adequately tested in practice nor thoroughly investigated in theory. Discussion about its practicability as a means of improving bombing accuracy had, it is true, now gone on in desultory fashion for some years. But no practical trials of the method were now being made, for the rather elementary Bomber Command experiments had been suspended owing to the experimenting squadron's other commitments. Theoretical discussions were equally at a standstill and the old Bombing Committee's sub-committee on Pattern Bombing had so far not met. Here then was another way, untested and largely unexplored but attractive at least superficially, by which the inaccuracy of high level bombing might perhaps in some measure be remedied. Until all these various possibilities had been tested and proved inadequate, no one could confidently pronounce high level attacks to be useless against 'precise targets'.

Objections  
to other  
methods

Low  
level

Nor was it possible to settle the question by pointing to some other method of attack whose practicability and success were proved beyond doubt. Low level bombing certainly offered, *prima facie*, an attractive solution to the problem of the 'precise target'. It required comparatively little training. It was relatively accurate. Even in 1937, when no sights existed for low level bombing, the average margin of error for trained crews from an altitude of 2 to 300 feet was not more than 50 yards. The method could be used in conditions of poor visibility. It could be used when the cloud base was low - and as Group Captain Don pointed out, in Germany it was possible on 93% of all the days in a year to see five miles from a low level, while treacherous fogs were rare. But low level bombing had its drawbacks. There was the major difficulty of navigating at low level and high speed over long distances and of locating the target at the end of the journey. There was the doubt whether a bomb dropped from a low altitude by a bomber in level flight would penetrate a target sufficiently even if the aim were accurate. Whether a 500 lb. D.A. bomb, for example, dropped from 3 to 500 feet would destroy a power house, the Air Staff Note could not say; but certainly it would not penetrate a masonry bridge or an armoured ship. And, above all, there was the problem of the balloon barrages which must be expected over all important targets and which might be met with as high as 5,000 feet. Until some effective antidote to the balloon could be found - a question that was now referred to the scientists - the sub-committee could not recommend low level attacks as the solution of the 'precise target' problem.

Dive  
bombing

Nor could dive bombing be accepted as the certain solution. The objections urged against low level attacks were no less valid against diving attacks. Moreover, dive bombing was at this moment in an experimental and transitional phase. It was still very open to doubt whether the new monoplanes could execute steep dives, and their greater speed made steep diving seem less necessary for them than for the old slow biplanes. They had therefore recently developed a new method, of approaching the target in a 'shallow dive' at an angle of some 20°. This shallow dive, the Air Staff Note thought, might now replace the former steep dive. The sub-committee

/did

did not, however, feel that enough was yet known about the comparative advantages of the two methods for a decision to be taken without considerably more practical experiment under scientific supervision. They felt, too, that the objections which could be urged against both steep and shallow dive and low level tactics made it impossible for them to advocate the general abandonment of training in high level 'precision' bombing. "The ideal of any bombing training must be to hit a point". Training therefore must go on in the old way and no vital changes were called for in bombing equipment, in aircraft characteristics, or in the principles of the instruction now given to bomber crews.

Urgent  
need for a  
Bomber  
Development  
Unit

Yet if the ideals expounded in the Manual of Air Tactics, and sought after in the latest bomber aircraft designs, remained unaltered after the sub-committee's first discussion, this was not because their discussion had made firm their foundations. On the contrary, the reason why the crews and aircraft must still be prepared to attack the 'precise target' from high level and low, by steep dive or shallow, was to be found in the general ignorance about the effectiveness and practicability of all these methods. No one really knew which method would be feasible and effective under war conditions. Therefore the crews must be equally skilled in them all. If war came soon, they would have to learn by trial and error which method to use on each operation. The discussion did therefore reveal an urgent need for immediate practical experiment. It "showed a strong feeling that insufficient attention was being given to the solution of..... bombing problems, and the opinion was expressed, and met with universal support, that there was a crying need for a Bombing Development Establishment which could concentrate on the necessary experiments, and which would perform functions in respect to bombing similar to those performed in respect to air fighting by the Air Fighting Development Establishment. The solution of the pattern bombing problem, for instance, could be entrusted to such an establishment. The functions of this proposed establishment were not discussed in detail at the meeting but it was decided to record a strong recommendation that the question be further and fully explored as a matter of urgency. It was mentioned that a similar proposal had been mentioned at the 2nd, 3rd, and 10th meetings of the Bombing Committee, but nothing had eventuated".

Uncertainty  
over tactical  
questions

This time something was to eventuate. But even now it eventuated very slowly. All through the summer and autumn of 1938 discussions were to go on about the desirability of setting up a Bombing Development Unit.<sup>(1)</sup> Yet the Unit itself did not come into being until after the Munich crisis. Until then - and indeed for long after - the doubts and problems which had troubled the Bombing Policy sub-committee at its first meeting remained unanswered and unsolved. For, in the circumstances of rapid expansion, of inadequate training, and continual re-equipment, only a Bombing Development Unit could answer and solve them. The Deputy Director of Operations remarked, in May 1938, that if there had been a Bombing Development Unit, there would hardly have been any need for a Bombing Policy sub-committee, for the Unit "would provide the answer to the factors which directly control policy." But there was no Bombing Development Unit. Without it, the sub-committee could only ask questions to which it was seldom possible to give definite answers. Thus throughout the

/period

period with which this chapter is concerned, the foundations of Bomber Command's tactical doctrine had perforce to remain virtually untested by practical experiment with up-to-date aircraft. A large question mark had to be left beside each of the major tactical assumptions of the strategical planners.

(g) The Evidence and Equipment for detailed Planning:  
Target Intelligence

Progress  
since  
1933

Besides knowing what would be the future strength, organisation, and tactics of the British bomber force, the operational planners needed also to have detailed and well-digested information about the targets in Germany which it could most proficiently attack. In this matter considerable progress had been made since 1933.(1) The investigations of the Joint Intelligence Committee and the Committee of Imperial Defence sub-committee on Industrial Intelligence in Foreign Countries had since that date been very largely, though by no means exclusively, concentrated upon Germany. Their work had been supplemented since the beginning of 1936 by a new standing sub-committee on Air Targets Intelligence.

The Air  
Targets  
Intelligence  
sub-committee,  
1936

This new sub-committee - a direct result of "the vast extension of the zone of operations that has been brought about by the advance of aviation"(2) - had been set up by the Committee of Imperial Defence on 30 January 1936.(3) It was composed of Sir Edward Crowe; the Deputy Directors of Intelligence from the Admiralty, War Office, and Air Ministry; and the head of the Industrial Intelligence Centre. Its terms of reference authorised it "to supervise co-ordinated interchange of information and reports between the Defence Departments and other Departments concerned in relation to air targets intelligence in foreign countries"; to co-opt Service and civilian experts to help in its work; to select, classify, study, and report upon the various types of targets most suitable to be attacked. It was to register all its information in such a manner "as to facilitate the selection of suitable targets for the Government's approval and to have immediately available information which the Air Force require to take immediate action against those objectives which the Government may decide are to be attacked". This information was to be tabulated and filed to conform to Air Staff requirements. The sub-committee thus filled a very serious gap in the air intelligence system, a gap which the Air Ministry and the other Defence Departments were by their nature hardly qualified to fill for themselves.(4)

Its surveys  
of German  
targets

By July 1937 the fruits of this wise foresight were almost ready for the operational planners to garner. The Air Targets sub-committee had by then already issued an appreciation upon certain groups of German industries and military

/targets.

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- (1) See above, <sup>chap</sup> Part II.ii.35-6.  
(2) C.O.S. Paper 420 D.C.  
(3) C.I.D. Minutes, 273rd Meeting.  
(4) D.C.O.S. Report on central machinery for co-ordination of intelligence, 1 Jan. 1936 - C.O.S. Paper 420 D.C.;  
4th Report of sub-committee on Industrial Intelligence,  
22 July 1936 - C.I.D. Paper 1248-B.



targets. It had in addition almost completed comprehensive surveys of the vulnerability to air attack of the German industrial system as a whole and of German military and naval organisation.<sup>(1)</sup> These bodies of digested target information represented a very considerable improvement in the intelligence position as compared with 1933. The Air Staff now had at their disposal a considered survey of the industrial geography of Germany - of the location of German industries and factories, of the precise nature of the German transport and communications system by road, rail, and inland waterway. It had, in other words, most of the essential target information required for the detailed operational planning of an offensive against the German war economy and its lines of communication.

Intelligence  
deficiencies

There was also available a good deal of detailed and digested information about the strength, equipment, and peace-time organisation of the German armed forces. But here the situation was less satisfactory, all the more so as in C.O.S. Paper 549 attacks on the German air striking force and Army were given priority over attacks upon the German industrial system. The real difficulty here was to obtain reliable information - or, indeed, any information - about the probable war dispositions of the German air and land forces, more particularly of the air striking force. This was a problem of which the planners were very soon to become acutely conscious. It was also a problem very difficult to solve in time of peace. Factories, industrial establishments, roads, rail and waterways, were comparatively permanent features. Where they were in peace, there they would mostly be in war, at least during the opening months. They were also comparatively easy to discover, by actual observation or from trade and other publications. But the war stations of the German air striking force were less obvious and less public. The British intelligence services had found it extremely difficult to locate or identify any of them.

Lack of  
progress in  
air recon-  
naissance

Besides, the Germans would undoubtedly have a very considerable number of airfields to choose from and it was by no means certain that their choice would be made long in advance of the beginning of hostilities. This, then, was essentially a task for war-time reconnaissance rather than for peace-time intelligence - and in the matter of systematic air reconnaissance the R.A.F. seems to have given by 1937 little more serious thought than by 1933.<sup>(2)</sup>

Lack of  
organisation  
for dis-  
tribution of  
intelligence

This, however, was a need that came to be recognised only when planning began. The failure to recognise it earlier was responsible for another defect. This was the lack of any organisation for making readily available to squadrons the target intelligence possessed by the higher authorities. We have already seen the Commander-in-Chief, Bomber Command, in the autumn of 1937 stressing the need for a resident full-time Intelligence Officer on every bomber station.<sup>(3)</sup> Such Station Intelligence Officers were urgently needed if pilots were to be adequately briefed before, and adequately interrogated after, a raid or a reconnaissance. In this matter the R.A.F. was still badly over-centralised and the need for specialist Intelligence Officers actually on the stations was only just beginning to be

/recognised.

(1) 5th Report of sub-committee on Ind. Int., 5 July 1937 - C.I.D. Paper 1338-B; J.P.C. Progress Report, 11 June 1937 - C.O.S. 597 J.P.

(2) See the Narrative of Photographic Reconnaissance prepared in this Branch.

(3) Above, p. 172.

recognised. Here, as in other matters, it was only slowly that the Service was beginning to grasp the full implications of a truly long range bombing offensive and to outgrow the somewhat casual habits formed in the short range 'army co-operation' war of 1914-1918.

These defects in the organisation for reconnaissance and for the distribution of intelligence to units were, however, more serious from the point of view of war-time operations than from that of peace-time planning. Despite them, the Air Staff in 1937 possessed a far more detailed and more readily accessible body of information about its potential enemy than had ever before been available to it in its planning.

(h) The Beginnings of Detailed Operational Planning,  
May to December 1937

C.O.S. Paper  
549

With the issue of C.O.S. Paper 549 British bombing policy in the event of a German war was finally defined and established. In its main lines and intentions that policy was to be changed surprisingly little in the ensuing years. In its timing, methods, and emphasis, however, it was to undergo considerable modifications even before the actual outbreak of war. The actual occasion of the more important of these modifications was the Munich Crisis of September 1938, but the causes lay deeper and farther back in time. Not least among them was the sobering influence of the work of preparing detailed operational plans which began with the reception by the Air Ministry of the instructions of 13 May 1937.

Procedure  
for detailed  
planning:  
work of Air  
Ministry  
branches

That influence did not perhaps make itself felt at once, for there was a considerable delay before detailed operational planning in fact began. The procedure adopted - and necessarily adopted in an Air Force where intelligence and planning services were so highly centralised - threw the bulk of the preliminary work upon Air Ministry departments which were already overburdened with matters of expansion, equipment, and administrative preparation. A minute written by the Deputy Director of Plans on May 28<sup>(1)</sup> makes clear what this procedure was - his proposals received only minor modifications during the ensuing months. In accordance with this minute the Deputy Director of Plans and the Deputy Director of Operations first defined what detailed plans were needed to implement the requirements of C.O.S. Paper 549. Next the Deputy Director of War Organisation checked these to see that they were administratively practicable. He further provided all the information needed about the probable strength and dispositions of the forces and reserves available for their execution. "Up to this point, the D.D.Plans says what we want to do and the D.D.W.O. says what we have got to do it with."

The subsequent stages really amounted "to the production of lists of objectives under a number of different headings, from which the C.-in-C. Bomber Command will select the suitable ones when the time comes". This was the Deputy Director of Intelligence's job. He produced "the detailed information necessary to put the plans into effect". With the help of the Air Targets Intelligence sub-committee, he collated and made available information about the German Army, the German Air Force, and " 'diversionary' objectives - vital centres attack upon which will (or anyway may) draw off or contain superior

/detachments

(1) A.M. File S.41432/1.

detachments from the main German Air Force supporting the invasion". After this the Deputy Directors of Intelligence and of War Organisation had to take into account such information as was relevant, or available, about the dispositions and intentions of the British Field Force and of any Allied military or air forces.

Work of  
Bomber  
Command

All this preliminary material was eventually assembled by Plans 3 and passed to Bomber Command. There a small planning staff under a Group Captain (Plans) then began to prepare the plans themselves, "going into detail as far as possible in the direction of the production of actual operation orders, leaving blanks where necessary - subject of course always to the proviso that the plans must remain completely flexible, the actual objectives for attack must be left to be decided in accordance with circumstances at the time." The plans had of course also to be drawn up "within the administrative limits arranged by D.D.W.O. and if Bomber Command wants these administrative arrangements modified (supposing they want to alter the war stations of any of their squadrons, or something of that sort) then they will have to get D.D.W.O.'s approval to ensure that the modification is administratively practicable".

When the Command planners had finished their task, the completed draft plan was "submitted to D.D.Plans for communication to the Joint Planning Committee for co-ordination and indexing and inclusion in the proposed sort of Joint Planning Book". The general arrangement was, in short, that "Plans Air Ministry acts as a co-ordinating agency and clearing house between the various departments in the Air Ministry, other Ministries, and Plans Bomber Command. And Plans 3 will be a sort of liaison officer with Bomber Command".

Delays at  
Air Ministry

Such a procedure meant that no progress could be made in preparing the plans themselves until the Air Ministry departments had completed their preliminary work and until Bomber Command had obtained its planning section. There was considerable delay over both these matters. The proposals of the Deputy Director of Plans were quickly accepted by the Air Ministry departments concerned, (1) and at the same time the Commander-in-Chief, Bomber Command, was informed of his Command's part in the work. (2) At Air Ministry, however, it was not until October 1937 that any real progress was made towards providing even the first requirement - a list of the detailed plans needed and their order of priority. It is true that the Deputy Director of Plans had suggested certain priorities in a paper of August 10, (3) but it was not until October 1 that his proposals were discussed and finally approved at a conference with the other Deputy Directors who were concerned with them.

Conference  
to settle  
priorities  
1 Oct. 1937

At this conference the list of plans required was divided into four groups. This grouping followed broadly the lines suggested by the Deputy Director of Plans on August 10, though with considerable differences in detail. (4) In their original form the four groups were made up of the following plans.

/Group I

- (1) D.D.Ops. June 2 - A.M. File S.41432/2; D.D.W.O. June 4 - ibid., min.3; D.D.I. June 8 - ibid., min.4.
- (2) See his reply, June 7 - ibid., encl.27A. He was later, on Aug.10, sent a copy of the extracts from C.O.S. Paper 549 - ibid., encl.14A.
- (3) Ibid., encl.16A. He then hoped to get to Bomber Command by Sept.1 the materials for a plan for attacking the German Air Force.
- (4) A.M. File S.41432/16A, app.B.

Group I was to consist of four plans. Two of these were primarily the concern of Bomber Command - that for attacking the German Air Force and its maintenance organisation (designated Plan W.A.1) and that for attacking the concentration areas of the German Army and interrupting its communications in an invasion of Belgium, Holland, or France (Plan W.A.4). Two were primarily the concern of Coastal Command - that for reconnaissance in co-operation with the Navy in home waters and the eastern Atlantic (W.A.2) and that for co-operation with the Navy in close convoy protection in the same waters (W.A.3).

All the plans in the other Groups were primarily the concern of Bomber Command. Group II was to contain a plan for attacking German air manufacturing resources (W.A.5) and one for a counter-offensive in co-operation with the Navy against the bases of the enemy's surface, submarine, and air forces operating against British trade (W.A.6). Group III included plans for attacking specially important depots or accumulations of warlike stores other than air (W.A.7); for putting the Kiel Canal out of action (W.A.8); and for destroying shipping and facilities in German mercantile ports, particularly those in the Baltic (W.A.9). Group IV covered the less specifically military or air objectives with its plans for attacking German war manufacturing resources other than air in the Ruhr, Rhineland, and Saar (W.A.10) and elsewhere in Germany (W.A.11); for attacking the German fleet or a section thereof either in harbour or at sea (W.A.12); and for attacking German headquarters and administrative offices in Berlin and elsewhere (W.A.13).

List of  
W.A.Plans  
1937-8

Further discussion led to certain modifications, conflation, and additions to this original list. A tendency also appeared to abandon the division into groups in favour of a straight list of numbered plans. Thus of the three plans for attacking German war industry in the Ruhr and elsewhere, one (originally W.A.5) was conflated with W.A.1 and the other two (the old W.A.10 and 11) were amalgamated and promoted to fifth place as W.A.5. The old W.A.7, with oil storage depots emphasised among its primary objectives, was moved up one to become W.A.6. The original W.A.6 became W.A.7. A new W.A.8 was put in, to deal specifically with night attacks. As a result the Kiel Canal plan moved down one and became W.A.9 and the plan for attacking mercantile ports became the new W.A.10. Finally a new plan - though one which had been intermittently considered ever since 1920 - for the destruction of enemy forests and crops was added as the new W.A.11. With these changes the list of the Western Air Plans, as they existed down to at least the Munich Crisis, reached its final form. In this form therefore it may be now convenient to tabulate them.

- W.A.1 - attack on German Air Force and its maintenance organisation and allied industries (A.M. File S.42728)
- W.A.2 - reconnaissance in home waters and the eastern Atlantic in co-operation with the Navy (S.42729)
- W.A.3 - co-operation with the Navy in convoy protection in home waters and the eastern Atlantic (S.42730)
- W.A.4 - attack on concentration areas, lines of communications. etc. of the German Army (S.42731)

/W.A.5

- W.A.5 - attack on German manufacturing resources
  - (a) in the Ruhr
  - (b) inland waterways traffic between the Ruhr and Baltic and North Sea ports
  - (c) outside the Ruhr. (S.43303)
- W.A.6 - stores, particularly of oil (S.43293)
- W.A.7 - counter-offensive in co-operation with the Navy in defence of seaborne trade (S.43294)
- W.A.8 - night attacks (S.43295)
- W.A.9 - attack on the Kiel Canal, etc. (S.43296)
- W.A.10 - destruction of German shipping and its facilities, especially in Baltic ports (S.43297)
- W.A.11 - destruction of forests and crops (S.46344)
- W.A.12 - attacks on German fleet or parts of it, at sea or in harbour (S.46345)
- W.A.13 - attacks on German administrative, etc., headquarters especially in Berlin (S.46346)

Air Ministry  
preparations  
of material  
for these  
plans

Concentration  
on W.A. 1, 4  
and 5

Once the list of plans and their order of priority had at last been decided, the various Air Ministry directorates were able to settle to the work of providing the exact definitions and the intelligence and administrative material necessary for their detailed elaboration. By December 1937 a new Air Ministry file had been opened for each of the first ten plans and files for the other three were to follow during the New Year. It was, however, upon three only of these thirteen plans that the Air Ministry at present concentrated its attention, so far as the bomber forces was concerned. Those three were W.A.1 (against the German Air Force), W.A.4 (against the German Army), and W.A.5 (against German industry). Of the other ten, three (W.A.2, 3 and 12) were of course, so far as planning was concerned, the business of Coastal Command and they are dealt with in the Narrative of that Command. The remaining seven plans, all primarily the concern of Bomber Command, received for various reasons comparatively little attention during the period before the Munich Crisis. The Air Ministry departments, and more still the Bomber Command Plans section which was not brought into actual existence until November 1937, (1) were too busy and too limited in numbers to waste their time upon the more remote or less profitable projects. And most of the seven plans that were comparatively neglected fell within those categories. Attacks upon storage depots, and particularly upon oil reserves (W.A.6) could not be planned in any detail until much more information had been collected and digested: nor had oil yet assumed its pre-eminent (and delusive) priority among targets. There could be little profit in studying night operations (W.A.8) until the more general plans for attacking German industry had been worked out. Limited and specialised operations, such as the counter-offensive measures against German commerce raiders covered by W.A.7, obviously could not be given precedence over the major projects. Attacks on the Kiel Canal (W.A.9) for which an intelligence appreciation was prepared as early

/ as

(1) A.M. File S.41432/30A.

as December 1937, (1) could not be studied in detail until 1,000 lb. bombs had been authorised and developed. Berlin (W.A.13) and the Baltic ports (W.A.10) were even more unprofitable subjects for study since by 1 October 1938 Bomber Command would have only a small handful of night bombers capable of reaching so far. None of these six plans, therefore, had progressed by September 1938 much beyond the stage of having their general aim defined and some of the information about their objectives collected and digested.

Plan  
W.A.11

The seventh of these plans, W.A.11 (forests and crops), did attract a good deal more attention. But this was perhaps due less to its intrinsic interest or importance than to the possibilities of comic relief which it offered and to the people whose enthusiasm it aroused. The idea behind it was by no means new. The possibility of discharging liquid fire for such purposes from low-flying aircraft had been discussed as early as 1925 and again in 1930. Experiments made at Porton in 1935 had produced discouraging results (2) but with the development of incendiary bombs and with Mr. Lucas' invention of an oil bomb the idea took a new lease of life in 1937 and 1938. It was further encouraged by stories of forest fires caused by bombing during the Spanish Civil War. (3) Thus, in June 1937 Group Captain Don, then Air Attaché at Berlin and soon to be the new Group Captain (Plans) at Bomber Command, urged the value of such attacks in Germany. In November a Captain Roberts, who had studied forest fires in Canada, suggested the idea to Mr. Churchill and apparently to the Air Ministry. In June 1938 no less a person than Lord Trenchard gave it his blessing, adding the suggestion that small balloons might be used to carry the incendiary material. (4) It might be true, as Squadron Leader Burge of A.I.(b) pointed out, (5) that to burn down the German forests would be a huge task and hardly one of the most remunerative. But even he admitted that it might prove a valuable irritant to the German economic system. Hence by July 1938 the Deputy Director of Research and Development (Armament) felt it worth while to press for experiments to discover the probable effectiveness of such attacks. (6) Nevertheless, all this was rather technical investigation than operational planning. The preparation of Plan W.A.11, despite the interest shown in it, remained in September 1938, like that of the other six plans, still in the stage of defining aim and collecting information.

W.A.1, 4,  
and 5 sent  
to Bomber  
Command  
13 Dec.1937

It is then upon the elaboration of Plans W.A.1, W.A.4, and W.A.5 that we must concentrate in order to study the influence of operational planning upon the evolution of British bombing policy during the period before the Munich Crisis. Instructions were sent to Bomber Command on 13 December 1937 to start upon the detailed preparation of these three plans. They were to be completed by 1 April 1938, while 1 October 1938 was

/to

- (1) A.M. File S.43296/3A
- (2) A.M. File S.41734/56
- (3) Ibid., 2, 5, 10A
- (4) Ibid., 1A, 52B, 6A.
- (5) Ibid., 7.
- (6) Ibid., 9.

to be regarded as the 'zero date' from which they might be required to take effect. All of them were to be based on the assumption that Britain would have either France or France and Belgium as her allies. They were, however, to cover all profitable objectives in Germany, since the Government had forbidden any staff conversations with the French or Belgians and no division of labour between the R.A.F. and its potential allies could be arranged in time of peace. For the same reason it was impossible to provide exact information as to the location of the refuelling bases on the continent which would be available to the squadrons operating from the United Kingdom. Nor could exact locations be given for the twenty medium bomber squadrons forming the Advanced Air Striking Force, which were due to operate from continental bases, ten of them moving across the Channel in the first fortnight after the outbreak of war, the other ten following about a month later. The most that could be done was to give the approximate areas in which such refuelling or operating bases would probably be located. Besides this, the instructions also contained hypotheses of the strength and composition of the German air forces and of the composition and mobilisable strength of the British bomber force at 1 October 1938. Finally, there were added intelligence summaries which tabulated and discussed the target information available for each of the three plans. These hypotheses and intelligence summaries were to be kept up to date by the issue of periodical revisions. (1)

Date for  
completion of  
plans postponed,  
Jan. 1938

By the middle of December 1937, then, it was at last possible for Bomber Command to begin the preparation of the detailed operational plans envisaged in C.O.S. Paper 549. But it soon became clear that those plans could not be completed by the appointed date of 1 April 1938. The time left was too short. The Plans section at Bomber Command had only been authorised in November 1937. (2) It was very small in numbers and it had to start almost 'from scratch', for there had not previously been any organisation for planning at Command level. In addition to all this, a good deal of the essential information was still not ready when the original instructions were sent to the Command on 13 December 1937. Thus it was not until December 30 that maps showing (very inadequately) the location of German bomber stations and aircraft factories were sent down. Information about the German air defence organisation followed later still. The list of the British bomber squadrons' war stations was not despatched until January 27. Statements of those squadrons' future initial establishment and immediate reserves, of the range and performance of their machines by zero-date, and of the estimated output of the British aircraft factories during the first year of war, did not reach Bomber Command until well into February. Even some of the most important target intelligence summaries came equally belatedly. For example, the Air Targets Intelligence committee's report on fuel, power, chemical, engineering, metallurgical, and transportation targets in Germany was not sent from the Air Ministry until March 22. (3) In such circumstances it was obviously impossible for Group Captain Don and his three or four assistants to complete three major operational plans

/by

(1) D. of O. and I. to C.-in-C., 43 Dec. 1937, with list of Plans W.A.1 to 12 and dossiers for W.A.1, 4, and 5 - A.M. File S.41432/32A, B.C.

(2) Ibid., 30A.

(3) Ibid., 33A, 34A and B, 36A, 44A, 45A and B, 47A, 52A.



by 1 April 1938. So on January 27 the date for their completion was moved forward to 1 June 1938 and that for their possible coming into effect was moved forward to 1 January 1939. (1)

Delay over  
re-distribution  
of bomber  
squadrons  
Feb-April  
1938

Even this time-table was not easily accomplished, for further causes of delay occurred. Of these the most important was that the study of the three detailed war plans led the Commander-in-Chief of Bomber Command on 4 February 1938 to propose a re-distribution of his squadrons. (2) The nature of the war plans, he pointed out, called for attacks both upon targets widely scattered over north-western Germany (W.A.1) and upon targets in the Ruhr and Rhineland (W.A.4 and 5). With the possibility of Belgium and Holland forming "a large neutral barrier round which we must operate", the question of aircraft range became of the first importance. It was true that there were plans for basing the twenty shorter-ranged squadrons on the Continent and for refuelling the other medium bombers there on their return journeys. But these plans were still largely hypothetical. Moreover, the continental bases might well not be available during the first critical weeks of war and, in any event, at least ten of even the Advanced Air Striking Force squadrons must during the first month or so operate, if they operated at all, from English bases. There was also to be considered the desirability of having the stations of each Bomber Group concentrated conveniently around its headquarters; of having each Group composed of as small a number of different types of aircraft as possible; and of placing the stations in regions where they could be adequately protected against enemy attack. It followed, therefore, that the heavy bombers with the greatest range, the Witleys, should be placed in the North, in Yorkshire; that the Harrows and Wellingtons should be centrally placed in the East Midlands; that the rather shorter-ranged Hampdens should be put rather more forward in Lincolnshire; and that the short-ranged Blenheims and Battles medium bombers must in war be placed well forward in Kent and East Anglia. The dangerous vulnerability of these latter areas to enemy air attack did, however, make an examination of the means for their defence a matter of the utmost urgency. Now these proposed dispositions differed in several respects from those at the moment prevailing and would entail some revision of existing administrative arrangements. They had therefore to be discussed with the Air Ministry departments concerned and it soon became apparent at a conference on March 24 that they could not be accepted exactly as they stood. In particular it proved not practicable to move the heavy bombers from their East Anglian bases. Accordingly the Command had to draw up a modified version, leaving some of the heavy bombers in East Anglia and providing for the Blenheims and Battles of the main force to operate from their present South Midland stations with advanced landing grounds for refuelling in Kent. This, while avoiding the worst administrative and financial difficulties created by the original scheme, secured most of its essential objects. In this modified form the scheme was sent to the Air Ministry on April 9. (3) It received final approval on April 28, with the

/single

- (1) Ibid., 36A.
- (2) A.M. File S.41432/41A, B, C, D.
- (3) Ibid., 57A, B, C.

single qualification that the advanced landing grounds in Kent were disallowed in favour of experimenting with the fitting of extra fuel tanks to the Battles and Blenheims. (1)

Plans W.A.1, 4, and 5 ready by the summer 1938

These discussions, valuable as their outcome was from the point of view of improving the effectiveness of Bomber Command, had not made for speedy operational planning. Thus, although Group Captain Don and his staff did succeed in producing by the end of May drafts of the three major plans, it was not until two or three months later that the final appreciations of those plans could be forwarded to Air Ministry.

Influence of their preparation on bombing policy

The completion of these detailed plans and appreciations marked an important stage in the crystallisation of both Air Staff and Bomber Command opinion upon the character and objectives of the bombing offensive. It will be worth while therefore to study with some care the views expressed in the Bomber Command appreciations. From them we may see how the work which had gone into their preparation helped to produce that considerable modification in the timing, methods, and emphasis of British bombing policy which appeared after the Munich Crisis.

The Appreciation of W.A.4

Of the three plans, W.A.4 was the most readily disposed of and the least favoured. Mr. Chamberlain and other ministers had certainly toyed with the idea of using the bomber force as a deterrent, if not as a direct 'stopper', to a German invasion of France or the Low Countries by land. (2) But such an idea appealed to the Air Staff almost as little as it appealed to the soldiers. They feared, perhaps, that it might ensnare the 'independent' bomber force once again in army co-operation. (3) They certainly did not expect that such action could produce immediate and decisive results. The C.A.S. was at one with the C.I.G.S. in doubting "whether any air force could ever stop a large army". (4) For the bombing of troops in the field had never been regarded as particularly rewarding and the labyrinth of road, rail, and water communications in western Germany strengthened the Air Staff's doubts of Bomber Command's ability to halt a German invasion of France or the Low Countries by attacking supply lines and storage depots.

From the first, therefore, few hopes had been based upon Plan W.A.4. Indeed, on 19 November 1937 the D.C.A.S. had explicitly told the Deputy Director of Plans that "I regard this particular war plan as covering a remote contingency. I therefore do not want Bomber Command to become deeply involved in this at the expense of more immediate and important phases of our Western War Plan". (5) Accordingly, the

/instructions

- (1) There were, however, to be two advanced landing grounds for 'lame ducks' returning from raids - ibid., 59A.
- (2) Above, Part III.ii.103-4.
- (3) See the views of the C.A.S. as stated at the C.O.S. 192nd meeting, 12 Jan. 1937.
- (4) C.O.S. Minutes, 193rd Meeting, 19 Jan. 1937.
- (5) A.M. File S.42731/5. The comment was passed on to Bomber Command in an Air Staff Note of 30 Nov. 1937 - S.41432/32C.

instructions of December 13 emphasised "that action against the German armies in the circumstances envisaged may only be one of the functions which will devolve upon the British air striking force; because it must be assumed that in such circumstances the enemy may at the same time be directing a heavy scale of attack upon this country. It is suggested, therefore, that you should examine the objectives listed, with the object of determining the minimum number of squadrons which, in your opinion, will be required to achieve the requisite effects against objectives in this category. If the results of the examination disclose that the minimum force required is likely to exceed what is, in fact, likely to be available for action against this class of objective, the Intelligence summary should be referred back to the Air Ministry, who will go into the matter with the War Office Committee on Air Targets Intelligence with the object of determining the order of priority in which targets should be attacked, if it proves that we have not sufficient forces to deal with them all".<sup>(1)</sup> The verbiage is cloudy but its meaning is clear. Plan W.A.4 was from the first looked upon by the Air Staff as somewhat of a sideline. It was a plan to be pursued with the minimum of bomber forces and one designed merely to harass an enemy whom it was primarily the Army's duty to repel.

The plan not  
favoured.  
Results of  
detailed  
examination

Detailed examination only served to confirm these views. The War Office committee on Air Targets Intelligence (Transportation) had suggested that, "while there can be no question of completely paralysing a highly developed transportation system such as that in Western Germany by means of air attack, heavy and continuous attacks made as far as possible simultaneously on a number of suitable objectives should be capable of reducing the capacity of the system sufficiently to cause a considerable delay to the German concentration. It must be borne in mind, however, that, in order to achieve this result, the scale of attack must be both heavy and continuous".<sup>(2)</sup> In this statement the Air Staff seem to have scented the possibility of the greater part of the bomber force being drawn into army support bombing against a wide variety of objectives. They believed also that the War Office committee had attached too little importance to heavy and continuous bombing of railway stations, locomotive sheds, and nodal points and had placed too great hopes in "the chances of breaking railway communications by bombing the line where it runs through defiles". The Air Staff therefore amended the phrase "heavy and continuous attacks made as far as possible simultaneously on a number of suitable objectives" so as to read "a heavy and continuous attack of suitable objectives".<sup>(3)</sup>

The detailed examination of the plan at Bomber Command, however, suggested that the War Office committee's view was nearer to the truth than that of the Air Staff. Attacks on 'points of interruption', such as bridges or outtings, would, it seemed, prove more profitable and economical than attacks upon 'points of interference', that is the traffic centres which the Air Staff preferred. The basis upon which

/these

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- (1) A.M. File S.41432/32A
  - (2) A.M. File S.42731/1C
  - (3) Air Staff Note, 30 November 1937 - A.M. File S.41432/32C

these calculations were made was of necessity largely theoretical. A loss of 10% of the raiding aircraft was assumed. Then the number of bombs which would probably have to be dropped to secure the necessary two hits was estimated by taking a slightly larger average bombing error, a slightly lower percentage of hits, than was normal in peace-time practice. On these assumptions, it was calculated that it would require one raid by 28 heavy-medium bombers carrying 500lb bombs to destroy a bridge or a viaduct. As the bridge could hardly be repaired in less than a week, two raids, that is the use of 56 heavy medium bombers, would suffice to keep it out of action for the fortnight covered by the plan, the period of the enemy's mobilisation and concentration. If 1,000 lb bombs had to be used, then the number of aircraft must be doubled. But even then only two raids by 56 aircraft, a total of only 112 individual aircraft sorties, would be needed. This would be much more economical than attempts to cut and keep cut for fourteen days one railway track by bombing open track and moving trains. For that, six raids by formations of three medium bombers carrying 250lb bombs would be needed every twenty-four hours, or a total of 252 sorties in the fourteen days. For destroying a track at a cutting and keeping it out of use for the fortnight, 342 medium bomber sorties would be necessary. Yet moving trains and cuttings, though less economical than bridges, were likely to prove far more economical than 'points of interference'. For to keep a railway traffic out of use for a fortnight would, on the same assumptions, call for at least one single medium bomber sortie every half hour, or three full squadron raids every twenty-four hours, a total of 672 sorties over the period of fourteen days.

Attacks on 'points of interference', then, were more likely than attacks on 'points of interruption' to draw large portions of the bomber force away from 'independent' action and into army support bombing. Yet even with attacks upon bridges or trains that danger would still be considerable. To keep just one bridge useless would mean that twice within the fortnight no less than five or six squadrons of heavy-medium bombers would have to be diverted from other targets. To keep just one track useless would absorb the entire effort of two or three medium bomber squadrons. And a study of the three zones into which the War Office committee divided the German army's concentration area revealed a depressingly large number of such targets. There were thirty permanent bridges across the Rhine. There were few or no railway tracks or roads for which, if they were closed, adequate alternatives could not fairly easily be substituted. There were virtually no 'bottlenecks'. (1) It was not merely clear that there could be "no question of paralysing" the transportation system of Western Germany. It was equally clear that "to impose the utmost possible delay and dislocation upon the German invasion of Belgium, Holland, and France by attacks upon the German army's concentration area and communications in Western Germany", that is to achieve the avowed aim of Plan W.A.4, might well absorb an excessively large proportion of the fifty-one bomber squadrons which would be mobilisable by 1 January 1939. (2) As the primary responsibility of Bomber Command during the opening weeks of war was to be prepared to hamper the enemy's air attack upon the United Kingdom, not to repel his land attacks upon the Low Countries,

/such

(1) Bomber Command appreciation of W.A.4 - A.M. File S.42731/35A  
(2) A.M. File S.41432/34C

such a conclusion could only be damning to Plan W.A.4.

The  
Appreciation  
of W.A.1.  
Early  
pessimism  
about the  
plan

The most obvious method of executing Bomber Command's primary task seemed, of course, to be that of a direct attack upon the German Air Force as envisaged in Plan W.A.1. But such direct attack had never been regarded as a very satisfactory solution of the problem of how to reduce the intensity of a German air offensive against the United Kingdom. The Joint Planning Committee had placed it first among the war plans only because they could find no better method. They had explicitly recognised that airfields and air force maintenance organisation were among the more difficult and less rewarding of targets.<sup>(1)</sup> C.O.S. Paper 549 had endorsed these conclusions.<sup>(2)</sup> The same doubts had been re-echoed at the Air Ministry conference on planning on 1 October 1937. "Discussion showed that the extent to which the German air striking force could be successfully attacked was a matter of doubt. Attempting to attack the enemy's aerodromes, landing grounds, and first-line aircraft would be difficult, certainly without considerable previous reconnaissance. It was known that the Germans did not mean to operate from their peace stations, and the whereabouts of their war stations was at present unknown. Similarly the whereabouts of aircraft reserves could not at the moment be ascertained. Attack on airframe, and more particularly aero-engines, factories, might therefore be more effective than on the air striking force itself, though little immediate effect might be obtained".<sup>(3)</sup>

Difficulties  
of W.A.1  
targets

Thus, when on 13 December 1937 the Air Ministry instructed Bomber Command to proceed with the preparation of the three major plans, the tone of those instructions, so far as they concerned W.A.1, was decidedly pessimistic. The intelligence summary which accompanied them listed ten different types of targets and found major difficulties in the way of successful and effective attack upon every one of the ten. Aircraft in operational units were virtually ruled out altogether, for so little was known of the war dispositions of the German bomber force. A reliable secret source had suggested in December 1935 that the Germans were planning to prepare about 300 'E-Hafen' or wartime aerodromes and landing grounds distinct from their peacetime stations, and that 150 of these had by then already been selected or prepared. Yet by the end of 1937 "not one of the first-class E-Hafen has been located with certainty, while it seems that no hope whatever can be held out of locating those in the second class, other than by reconnaissance after the outbreak of hostilities". And, given the German thoroughness in the art of camouflage, "even direct reconnaissance may produce very meagre results".

Reserve aircraft in storage would prove an equally unprofitable target. The Germans were thought to be planning to switch their industry over to war production so promptly that they would not require a large stored war reserve of aircraft. Thus "the location, and even the existence, of a war reserve" beyond, possibly, a 33% reserve at aircraft parks, was "a matter of conjecture".

Aircraft factories would be more practicable targets. "The position of all those of importance is known: none of them is located very close to the western frontier, but all are in range of an aeroplane which can reach Berlin". They were

/ "large,

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- (1) Above, p. 149
  - (2) Above, p. 151
  - (3) A.M. File S.41432/26B

"large, distinctive, and vulnerable targets", though, thanks to the decentralisation of the industry, quickly repairable. Yet, even assuming that Fighter Command and the anti-aircraft guns could inflict losses of 100% a month upon the German bomber squadrons and that those squadrons' reserves amounted to only 66% of their first-line strength, "it would still take a period of something like three weeks before a complete stoppage of the aircraft industry would actually compel a reduction in the weight of German attack". And the Joint Planning Committee in their report had considered that the first fortnight would be the crucial and decisive period of a German air offensive against the United Kingdom! (1) Nevertheless, if a complete stoppage of German aircraft production could be effected within a week or so, "the German Air Force would be 'living on capital', and a restricted capital at that: an attempt to force a decision by intense air bombardment of this country would become a desperate gamble, and would probably be relinquished before the shortage of aircraft became too serious". If therefore, British bombing could produce even "a 50% reduction of output in the first week, this group is worth serious consideration". On the other hand, "if these figures cannot be approached, the effect is likely to be too long delayed to bring about any immediate reduction in the weight of German attacks on this country".

Of the other types of targets, maintenance and headquarters staffs were dismissed as unlikely to "achieve a sufficient measure of success to assist materially in the attainment of the aim". Fuel and bomb supplies were also ruled out as "too uncertain" in their results. Reserves of engines were dismissed "for lack of information". The destruction of aero-engine factories, though these were "fewer in number and more vulnerable" than any of the other targets, could not produce an immediate effect. Finally, attacks on the scattered production of vital components would secure no results which could not be more economically obtained by attacking airframe or aero-engine factories. (2)

In sum, then, as the Air Ministry's instructions said, (3) "the Intelligence Summary ..... discloses an unsatisfactory situation, in that the detailed objectives for initial attack are so indefinite and the results to be expected are, on the whole, so uncertain and hold out so little promise of any immediate results". The most that could be hoped was that by the time war came "we might possess information which would form a firmer basis for a plan to attack the German air striking force or its maintenance organisation, or alternatively other targets might give promise of such hopeful results in the reduction of the general German war effort, that any other course of action would constitute a demonstrable waste of energy".

The Bomber Command Appreciation confirms doubts about W.A.1

The investigations of the ensuing months served only to strengthen this pessimism about Plan W.A.1. By the end of August 1938 the completion of the Bomber Command appreciation went far to damn it altogether. (4) This appreciation emphasised that, during the first few crucial weeks of war, almost the

/whole

- (1) Above, pp.146-7
- (2) A.M. File S.41432/320
- (3) Ibid., 32A
- (4) 30 August 1938 - A.M. File S.42728.

whole of the British bomber force must in any case operate from English bases. Yet from those bases they would be able to reach very few targets of any importance on the W.A.1 list - even if they operated from French bases the number would still be small. For on 1 January 1939 80% of the aircraft in the British bomber force - and all but two of its day bombing squadrons - would be either Blenheims or Battles, neither of which would be able to penetrate much more than 100 miles beyond Borkum. Besides, especially if Holland and Belgium remained neutral, the cost of such penetration would be very high. To reach their targets the bombers must fly 200 miles across the North Sea; enter German air through a gap between the Dutch and Danish borders no more than 100 miles wide; and then penetrate to the extreme limit of their range. They must then return across 100 miles of well defended enemy territory; through the concentrated and alert defences of the 100-mile gap; and back again over the 200 miles of sea. For such operations at extreme range, the Blenheims and Battles were peculiarly ill-equipped. Not only was their accommodation for their crews cramped and tiring, but also their defensive armament was so manifestly inadequate that the Commander-in-Chief felt bound to ask that they should be given fighter escorts. With the development of the Messerschmidt 110, only long range, high performance fighter aircraft could shield such bombers from disaster. The lessons of the Sino-Japanese War and the Spanish Civil War seemed to confirm these views. For such operations as Plan W.A.1 required, bombers of much greater range were essential. And, if the Air Staff could not rescind its ban on fighter escorts, then the bombers must be very much more heavily armed than even the Hampdens and Wellingtons with which a mere two day bombing squadrons would be equipped by 1 January 1939.

In addition to the cost and difficulty of reaching the W.A.1 targets, there was also the difficulty - almost the impossibility - of inflicting decisive damage upon them. Recent experiments on Salisbury Plain had shown what very poor targets dispersed and camouflaged aircraft provided - even if anything had been known about the location of the German airfields. Aircraft factories were easier to find and to hit, but most of them were beyond the range of Blenheims and Battles. The Whitleys and Harrows could reach them, but those aircraft were too slow to be used except by night, and to identify particular factories by night might not prove easy.

Plan W.A.1, then, concerned as it was chiefly with the crucial first weeks of war when continental bases would hardly be available to British bombers, seemed to the Commander-in-Chief to hold out nothing better than "the chimerical hope of destroying the enemy Air Force via the difficult North Sea route". It might be necessary to carry out some such plan, on a large scale or a small, at the start. But it could do little to reduce the intensity or duration of a German air offensive against the United Kingdom and that little would be achieved at prohibitive cost. Indeed, the Commander-in-Chief virtually wrote off his Command as a counter to the German air offensive. He explicitly asserted that the strongest air defence of Great Britain was the combination of the North Sea and the most powerful possible fighter and anti-aircraft defences.

The  
Appreciation  
of W.A.5

Before the Munich Crisis occurred, then, the idea of using Bomber Command in a primarily counter-offensive role, whether against the German Army or against the German Air Force, had been virtually abandoned. There remained the original

/conception



Rising hopes of  
this plan

conception of it as an independent offensive weapon designed to strike, not directly at the enemy's armed forces, but at the industrial and transportation systems upon which those forces depended. The closer study of Plan W.A.5 in 1938 encouraged the Air Staff to place their faith still more firmly and exclusively in this conception. They even began again to cherish the hope of finding within the terms of that plan a 'panacea target'. a group of objectives sufficiently small in number for their total destruction to be compassable and sufficiently vital in importance for their destruction to cripple Germany's war-making power as a whole. The Joint Planning Committee in October 1936, it will be remembered, had been unable "to discover any air objective to attack, which would be likely to force Germany to divert her own air offensive from the relatively vulnerable points in our own organisation".<sup>(1)</sup> In December 1937, however, the Air Staff in their instructions to Bomber Command<sup>(2)</sup> felt somewhat less despondent. "The detailed examination of possible targets in the German war industrial system", they then wrote, "has made considerable progress in the twelve months since that report was written; and although no objectives have been found on which attack would have an immediate effect in reducing the scale of attack on this country, it seems probable that targets will be discovered, the destruction of which would not only tend (though probably not immediately) to cause a reduction of the German air offensive, but would at the same time have an adverse effect on the German war effort and German economic life generally".

The Bomber  
Command  
Appreciation  
of W.A. 5a

This growing optimism was strengthened by the completion of the Air Targets Intelligence committee's report on fuel, power, chemical, engineering, metallurgical, and transportation targets in Germany. This report, sent to Bomber Command on 22 March 1938, brought out the possibility of crippling German war industry by attacking coking plants and power stations in the Ruhr area.<sup>(3)</sup> It was this which inspired the glowing Appreciation by Bomber Command of that part of Plan W.A.5 which concerned the Ruhr.<sup>(4)</sup> Sent up to Air Ministry on 28 July 1938, this Appreciation began by emphasising the Ruhr's importance as the industrial nerve-centre of Germany, 75% of whose output of coal and iron came from that area. Natural and economic reasons made any large scale or early transference of industry to other regions almost impossible. Yet the Ruhr lay close to Germany's western frontier, 150 miles from the North Sea coast or the French border but no more than 25 to 50 miles beyond the frontiers of Holland and Belgium. It was - or so the Bomber Command planners then believed - easy to locate, despite the prevalence of industrial haze and morning ground mist. It was the only German target equivalent to London or the industrial Midlands of England. Its paralysis would - or so the Appreciation maintained - prevent Germany waging war on a large scale in less than three months.

Now the British bomber force would not by 1939 possess the numbers of aircraft needed to put all the industries of the Ruhr out of action. But there were certain essential targets upon which all those industries depended.

/Of

- (1) J.P.C. Paper 155; and above, p.11.
- (2) A.M. File S.41432/32A
- (3) Ibid., 52A
- (4) A.M. File S.43303/3A, B.

Of these the vital Dortmund-Ems aqueduct and the equally vital Mohne, Sorpe, and other great dams, raised problems of technique and equipment which could not at the moment be solved. All would need the not-yet-developed 1,000 or 2,000 lb bombs. The dams might necessitate torpedo attack, involving problems outside Bomber Command's competence. But the coking ovens and power stations were no less vital. The destruction of the more important of these targets would, it was believed, cripple at once the whole industry of the Ruhr. Power houses were, admittedly, small targets (perhaps 100 yards square) for high level attack, but Bomber Command hoped for one hit from every twenty bombs dropped and believed that one hit would destroy the plant. Coking ovens, whose average size Bomber Command estimated at some 100,000 square yards, were easier targets, suitable also for night attack: 15 to 20% of the bombs dropped should hit them and twenty hits should put a single plant out of action. The opposition from the German defences would, of course, be severe and the bombers' losses heavy.

Nevertheless, the Command estimated that in 3,000 sorties, with a wastage of 176 aircraft, it could so cripple the twenty-six most important coking plants and the nineteen most essential power stations that the output of the Ruhr's industry would be reduced "below the critical minimum". In other words, a 'sustained' effort by 300 bombers for one month, or by 600 bombers for a fortnight, should be capable of so reducing the activity of the Ruhr's industries that Germany's war-making power would be brought to a total standstill.

This appreciation did not escape criticism on points of detail when it reached the Air Ministry. (1) Its estimates of wartime bombing accuracy were thought over optimistic (2) and Squadron Leader Burge of A.I.1(b) felt that, in its enthusiasm for power plants and coking ovens, it underrated the immediate possibility of attacks on dams and the value of 'plastering' marshalling yards and such inland harbours as Duisburg-Ruhrort. (3) Obviously, again, it was too narrowly limited in the geographical area which it covered. There were important specialised engineering and aluminium and magnesium plants in the Rhineland around Cologne and Aachen, and in the Saar, and the Frankfurt-Mannheim area. (4)

Yet this very narrowness, both in targets and in geography, served to stimulate the faith in the possibility of finding a group of 'panacea' targets. The enthusiasm of the Air Targets branch for dams was hardly less than that of Bomber Command for power plants and coking ovens. The destruction of the Mohne dam, they maintained, "would achieve all the damage which Bomber Command hope to effect in some 3,000 sorties, directed against other objectives, and a good deal more in addition". (5) The dams; even more than the much more numerous

/pumping

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- (1) Pencilled notes in its margins point out - that only a direct hit in the middle of the turbine room would put a power station out of action; that it would need nearer 100 than 20 bombs to secure one such hit; that the average size of coking plants was more like 20,000 than 100,000 square yards; that they were not easily recognisable at night; and that all parts of them were not equally vulnerable.
  - (2) A.M. File S.41432/9
  - (3) Ibid., 5: for Duisburg-Ruhrort, ibid., 32C.
  - (4) Intelligence summary on war manufactures outside the Ruhr, appendix 5 to Plan W.A.5, 2nd revise dated 21 Sept. 1938 - ibid., 32C.
  - (5) Minute of 16 Aug. 1938 - A.M. File S.43303/7.

pumping stations, were the key to the water supply, drainage, and sewerage systems of the Ruhr. "If certain reservoir dams were destroyed, the water supplies of the Ruhr would be very seriously affected, and, if in addition a few pumping stations were put out of action, flooding and the collection of sewage water might seriously affect many industrial activities and lead to the evacuation of whole districts, through the complete failure of the sanitation system". Had not the great Emscher Sewage Company been established largely because of the fierce cholera outbreak in 1866 and the recurrent typhoid epidemics of ensuing years? The destruction of the Mohne and Sorpe dams, holding back between them some 215 million cubic metres of water, would flood the Ruhr valley very extensively, inundate long stretches of railway, put many manufacturing plants and pumping stations out of action, and cut off both industrial and domestic supplies of water.(1)

Besides the dams and pumping stations, there was also the important system of inland waterways, vital to the Ruhr's activity since German railways "could meet both military and civil requirements in war only so long as heavy industrial traffic was allowed to proceed freely by inland waterway". This canal system was peculiarly vulnerable at one point. There was "a complete bottleneck" between the junction of the Dortmund-Ems and Ems-Weser canals at Beveren and the junction of the Rhein-Herne and Wesel-Datteln canals with the Dortmund-Ems in the Ruhr. In this bottleneck there was a set of locks just north of Munster, and an aqueduct a little north of that, whose destruction would entirely cut off the Ruhr from communication by water with central Germany and the northern ports. If to this were added the destruction of the 'key' locks on the Ems-Weser and Weser canals at Minden, then this "would effectively immobilise shipping over the entire North-Western system" for several months. Coupled with attacks upon the principal railway workshops and repair shops, such action must, it was asserted, "bring about a complete breakdown of the transportation system".(2)

Here, then, were three groups of targets - dams and canals as well as Bomber Command's favoured power and coking plants - all covered by Plan W.A.5 and each of which seemed to offer a prospect of bringing near to a standstill the industrial activity of the Ruhr. Now "the Ruhr is a relatively small and highly concentrated industrial area lying not far from the western frontier of Germany nearest to Belgium and Holland, and is confined there through the location of the coal deposits. Upon the coal-mining district of the Ruhr has been superimposed the greatest and most centralised industrial area in the world. No informed quarter holds that the Ruhr can be supplanted as the industrial nerve-centre of Germany ..... 51% of the total of Germany's industrial population is concentrated in the Ruhr. Eight of the principal towns in the Ruhr alone have a total population of over 6,000,000. The Ruhr is responsible for the following percentages of the total output for the whole of Germany: coal, coke, 70-80%; pig-iron 67%;

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- (1) Air Targets Intelligence report on the Ruhr, Appendix 5a to Plan W.A.5, 3rd revise dated 8 Sept. 1938 - A.M. File S.41432/32C.
  - (2) Air Targets Intelligence report on inland waterways, appendix 5c to Plan W.A.5, 1st revise dated 9 Sept. 1938 - ibid., 32C.

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It contains not only 75% of the nation's steel capacity, but over 60% of the heavy engineering capacity, over 70% of the mechanical engineering capacity, and by far the greater part of the basic chemical production. Finally, upon this great and highly concentrated industrial area depends the output of vital factories in other districts". (1) Clearly, then, it seemed that if the Ruhr were paralysed, "the German economic system could not function, and she would become impotent to wage war on a large scale in less than three months". (2) And, if Bomber Command and the Air Targets Intelligence branch were right, the British bomber force of 1939 might hope to create this paralysis within a comparatively short period of time.

In the light of later history, the wildness of this optimism must provoke a smile. But thus to smile is really to ignore history. For it was the greatest handicap to all the planning of a bomber offensive that there was virtually no practical wartime experience by which theoretical conclusions might be tested. Only later history could show whether those conclusions were optimistic or accurate. Only later history could show how little relation there was, for example, between peacetime and wartime 'average bombing error' or how great was the weight of attack required for the destruction of such targets as the Ruhr industries. On the scanty evidence available in 1938 it was not wholly unreasonable to believe that the British Bomber force would be able to achieve these great results. It might not be capable of stopping in a fortnight the German air offensive against the United Kingdom or the German land offensive against France and the Low Countries. But there did appear to be ground for hoping that it might, at the cost of severe but not entirely prohibitive losses, be capable of crippling German war industry within a comparatively few months.

Influence of  
the study of  
W.A.1, 4,  
and 5 on  
bombing policy

Bomber  
Command not  
a counter-  
offensive  
weapon against  
German armed  
forces

What, then, was the total effect of the study of these three war plans (W.A.1, W.A.4., W.A.5) upon the evolution of British bombing policy in 1937-1938? In the first place, it suggested that Bomber Command would not be to any great extent effective as a direct counter-offensive weapon against the attacks of the German armed forces in the opening weeks of war. Its potentialities as a weapon against the German surface and underwater naval forces had not been highly considered. Its value as anything more than a useful harassing weapon against the German Army had been largely discounted by the study of Plan W.A.4. Its inability to play a major and immediately decisive part in the initial phases of the air defence of Great Britain by striking directly at the German air striking force had been demonstrated by the study of Plan W.A.1. Thus the idea, which had been growing in the minds of some of the politicians during 1936, that Bomber Command might perhaps be used as a kind of master force to tame by direct action all arms of the German forces, had been considerably discredited. The ancient axioms had been reiterated, that only a navy can defeat a navy in battle, that only an army can crush an army in the field, that only fighter aircraft and anti-aircraft guns can beat off a bomber force in the air.

/On

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- (1) Note on economic importance of the Ruhr, appendix A to Plan W.A.5 - ibid., 32C.  
(2) Air Target Intelligence report on the Ruhr, - ibid., 32C.

Emphasis on  
long term  
value of  
independent  
air offensive  
against  
enemy war  
economy

On the other hand, the study of Plan W.A.5 had again exalted the bomber force as a potential and eventual war-winning offensive weapon. It might not be capable of immediately checking by its direct interference, the operations of the enemy's armed forces. But it might hope, within a comparatively few months so to paralyse the enemy's war industries and communications that his armed forces would be brought to a standstill and be 'softened up' for eventual defeat. In other words, the original, the 'pure', doctrine of the 'independent' air offensive was once more elevated to its pristine pre-eminence. The idea of the 'bomber experiment' was vindicated afresh.

Priority to  
defence

One result of this was, of course, to provide fresh reason for giving the immediate priority in production and training to air defence rather than to air offence, to Fighter Command rather than to Bomber Command. An 'all-out' German air offensive upon the United Kingdom was still the 'worst case' for Britain's planners to provide against. Such an offensive might be launched at the very beginning of the war. If it were, then it must be met and mastered within the first two or three weeks. But in that short space of time Bomber Command could do little to diminish the intensity of the German attack. the brunt of that task must fall upon Fighter Command - and with its new fast eight-gun fighters, its radio-location, its ground control system, Fighter Command had in 1938 a brighter hope than ever before of performing that task with success. To avert defeat during the first few weeks was more essential than to win the war in the first few months. Fighter Command might now hope to avert defeat from the air. Bomber Command, it seemed fairly clear could do but little to achieve that immediate objective. Increasingly, therefore, the tendency was to give the higher short-term priority to Fighter Command and to regard bombing policy as being concerned rather with long term war winning than with the immediate averting of defeat.

Waiting for  
the 'Big  
Bombers'

There were other reasons, too, to encourage such a tendency. As early as 19 March 1938 the Commander-in-Chief of Bomber Command had sent to the Air Ministry three graphs showing the estimated weekly wastage of aircraft and aircrews in war. These were, of course, based upon the usual and (inevitably) stereotyped assumptions about the rate of losses to be expected in 'maximum' or 'intensive' or 'sustained' operations against 'heaviest' or 'heavy' opposition. But the results of such theoretical calculations were most sobering. For they implied that, if war came in 1939, and the bomber force operated at 'maximum' effort for the first five days, 'intensive' effort for the next seven days, and thereafter at 'sustained' effort, all the medium bomber squadrons would be eliminated by the end of three and a half weeks and all the heavy bomber squadrons after seven and a half weeks, while "literally hundreds of fresh crews will be required in the first few weeks of war".<sup>(1)</sup>

Inadequacy  
of Scheme F  
force

It is true that by July Bomber Command felt a little more optimistic. In their appreciation of Plan W.A.5 they anticipated, as we have seen, being able to knock out the

/Ruhr

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(1) A.M. File S.41432/53A

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Ruhr industries in 3,000 sorties for a loss of 176 aircraft. But this optimism looked rather to the remote than to the immediate future. Detailed study of Plan W.A.5 had emphasised in how many respects the Scheme F. 1939, bomber force would be inadequate to its task. Eight-tenths of its aircraft, the Battles and Blenheims, could hardly hope to reach the Ruhr if they had to respect Dutch and Belgian neutrality. Even if their range had been greater, those same Battles and Blenheims, with their weak rearward defensive armament, could hardly hope to fight their way to their targets and back again across 100 miles or more of enemy territory against the new Messerschmidt 110. Moreover, they were too small to carry the loads of 1,000 or even 2,000 lb. bombs that, it was now realised, would be required to destroy targets such as dams, aqueducts, and canal locks. The Whitley and Harrow heavy bombers and the Wellington and Hampden heavy-medium bombers could indeed carry such loads and reach the necessary distances. But the Whitleys and Harrows were too slow and vulnerable to be used by day and could hardly find such targets at night, while at the beginning of 1939 Bomber Command would have only two squadrons of Wellingtons and Hampdens.

Need to  
conserve the  
bomber force  
till the big  
bombers  
arrive

It was therefore becoming more and more obvious that the effectiveness, and even the possibility, of a long-range bombing offensive against Germany must remain very doubtful so long as it had to be executed by the Scheme F bomber force. That force would eventually be replaced by the longer-ranged and better defended machines of greater lifting capacity envisaged in Scheme H and already being designed to the specifications B 12/36 and P 13/36. And these latter aircraft should prove well able to realise the hopes placed in Plan W.A.5. But they could not be ready in any numbers until 1941 or 1942, whereas war with Germany might well come in 1939. It would therefore be obviously unwise to use the Scheme F force 'to destruction' in 1939 or 1940. For that would mean the destruction of the crews trained in peacetime, whose skill and experience would be invaluable when the B 12/36 and P 13/36 machines came into action in 1941 or 1942. It was thus becoming clear, from this point of view also, that, if war with Germany should come in 1939, there would be very strong arguments for conserving the British bomber force so far as possible until it could be re-equipped with the 'big bombers' built to the 1936 specifications.

Question of  
the legality  
of targets

But to conserve the bomber force would not mean that it must rust unused. As the Joint Planning Committee had pointed out, "since we cannot apply effective pressure on Germany until we attack her vulnerable points, it is essential that at least a portion of our air striking force should take the offensive against such objectives as soon as possible". (1) This, however, raised further questions of bombing policy. The study of the three major war plans suggested that the German armed forces would not be mortally vulnerable to direct bombing attack. The only truly vulnerable points in Germany's belligerent power would, it seemed, be the key installations of her war economy. Now, many of the most vital of those installations were small and relatively difficult targets, hemmed in among the dense civilian habitations of the Ruhr. To bomb them must, in effect, be to launch a direct attack on the German

/civilian

(1) Above, p.150.

civilian population. It was not a matter of an occasional stray bomb falling among workers' dwellings. For, even in the optimistic calculations of Bomber Command, it was anticipated that nineteen out of every twenty bombs aimed at a power station would fall wide of the mark. And, to judge from the peacetime average of error in high level bombing, a good many of those misses must fall among purely civilian dwellings. The results of attacks upon dams - flooding wide areas with sewage and producing the threat of cholera and typhoid - would affect the mass of the people hardly less cruelly, if more indirectly. In short, Plan W.A.5, the favoured choice of the Service experts and perhaps the only one of the air war plans likely to produce decisive results, implied 'total war'. It implied a conception of warfare whose essential brutality could hardly be disguised; a conception which must be repugnant to anyone brought up in the ordinary traditions of decency and humanity that had prevailed before 1939, at least in Western Europe. No self-respecting English statesman could seriously consider resorting to such methods of barbarism unless the Germans had first set him the example and forced him to copy them in self-defence.

Need for  
'legal'  
plans

Now the Germans might, of course, set such an example and compel the British, for their own preservation, to copy it. But they might, on the other hand, choose to concentrate, as the War Office always believed that they would, upon more orthodox and less experimental methods. Should they choose to concentrate their army and air force upon a land offensive against France and the Low Countries and to hold their hand in the air against the United Kingdom, Plan W.A.5 would have little chance of getting Cabinet sanction. Should they choose to stand upon the defensive, by land and air, in the West and direct their arms eastwards, the chance of W.A.5 being sanctioned would be equally small. In either event, the 'independent' air offensive could hardly begin. What, then, would the British bomber force be able to do? What would it be allowed to do? Clearly, it must confine itself to 'military' targets of undeniable legality, to direct attacks upon the enemy's land, sea, and air forces. The considerations were already appearing which, after the Munich Crisis, were to cause the Air Staff and Bomber Command to direct much more of their attention to 'minor' plans of a less wholesale brutality, such as those for attacking enemy warships at sea or in harbour and for blocking the Kiel Canal.

Effects  
of this

Here again was an argument in favour of the 'big bomber' policy. Attacks upon warships, harbour installations, and canal locks would require the use of 1,000 and 2,000 lb. bombs. Those bombs must be carried by aircraft well armed to defend themselves against defences of the utmost intensity. Very few of the Scheme F machines would adequately satisfy these requirements, which called plainly for bombers of the B 12/36 and P 13/36 power and quality.

This in itself was yet another argument pointing towards a policy of conserving the bomber force during the opening period of the war. Conscience might not make cowards of all the belligerents for very long. It was not improbable that sooner or later "the gloves would be off" and no methods barred. Then the opportunity for unrestricted 'independent' air offensive would arrive. Then the bomber force must be intact and capable of seizing its chance.

/The



Resultant  
change in  
timing of  
the bomber  
offensive

The net effects of operational planning in the months before the Munich Crisis were thus considerable. There resulted from it a tendency for Bomber Command to lose much of its pre-eminence as a counter-offensive weapon for the averting of initial and immediate disaster. There was a tendency also for the timing of its 'independent' offensive to be retarded, for the full development of its operations to be postponed until that 'second phase' of the war in which, in the Joint Planning Committee's view, air action would be the first step towards ultimate victory. The bomber force would thus be emancipated not only from army co-operation and naval co-operation but also, to a great extent, from direct co-operation in the air defence of Great Britain. Its 'independent', 'strategic', role would thus be emphasised - though at the price of losing some of its immediate priority over the claims of Fighter Command.

Bomber Command was thus coming to be regarded more as a war-winning, and less as a defeat-averting, weapon. Its time would come, not in the opening crisis of the war, but in the later period of the preparation of victory. It was becoming more possible therefore to look beyond 1939 and the Scheme F bomber force, to the 'big bombers' of 1941-2. And detailed examination of the three major air plans had already made clear that only those 'big bombers' could really hope to realise the aims of the believers in an 'independent' air offensive.



## IV. PREPARATION FOR A WAR WITH GERMANY

## (iii) EXPANSION AND EQUIPMENT, 1937-8

## (a) The Origin of Expansion Scheme J. (October 1937)

Conditions governing expansion 1937-8.

From February 1937 until the Munich Crisis of September 1938 the expansion and equipment of the R.A.F. continued to be dominated by the governing considerations which had emerged in 1936. Tension between Britain and her potential enemies showed little sign of slackening. Nothing in international affairs occurred to discredit the Foreign Secretary's warning that war might break out at any time after the opening of 1937.

The threefold peril

For Britain, war now meant a threefold peril. Certainly the gravest manace to peace lay in the growing strength and ambition of Germany. But if Germany went to war, Italy and Japan were not likely to be long in joining her. To repel this triple threat, Britain must now depend chiefly upon her own resources. France's power and will were too unreliable for her to be greatly depended upon as an ally. Russia's policy could hardly be conjectured. The U.S.A. remained wrapped in traditional aloofness. The Belgian declaration of neutrality had recently indicated that the smaller European nations were beginning to seek security at the best in inoffensive isolation, at the worst in prostration before the rising sun of Axis power.

Growing inadequacy of British resources

It was therefore urgently necessary for the British government to take stock of its resources and to allot them where they were most needed. It was indeed becoming painfully obvious already that strategical requirements were outrunning the nation's capacity in man power, in industrial output, and in finance.

Man power

In man power, it was not merely that, as Schemes G and H had shown, the required numbers could not be recruited and trained in the time. The numbers were simply not there. Great Britain, out of her 44,500,000 people, could not provide forces to meet simultaneously and on equal terms the forces which Germany could draw from her 66,000,000 people, Italy from her 43,000,000, and Japan from her 92,000,000. Already the various branches of the Services were competing against one another for recruits. The R.A.F. and the Army both had schemes for enlisting 'garage hands' as mechanics. (1) On 29 October 1936 the Committee of Imperial Defence had authorised plans for anti-aircraft defence which entailed a London balloon barrage operated by 5,500 men and such increases in the use of anti-aircraft guns as would require a very large part of the Territorial Army to man them. (2) The Air Raids Precautions departments, too, were now asking for 400,000 part-time air raid wardens and (on the basis of a possible one million casualties from air raids in the first two months of war) for some 395,000 men and 220,000 women, one-third of them full-time, as medical orderlies and stretcher-bearers. No less significantly, many industrial firms engaged in the manufacture of essential materials were beginning to raise the question whether their employees ought to be allowed to enlist in the Territorial Army. (3)

Industrial capacity

Industrial capacity was indeed becoming a limiting factor no less powerful than man power. The demands upon it were continually widening. Balloons had to be made for the new London

/ barrage.

(1) A.M. File S.42667/8A

(2) C.I.D. Minutes, 283rd Meeting (1)

(3) Ibid., 290th Meeting (4), 11 March 1937; C.I.D. Papers 1319-B.

barrage. Ten million civilian gas-masks were to be manufactured every year for three years from 1 January 1937<sup>(1)</sup>. In the aircraft industry, as the investigations preceding Scheme H had shown, no further increase of output could yet be looked for. Nevertheless the demand was continually growing and the Services were beginning here also to compete seriously with one another. The Admiralty, having considered the Joint Planning Committee's report on the Protection of Seaborne Trade in a War with Germany,<sup>(2)</sup> was demanding that a force of 309 aircraft should be exclusively earmarked for convoy protection. In the face of Air Ministry protests, they were also asking that another 150 light machines should be held in reserve for reconnaissance work from armed merchant cruisers<sup>(3)</sup>. Similarly, the authorised increase in the number of anti-aircraft guns to be allotted to home defence could hardly be produced except at the expense of cutting down the equipment of the Army's Field Force.<sup>(4)</sup> The government could not fail to take notice of such problems. Indeed, several times during the early part of 1937 the new Prime Minister, Mr. Neville Chamberlain, had spoken in the Committee of Imperial Defence of his anxiety about the general industrial situation.<sup>(5)</sup> To him, clearly, it was now industrial capacity rather than finance which appeared as the major limiting factor in national rearmament.

#### Finance

Nevertheless, the financial limits, too, were again becoming important. Every new demand, every increase in the old demands, of the defence services called for increased grants of public money. And the demands seemed endless. The Air Ministry was cogitating new expansion schemes for the R.A.F. The Secretary of State for War (Mr. Duff Cooper) was urging that the Territorial Army should now be equipped and prepared to join the regular Army in the field.<sup>(6)</sup> The First Sea Lord was convinced that "even to talk of war simultaneously with Germany, Japan, and Italy seemed unrealistic in view of our existing standard of One-Power Naval Strength".<sup>(7)</sup> He, too, therefore was proposing the adoption of a new standard that would enable the Royal Navy to meet the requirements of a war with Germany and at the same time to send to the Far East a fleet adequate for defensive action and as a strong deterrent to Japanese aggression.<sup>(8)</sup> Moreover, to these demands of the more offensive Services there were now being added the demands of civil defence and of anti-aircraft defence at home. The drain on the nation's finances was thus growing serious enough in itself to give the government pause. For the situation was continually changing and always in the direction of greater expense. "There seemed", as Mr. Neville Chamberlain had complained, "to be no permanence". In 1934, he pointed out, the estimated cost of anti-aircraft defence had been £3,000,000; in 1935 it had been £13,500,000; early in 1936 it had gone up to £30,000,000; and by November of that year new proposals were suggesting £60,000,000. Such figures were not merely alarming from a financial point of view; they were also significant of the strain which rearmament was placing upon the nation's resources of man power and industrial

/ capacity.

- (1) C.I.D. Minutes, 278th Meeting (7), 12 May 1936.
- (2) C.O.S. Papers 535 J.P., 15 Dec. 1936.
- (3) C.O.S. Minutes, 190th Meeting, 21 Dec. 1936.
- (4) C.I.D. Minutes, 285th Meeting (2), 10 Dec. 1936.
- (5) *Ibid.*, 290th Meeting (2), 11 March 1937.
- (6) *Ibid.*, 284th Meeting (4), 19 Nov. 1936.
- (7) C.O.S. Minutes, 200th Meeting (2), 5 March 1937.
- (8) Cp. C.O.S. Papers 589 J.P., 31 May 1937.

capacity. They were perhaps even more significant as a rough and ready indication of how those resources were being allotted to the various Services. And to Mr. Chamberlain and Mr. Duff Cooper, if to no one else, they suggested that the allocation was becoming unbalanced and that too much effort was being spent upon defence, too little upon the offensive.<sup>(1)</sup>

Need for a new inquiry into defence programmes.

With requirements outrunning supply, with the various Services competing for men and equipment, it was clear that the government must once again take stock of the resources at its disposal and then prune and balance the various Services' programmes to the measure of its means. Some pruning would be inevitable. Balancing, too, there must be, for everyone now recognised that success in war must still depend upon the combined effort of all arms. It was now no longer possible to cherish the idea, which had so strongly attracted several Ministers (notably Mr. Chamberlain), that a mighty bomber force might make anything more than a token Field Force unnecessary in a European war.<sup>(2)</sup> That idea had been killed by the unanimous arguments of the three Chiefs of Staff, for, as we have seen, even the Chief of Air Staff agreed "that it was doubtful whether any air force could ever stop a large army". "Wars", they had laid down, "are conducted in all three elements" and success required the exertion of an adequate effort in each element.<sup>(3)</sup> The nation's not unlimited resources must therefore be allocated in proper proportion among the various arms. Accordingly at the end of June 1937 the Cabinet resolved to undertake a general review of the various defence programmes.<sup>(4)</sup>

Origin of Scheme J

It was from this resolution that the next R.A.F. Expansion Scheme, Scheme J, took its origin. Early in July 1937 the Chancellor of the Exchequer (Sir John Simon) wrote asking the Service Departments to supply him with estimates of the period required for the completion of their already sanctioned programmes and of the money needed year by year during that period, and during the years following that period, to complete those programmes. In the case of the R.A.F. he asked for these figures to be supplied both for the existing authorised programme (Scheme F) and also for Scheme H.<sup>(5)</sup>

Reply to Chancellor's question 12 July.

The Secretary of State for Air, after consulting the Air Staff, replied to these questions on July 12.<sup>(6)</sup> The full equipment for Scheme F would, it now seemed certain, be nine months behind schedule under present industrial conditions. Thus although its first-line squadrons should all be completed by 31 March 1939, they were unlikely to get their full reserves until the end of that year. Scheme H, which could only begin after Scheme F had been completed, could probably be attained so far as first-line strength went by March 1941, but could not get its full reserves until March 1942. On this timing the money needed for Scheme F, and the small instalments of Scheme H

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- (1) C.I.D. Minutes, 283rd Meeting (1), 29 Oct. 1936.  
 (2) Sir Thomas Inskip, the Minister for Co-ordination of Defence, told the C.O.S. on 19 Jan. 1937 that "there was no doubt that the Cabinet.....had had in mind the proposition that air forces would be the most powerful factor in the future, and that therefore it might not be wise to spend too much on our land forces at the expense of our air forces". Mr. Chamberlain, in particular, he said, "was opposed to the idea of a large 'Continental' army such as we had had in the last war" - C.O.S. Minutes, 193rd Meeting.  
 (3) *Ibid*; also 192nd Meeting (2) and C.O.S. report on the role of the Army, 28 Jan. 1937. C.O.S. Paper 550.  
 (4) Cabinet 27(37), conclusion 2; and C.P. 165(37)  
 (5) A.M. File S.39676/29A. (6) *Ibid*; encl. 35A.

which had received government sanction, would be £82,500,000 in 1937, £100,000,000 in both 1938 and 1939, £95,000,000 in 1940, £85,000,000 in 1941, and £80,000,000 in both 1942 and 1943. The figures for the full Scheme H would be £85,000,000 in 1937, £115,000,000 in each of the years 1938, 1939, and 1940, £100,000,000 in both 1941 and 1942, and £95,000,000 in 1943.

Inadequacy  
of author-  
ised R.A.F.  
programmes

These figures, however, did not represent the true needs of the R.A.F. As the Secretary of State was careful to point out, neither Scheme F nor Scheme H took any account of the new situation created by Italy's action in North Africa. Moreover, "no scheme had been put forward to enable us to maintain a force equal to Germany in Europe and to meet requirements in the Far East in a Japanese war" at the same time. Nor was any provision included for radio-location, though "the R.D.F. has made such satisfactory progress that the Air Defence Research Committee has strongly recommended the immediate placing in hand of a chain of 20 stations at a capital cost of £1,000,000 and an annual cost of approximately £164,000." (1) There were other reasons, too, though the Secretary did not mention them in his letter, to suggest that the present figures would prove inadequate. There was the possibility that balloon barrages would be needed for other areas as well as for London. With the increasing range of aircraft, it was inevitable that the Observer Corps organisation must eventually be extended to cover the whole country. Above all, the rearming of the bomber force with the new four-engined machines which might begin in 1942 or 1943, would involve fundamental changes in organisation, manning, and equipment, whose cost could hardly yet be estimated. It might, for example, require the laying of tarmac runways on many of the bomber airfields. The existing grass surfaces could carry a load of only 5 tons on each aircraft wheel, whereas the B 12/36, when fully loaded, placed 7 tons upon each of its wheels. (2)

Admiralty  
and War  
Office  
replies:  
their new  
programmes

It is not, then, surprising that the Secretary of State, when supplying the Chancellor of the Exchequer with the figures he had asked for, was careful to emphasise that they were the estimates for programmes which were regarded by the Air Staff as no longer adequate to meet the air situation. The Admiralty and War Office, indeed, went further than this. Both submitted papers setting out estimates, not of the cost of their already authorised programmes, but of the cost of meeting what they considered to be "their requirements from a strategical point of view to meet the increased commitments which have to be taken into account". Thus, the Admiralty presented the figures for its "new standard", which would enable it to maintain adequate forces to deal with the Germans in Europe and at the same time provide an adequate deterrent to the Japanese in the Far East. (3)

Decision to  
prepare a  
new R.A.F.  
Expansion  
Scheme

It was not until October, it seems, that the Air Ministry learned what the other departments had done. On October 4 the C.A.S. (Air Chief Marshal Newall) wrote to the Secretary of State to give him the information and to suggest that the Air Ministry should likewise submit a statement of its full requirements. He recognised that none of the Services were likely to get all their demands approved, but urged that, since the others were submitting their full programmes, the R.A.F. must follow suit. (4) The

/ Secretary

- (1) Ibid.
- (2) Ibid., encl. 31A, 32A
- (3) A.M. File S.42667/3
- (4) Ibid., Min. 1.

The Secretary of State at once agreed. As the government was about to decide the character and scope of its armament programmes over a period of years, the Air Staff must provide figures upon a basis comparable to those of the other Services. They must state what other Powers intended and how far and how soon they were likely to realise their intentions - Germany's aim of 3,000 first-line aircraft, Italy's position, and "the unsatisfactory French situation previously disclosed". Apart from the late Prime Minister (Mr. Baldwin's) pledge of air parity, the Air Staff must say what they considered would be an effective answer to the German menace. This need not be "necessarily exact parity in men and machines", but it must at least be "an effective deterrent which would make the Germans feel that it was not worth while to try conclusions with us". The argument that Britain would have allies to help her must then be forestalled by saying that, if allies were assumed, it must also be assumed that Italy would be hostile and that it would not be safe to rely upon the French Air Force to do more than offset the Italian - if, indeed, it could do that. The Air Staff should also state how far their proposals were within the capacity of the country's industry and man power, and the date by which their new programme might be completed. They must emphasise that Germany possessed an "enormously effective gunnery defence"; that recent lessons had shown the anti-aircraft gun to be much more deadly than was thought a year or two ago; and that Britain therefore must have adequate gun and searchlight defences since parity meant not merely equal striking power but also equal defensive resistance from the ground. This done, the Secretary of State said, "you would have deployed what as a General Staff you consider is militarily the proper insurance of safety, leaving it to the Cabinet to decide the extent to which that programme should be carried out".<sup>(1)</sup>

Drafting of  
Scheme J.  
Oct. 1937.

Upon this basis the new Expansion Scheme J was elaborated. The work had to be rushed through in a fortnight as the ministerial Defence Plans (Policy) committee was due to review the requirements of the three Services in the third week of October.<sup>(2)</sup> The Scheme was in fact approved by the Secretary of State on October 20<sup>(3)</sup> and presented by him to the Defence Plans (Policy) committee on October 27.<sup>(4)</sup>

(b) Expansion Scheme J (October 1937)

Unique  
character of  
Scheme J

Expansion Scheme J was in its character unique among the expansion schemes of the years from 1934 to 1939. It provided what the Air Staff considered to be "militarily the proper insurance of safety". It provided for the overseas Commands and for trade defence equally with the Metropolitan Air Force. It was based upon strategical requirements rather than upon political considerations or considerations of available resources. It was, moreover, the first scheme to have its programmes based upon calculated strategical requirements - upon the various appreciations of the Joint Planning Committee of requirements for a war with Germany,<sup>(5)</sup> for a war with Japan,<sup>(6)</sup> for a war with Italy,<sup>(7)</sup> and for the protection of seaborne trade in a war against Germany,<sup>(8)</sup> or against Germany and Japan together.<sup>(9)</sup>

/ In its

- (1) Ibid., min. 2 (Oct. 2)
- (2) Ibid., Min. 3
- (3) Ibid., encl. 10A.
- (4) Ibid., min. 11; D.P. (P) Paper 12
- (5) C.O.S. Paper 549, approved by the C.O.S. Committee on 15 Feb. 1937.
- (6) Ibid., 579 of 7 May 1937
- (7) Ibid., 603 J.P. of 26 July 1937.
- (8) Ibid., 535 J.P. of 21 Dec. 1936.
- (9) Ibid., 621 of 14 Oct. 1937.



Its provisions

In its detailed programmes Scheme J<sup>(1)</sup> provided for the creation by 31 March 1941 of a total force of 3,031 aircraft in 203 squadrons. Of these, 45 squadrons, totalling 644 aircraft, were allotted to the Overseas Commands; four squadrons, totalling 56 aircraft were specifically allotted to trade defence; and the remaining 154 squadrons, totalling 2,331 aircraft, were to form the Metropolitan Air Force. These latter 154 squadrons were to be backed by war reserves amounting (with their immediate and workshop reserves) to 225% of their first-line strength. These, it was at that time assumed, would suffice to meet the wastage of the first four months of war. With such reserves the Metropolitan Air Force would be able to keep up its first-line strength during the first six months of war, since the current production of the factories during that period should be equivalent to two months' wastage. By the end of that time industry should have been placed on a war footing and be capable of keeping pace with losses. The Metropolitan Air Force would thus be "100% ready for war".<sup>(2)</sup> The overseas forces, too, would be ready, as war reserves were also to be provided for them on the same scale as for the home-based squadrons - the first time that this had been suggested.

Composition of the home based R.A.F.

Of the 154 squadrons (2,331 aircraft) forming the Metropolitan Air Force, 38 (532 aircraft) would be fighters; 9 (189 aircraft) General Reconnaissance; 6 (36 aircraft) Flying Boats; 11 (132 aircraft) Army Co-operation; and 90 (1,442 aircraft) bombers. The Scheme J force, apart from its Flying Boat and Army Co-operation units, would thus be appreciably larger than that of the current Scheme F, which allowed only 30 fighter squadrons (420 aircraft), 7 General Reconnaissance squadrons (126 aircraft), and 70 bomber squadrons (1,022 aircraft).

The bomber force.

The bomber force, in particular, would be not only larger but also much more powerful. Scheme F provided for 750 medium bombers as against only 240 heavy bombers, a ratio of about  $3\frac{1}{4}$  to 1 in favour of the medium bomber. Even Scheme H had only reduced this ratio to about  $2\frac{1}{2}$  to 1 (987 to 392). Scheme J, on the other hand, envisaged the eventual creation of an "all-heavy bomber" force. Such a force would not be attained until at any rate the spring of 1943, when it was hoped that the 90 squadrons would be made up of 22 squadrons of Wellingtons and Hampdens and 68 squadrons of the P 13/36 and perhaps also of the B 12/36 machines. But even by March 1941, the date for Scheme J's completion, it was hoped that only 26 squadrons (546 aircraft) would be equipped with medium bombers (Blenheims and Battles) as against 64 (896 aircraft) which would have ' heavies ' (140 Harrows and Witleys; 350 Wellingtons and Hampdens; and 406 P 13/36). This gave a ratio of almost  $1\frac{2}{3}$  to 1 in favour of the heavy bombers, and heavy bombers for the most part of much more powerful types than those looked for by Scheme F. With Scheme J, in other words, the Air Staff more or less explicitly committed itself to that 'big bomber' policy which had begun to engage its affections during 1936.

Scheme J no more than a minimum insurance

Such, then, was the programme which in the Air Staff's view would represent the minimum version of an 'ideal' R.A.F. to meet the threefold menace of German, Japanese, and Italian air power. To the Air Staff it indeed seemed no more than a minimum version. Its overseas forces would provide only a defensive deterrent against Japanese or Italian aggression; they would in no way suffice for offensive action. Nor would its Metropolitan Air Force provide true parity, in the strict sense, with the German Air Force. For by Scheme J parity in numbers would be secured only in the air striking force - the standard for fighters and naval and army co-operation units was now adequacy to their task not numerical equality with the equivalent German units.

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(1) D.P.(P) Paper 12; also A.M. File S.42667/5A  
(2) A.M. File S.42667/9A.

The idea of overall parity in numbers had, in fact, been abandoned. All that remained of it was the attempt to secure equality in striking power, in bombers. Nor was true parity aimed at even here. Scheme J would only provide by 31 March 1941 the number of first-line bombers which the German Air Force was expected to have by the close of 1939. Even here therefore the parity was largely fictitious; it was parity with a time-lag of fifteen months. It is hardly surprising that the Air Staff regarded Scheme J as no more than the minimum insurance of safety.

Scheme J barely attainable without drastic changes of policy

Industry

Yet, even while preparing the Scheme, the Air Staff had been aware that their minimum insurance would be barely attainable without drastic and at present improbable changes in government policy. Industry, working on its present peacetime basis, could not complete even the Metropolitan Air Force, leaving out the overseas increases, envisaged in Scheme J before the autumn of 1941. The best that it could hope to do by 31 March 1941 was to provide the first-line aircraft plus a 175" reserve (100% war reserve, 75% immediate reserve and workshop reserve).<sup>(1)</sup>

Men

To provide the aircrews and ground crews for such a force would be still more difficult, indeed impossible, under the existing policy of voluntary recruitment. The demands of Scheme J for men were very considerably greater than those of Scheme F. They were greater not only because the total number of squadrons was greater and because the newer bomber aircraft would require crews of three, four, five instead of merely a pilot and observer. They were also greater because Scheme J required a higher standard of readiness for war. It therefore provided for an addition of 20% to the peace establishment of operational units. These additional men were to be provided to make good the losses during the opening weeks of war, while the reservists were undergoing refresher courses or 'conversion' training.<sup>(2)</sup> All this, however, entailed a demand which was unattainable in the existing conditions of recruitment. So far as aircrews were concerned, the best that could be hoped for 31 March 1941 was to recruit and train enough to man the Scheme J force up to the Scheme F standard of readiness, that is without the 20% addition. Even this would imply increasing the entry of pilots in 1938 and 1939 by 500 in each year, or by 25% above the 1937 entry. On this basis the full Scheme J requirements for aircrews might be met by 31 March 1942. With ground crews the position was still more difficult. Scheme J would, for example, mean doubling in 1938 and 1939 the 1937 entry of flight mechanics, which was impossible. Even a 25% increase on the 1937 intake would provide by 31 March 1941 only 14,000 of the additional 24,500 airmen required. On that basis the requirements for airmen would not be met until March 1943 - and that basis itself was hardly attainable. The 1937 programme was here the best that could be looked for, and that would not provide the airmen Scheme J needed until towards the end of 1943. And, in addition to the problem of recruitment, there was the problem of training. If it had been possible to get the numbers which Scheme J required, then the pilot training establishment would have had to be doubled and the fitter training establishment quadrupled. This, in its turn, would have meant very large withdrawals of skilled men from the squadrons to make up the training staffs, with very harmful results upon the efficiency and readiness of the first-line units during the next few critical years.<sup>(3)</sup>

/ In its

- (1) A.M. File S.42667/9A.
- (2) Ibid., 5A,6,9A
- (3) Ibid., 3,6,6A,8A,9A.

Finance

In its demands upon the nation's industrial capacity and man power, then, Scheme J went right up to, and in some points actually beyond, the limits of what could be obtained without placing industry and recruitment upon a war footing. Its financial demands, too, - the measure by which its call upon the nation's total resources could be roughly judged - went beyond the limits which the government was then prepared to allow. It required an expenditure during the years from 1937 to the end of March 1942 of no less than £650,000,000, as against the £467,500,000 of Scheme F.<sup>(1)</sup> This represented an unduly large proportion of the total sum which the Cabinet was ready to allot to rearmament during those years. It is not surprising therefore that, when the Scheme was submitted for the preliminary approval of the Minister for Co-ordination of Defence (Sir Thomas Inskip), he insisted upon a drastic pruning of its proposals.

(c) The Rejection of Scheme J and the Origin of Scheme K

Sir T.  
Inskip's  
proposals  
4 Nov. 1937.

Sir Thomas Inskip, after perusing the Air Staff's proposed Scheme J, wrote to the Secretary of State for Air (Lord Swinton) on 4 November 1937.<sup>(2)</sup> His letter contained a series of questions which implied not only the necessity for serious cuts in the Scheme but also the possibility of a radical change in policy towards the bomber force. He asked what savings of money and men would be effected by abandoning the proposed overseas increases? He wanted to know what would be the cost of building up 'war potential'? He also asked how much would be saved if, while the Scheme J fighter squadrons were retained at full readiness for war, the bomber squadrons, or half the bomber squadrons, were left with an establishment that would allow them to become fully efficient only after mobilisation? Further, he wrote, "you will probably agree that you are not quite in the same position as the Navy in asking for parity in striking force. If our Fleet were defeated or unable to keep our communications open, we could not long survive. If, on the other hand, our air striking force were inferior, we should suffer more than the enemy at home.....but the result might not at once be critical. And, of course, to counter his striking force we should have our ground defences on whatever scale we may determine. My point is that we may be forced to consider a smaller air striking force".

Protests of  
of the  
Secretary  
of State  
Nov. 4

This breath of critical common sense laid bare once again the true essentials of national security. But the Air Staff could hardly be expected to let pass unchallenged so sharp a deflation of their claims for the pre-eminent importance of air striking power. Their reaction to the letter was prompt and vigorous. The Secretary of State replied, protesting, immediately he received the Minister's proposals.<sup>(3)</sup> While agreeing warmly that an improvement in 'war potential' was desirable, he protested strongly against any weakening of the air striking force. The Scheme J bomber force had been calculated upon the number of German aircraft that could and probably would be used against the United Kingdom. The government could not keep its pledge of parity on anything less. But, parity apart, the vital question was - what wins wars? "It is not the mere fact that the enemy's fleet is sunk or his army defeated, it is that the entire country and its resources are laid open to attack. The air fleets do not meet as in naval warfare, but the whole resources of the country are none the less laid open

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- (1) Ibid., 20A
- (2) A.M. File S.42667/12A.
- (3) Ibid., 13A

to attack from the immediate outset. From this it follows that success will go to the nation which can most quickly overcome the will of his opponent to continue the fight. The Air Staff consider, and I agree, that it would be radically unsound to accept a lower figure. The criterion which the Air Staff have put forward and which the government has just stated to Parliament is that we must have a force which will be an effective deterrent and will enable us to meet an enemy on equal terms. It is surely impossible to contend that either of these conditions is fulfilled unless our striking force is equal to that of the enemy. As I see it, we could only accept inferiority in striking power if we were satisfied of our superiority on two counts - first, our defences were stronger than the German defences, so that we could guarantee that German bombers coming to England would suffer more damage and heavier losses than English bombers going to Germany; second, that German targets were more accessible and vulnerable than English targets, i.e. we could guarantee that an English force would do more harm in Germany than an equivalent German force would do in England. Unfortunately, neither of these conditions is or can be fulfilled..... In these circumstances, I do feel most strongly that we must aim at parity in striking force".

Air  
Ministry  
replies  
Nov. 26

Three weeks later, on November 26, after full discussions with the Air Staff, the Secretary of State gave Sir Thomas Inskip their considered answer. The Secretary of State in his letter<sup>(1)</sup> added to his earlier arguments. "It would", he wrote, "be an illusion to suppose that we have a sure means of defence". The Air Staff and Fighter Command had "mobilised every asset that science can give" and had concentrated "wholeheartedly on applying the scientific results. But we must not exaggerate the possibilities" or be misled into over-confidence by recent improvements in anti-aircraft gunfire, by the value of balloon barrages, or by the unexpectedly good progress of R.D.F. "Counter-attack still remains the chief deterrent and defence". To abandon this view by accepting an inferiority in striking power, in bombers, would moreover be a definite change in policy. It would be an abandonment of the government's public promises, an abandonment of which they would have to inform Parliament. The effect of such an announcement upon the German government would, Lord Swinton thought, be disastrous. "I believe that nothing is so important as to come to an arrangement with Germany, and I believe it would be possible. But I am convinced that it would not be possible to do so unless the Germans remained convinced that we with our great resources would accept no position of inferiority".

The Air  
Staff  
Note

The Air Staff, in a Note which Lord Swinton enclosed with his own letter, elaborated similar arguments. After protesting that Scheme J's overseas forces were a minimum insurance since "the chance of a unilateral war with any single one of our potential enemies is extremely remote and that, if hostilities were to break out,.....we should very quickly find all three Powers arrayed against us", the Note went on to re-iterate the traditional doctrine of the offensive. "The bomber force is fundamentally the basis of all air strategy". It must be at instant readiness no less than the fighter force. If it needed time to mobilise, it would be but a poor deterrent to an enemy "hoping for early success by means of a sudden blow delivered with his maximum air strength at his own selected moment". It would also be very vulnerable while mobilising. In short, the "first few weeks may decide the issue one way or another and unless we are ready to hit back at an aggressor immediately he has shown his hand, we may never get on equal terms with him again." For these reasons, therefore, the Air Staff emphasised "that Scheme J was worked out as a balanced whole and, further, that the total air strength and the improved organisation which it involves represents in the view of the Air Staff the absolute minimum requirements for Imperial security.

/ If

(1) Ibid. 14A.

If therefore certain modifications to the Scheme are dictated by financial considerations alone, the dangers and weaknesses which will inevitably accrue should be fully appreciated before any decisions are taken".

Inskip's  
Memorandum,  
Dec. 15,

The arguments of the Secretary of State and the Air Staff did not, however, change Sir Thomas Inskip's opinion about what things were essential and what things could be afforded. On the contrary, in his Memorandum to the Cabinet of December 15, (1) he accepted only the increase in the home-based fighter force proposed in Scheme J. He rejected altogether the overseas increases and, while prepared to allow some addition to the first-line bomber force and to 'war potential', he suggested that the provision of reserves for all but the home-based fighters should be considerably reduced.

Approved by  
the Cabinet  
Dec. 22.

These proposals were discussed by the Cabinet on December 22. No final decision was then reached as to exactly how much money could be allowed for the expansion of the R.A.F., but the suggestions made by the Minister for the Co-ordination of Defence in his Memorandum were approved. Scheme J thus joined Schemes B, D, E, G, and H in the limbo of rejected proposals and the Air Staff settled once again to the task of cutting their coat more according to their cloth. The result of their labours was a new Scheme, Scheme K, which was completed on 21 January 1938.

#### (d) Expansion Scheme K (January 1938)

Discussion  
of Scheme K

There is no need here to go into the details of the Air Ministry discussions from which Scheme K emerged. Those discussions were somewhat involved and prolonged, largely because the government had not fixed clearly the extent to which the financial provision must be limited. (2) As a result, the Air Staff tried to preserve as much as they could of their Scheme J programme and their first draft for Scheme K only reduced the cost up to March 1941 by some £42,000,000, from £650,000,000 to £608,000,000. This reduction was considered by the Secretary of State to be insufficient. Accordingly, on 12 January 1938 it was ruled that the aim must be 'Scheme F plus £100,000,000', that is, a total cost by 31 March 1941 of £567,500,000. (3) This, with Sir Thomas Inskip's proposals of December 15 and the Secretary of State's ruling of January 2 that the first-line bomber force must be calculated at 1,350 aircraft - the figure which the German bomber force was expected to attain during the summer of 1938 (4) - provided the basis upon which the final version of Scheme K was framed.

The  
Scheme K  
programme

In this final version of Scheme K, issued on 21 January 1938, the overseas forces were left on the existing Scheme F basis and all the Scheme J increases were omitted so far as they were concerned. In the Metropolitan Air Force, the first-line strength and the reserves provided by Scheme J for the Coastal Command General Reconnaissance and Trade Defence squadrons and for Fighter Command were retained. Bomber Command, on the other hand, had its first-line strength reduced from 1,446 to 1,360 aircraft and its reserves cut from a figure estimated to cover sixteen weeks' war wastage to a figure estimated to cover no more than nine weeks. The reduction in reserves was offset to a certain extent by provisions for an increase of 'war potential', which

/ would

- (1) C.P. 316(37)
- (2) A.M. File S.42667/15A.
- (3) Ibid., 20A
- (4) Ibid., 17A

would enable industry to reach full war production slightly earlier. But it meant in effect that during the first weeks of war there would have to be some 'rolling up' of bomber squadrons to provide the necessary reserves. The Scheme K 1,350 aircraft would, for example, have thus to be reduced to an effective 1,000 first-line machines if they were to continue operating for 16 weeks at the same degree of intensity as under Scheme J. In other ways, too, the effective bomber force was weakened. In order to save on overhead costs in men and works, the squadrons were to be reorganised into flights of eight aircraft, though the tactical formation would remain six aircraft in the air. This would reduce the operative force from 86% to 75% of the first-line establishment. Furthermore, the Blenheims and Battles, which under Scheme J were to disappear on rearming before March 1943, were now retained until after that date for the three A.A.F. bomber squadrons. The proportion of heavy bombers as at 31 March 1941 would, however, be greater than under Scheme J - 928 heavies to 432 mediums, a ratio of more than 2:1 as against Scheme J's 1 2/3:1. (1)

Significance  
of Scheme K  
in bombing  
policy

Scheme K thus fell a good deal short of the Air Staff's idea of a minimum insurance for safety. Within the limits set by the government, it "creates the most effective deterrent possible, provides an effective close defence, and contains the maximum provision of striking force which the money will provide". But it "would not enable a counter-offensive to be maintained on the scale which they as an Air Staff regard as an adequate response to probable enemy attack". The improvement in 'war potential' was valuable, but the inadequacy of the bomber reserves must mean the 'rolling up' of squadrons and the conservation of the force to such a degree that the 'potential' may never become 'production' in the face of heavy enemy air attack". (2) There was, too, some doubt whether the calculations of aircraft, and more especially aircrew, wastage in war did not require revision in the direction of higher rates, which would make the Scheme K reserves even less adequate than they at present appeared. (3) Yet, inadequate as the Scheme K force might be, it could not be attained until well into 1941 - its first-line strength could be completed by 31 March 1941 but its curtailed reserves not until late in that year. And that first-line strength would be the equivalent, not of the strength of the German air striking force in 1941, but of the German air striking force in the summer of 1938. (4) In other words, Great Britain's industry and man power, under existing conditions of production and recruitment, could no longer hope to achieve real parity, even in air striking power alone, with the German Air Force.

A turning  
point in  
air policy

Scheme K thus marked the practical abandonment of the race for air parity. It marked also a virtual revolution in air policy. The government, by its directions and financial limitations, had imposed upon the Air Staff a policy whose primary emphasis was upon the defensive, rather than upon the offensive, aspect of air power. The first and most essential requirement was now to be the provision of fully adequate forces, backed by fully adequate reserves and maintained in a state of instant readiness, for the air defence of Great Britain and of Great Britain's seaborne trade. The offensive, bomber, force now took second place. Its strength was determined less by the idea of equality with the enemy's striking force than by the amount of money and resources left available after the demands of 'close defence' had been satisfied. So, the limitations of Britain's resources and the instructions of the government had compelled the Air Staff to give first place to defence, even before the detailed examination of the W.A. operational war plans had begun to

/ raise

- (1) D.P.(P).Paper 16; A.M.File S.42667/21A,33A
- (2) Air Staff Note of Jan.24 - A.M.File S.42667/33A
- (3) Ibid., 30A; A.H.B., V/5/9/2,11 and 5/8/4,5.
- (4) A.M.File S.42667/33A.



raise doubts about the value of the bomber force as a direct and immediate counter to the enemy's air offensive. This was a considerable reversal of the traditional Air Staff doctrine of the offensive, evolved in the War of 1914-1918 and confirmed by twenty years of peacetime study. Naturally the Air Staff did not like it. They emphasised that they still considered Scheme J as "the minimum strength required to provide a reasonable standard of security" and that the cuts now made were made against their will and for political and financial reasons only. (1) In the view of the C.A.S., Scheme K meant that "there would be an Air (Striking) Force well housed and well equipped of a first-line of 1,360 aircraft; not ready for war, with nine weeks' reserve behind it, a small training capacity, and a war potential which, though considerable, would not be in full production for many months after the outbreak of war. It appeared probable that there would be a period when the Air Force would come to a standstill owing to lack of reserves and the potential would consequently be useless (since the war would have been lost), if it were not destroyed". The D.C.A.S. heartily agreed - to him "Scheme K was now a completely unbalanced scheme". (2) But Scheme K was a poor and unbalanced reflection of the traditional Air Staff policy just because it was an accurate fore-mirroring of the shape of things to come. For this reason it marks a real turning point in the evolution of pre-war British air policy.

Scheme K  
rejected  
March,  
1948.

It is true that Scheme K, like Scheme J, was never more than a project. By the time the Cabinet came to discuss it, on 14 March 1938, the international situation had radically altered. Two days earlier Hitler had sent his troops into Austria. His action brought the possibility of war appreciably nearer and stirred the British government into a drastic revision of their attitude towards rearmament and industry. That revision, however, came too late and was still too incomplete to enable the R.A.F. to catch up with the German Air Force in the race for parity. Thus the new R.A.F. Expansion Scheme L served only to confirm and establish the implications of the abortive Scheme K.

(e) Expansion Scheme L (April, 1938)

New  
conditions  
governing  
Scheme L

So far as the R.A.F. was concerned, the immediate consequences of the German occupation of Austria were that Expansion Scheme K was referred back to the Air Ministry for acceleration (3) and that the aircraft industry was authorised to work double shifts by the Cabinet's decision, of 22 March 1938, to abandon its policy of 'no interference with the course of normal trade'. (4) By April 1 the Air Ministry had drafted on this basis the required new programme, known as Scheme L. (5) This Scheme may be briefly summarised as Scheme K with its date for completion accelerated from 31 March 1941 to 31 March 1940 and with its home-based fighter squadrons augmented by two first-line aircraft each from a total of 532 aircraft to a total of 608. In this form it must obviously cost more than Scheme K and both the Chancellor of the Exchequer and the Minister for the Co-ordination of Defence opposed it on the ground that it could not be reconciled with the Cabinet ruling of February 16 that the combined expenditure of the three Defence Ministries for the years 1937-41 must not exceed £1,570,000,000. (6) Their objection was, however, overruled. The draft Scheme was approved by a Cabinet committee of four ministers on April 6 and the Air Ministry was authorised to proceed with it without reference to

/ financial

(1) Ibid.

(2) Minutes of C.A.S. meeting, 18 Jan. 1938 - Ibid., 28A. That the C.A.S. omitted the word 'striking' from 'air (striking) force' is an interesting sidelight, as is the whole statement, on how strongly the Air Staff regarded the bomber force as being essentially the Air Force.

(3) Cabinet 13(38)

(4) Cabinet 15(38)

(5) C.P. 86(38)

(6) Cabinet 5(38).



financial limitations and upon the basis of providing the best force that the aircraft industry could produce by 31 March 1940.

'The best force that industry could produce by 1940'

Consultations between the Air Ministry and the aircraft industry<sup>(1)</sup> soon made it apparent, nevertheless, that the best force obtainable by March 1940, even under the new conditions, would be no more than the Scheme K force with a somewhat augmented Fighter Command. Such a force would require the production of some 12,000 aircraft of all types within the next two years and this was the greatest number that could be hoped for. Moreover, even if the aircraft industry had been able to produce more aircraft, the men to fly and maintain them could not be provided in the time. Even the adoption of conscription would have made little difference, for the limiting factor was not recruitment but the supply of trained instructors. These extra instructors could have been found only in the squadrons. Any very large increase, therefore, in the number of men under training must entail during the immediate future a diminution of effective first-line strength. The Air Staff had, indeed, already decided to convert two complete first-line bomber squadrons virtually into ab initio training units for air observers and wireless operators. And many other squadrons would have experienced officers and men taken from them to staff the training establishments for more pilots, for the new 'direct entry' observers, and for the increased numbers of R.A.F.V.R. and other reservists. In fact, as the Air Staff recorded on April 11, "it cannot be too strongly emphasised that the general limiting factor in determining real first-line strength is now that of personnel, under two heads:- (a) the provision of regular trained crews including air observers and W/T operators (present arrangements are totally inadequate to meet this requirement); (b) the provision of Reserve trained crews to replace wastage, including pilots capable of flying modern service aircraft, air observers and W/T operators (no advanced training organisation for the R.A.F.V.R. as yet exists and there is no crew policy for the reserve)".<sup>(2)</sup>

Provisions of Scheme L

Scheme L, therefore, in its final form as approved by the Cabinet on 27 April 1938, very closely resembled Scheme K. It left the overseas forces, the Army Co-operation squadrons, and the Flying Boats on the Scheme F scale, both for first-line and reserves. It preserved the Scheme J and Scheme K increases in the first-line strength and the reserves of the Coastal Command Reconnaissance and Trade Defence squadrons. It augmented the Scheme K thirty-eight squadrons of Fighter Command by two first-line aircraft each, providing a total of 602 home-based fighter aircraft. It provided a bomber force of much the same size as Scheme K, namely, 1,352 first-line aircraft with the same initial establishments for flights and squadrons and backed by the same nine weeks' reserve. The immediate efficiency of this bomber force, as compared with that of Scheme F, was, as in Scheme K, somewhat increased by a reduction in the number of non-regular medium bomber squadrons from eleven to three - the other eight A.A.F. and S.R. squadrons being distributed equally between Fighter Command and Coastal Command.<sup>(3)</sup>

Scheme L confirms implications of Scheme K

Scheme L thus confirmed the implications of Scheme K. It was, indeed, forced to do so, in spite of the facts that it could disregard financial limitations and that it could draw upon an aircraft industry working double shifts. For industrial capacity and, more particularly, recruiting and training capacity still set much the

/ same

(1) A.H.B. V.5/10/4.

(2) Brief for S. of S. on Scheme L, 11 April 1938) A.H.B. V.5/10/3; cp. conclusions of C.A.S. conference, April 12 - A.H.B. V.5/10/7; Paper by D. of O. on intake and training, April 26 - A.H.B. V.5/10/17; also Narrative of Training prepared in this Branch.

(3) A.M. File S.22846/V/1A.

Air  
parity  
not att-  
ainable

same bounds to what could be attained within the next few years. And those bounds fell far short of that the German Air Force was expected to attain. Scheme L, in fact, meant the formal abandonment of the attempt to attain parity with the German Air Force. Even if its programmes were realised, they would still not be completed until almost two years behind the corresponding German programme - "and there is every reason to suppose that in that time the German Air Force will have undergone still further expansion".<sup>(1)</sup> There was, indeed, reason also to suppose that the time-lag might be even longer. Some seven hundred of the regular pilots required to man the Scheme L first-line aircraft could not be fully trained until September 1940, without unduly depleting operational units to provide them with instructors.<sup>(2)</sup> But, even ignoring this last possibility, the government could no longer pretend to be keeping its pledge of air parity after it had authorised in Scheme L a programme which would only provide in the spring of 1940 a striking force equal to that which the Germans would possess in the summer of 1938 - if they did not already possess it. As the Air Staff put it, "we are endeavouring to compete with a nation of 70 million people, whose whole man power and industrial capacity has been in effect on a basis of national mobilisation for the past 4 years". The competition was too severe and even the accelerated programme in Scheme L fell in many ways far short of the level of safety. Yet "in many - indeed in most of these respects, the deficiencies could not fully be made good within the next two years"<sup>(3)</sup> Parity, in other words, even in offensive air power, was no longer attainable and the Air Staff was forced to recognise that it was no longer attainable.

New tend-  
encies in  
air policy  
confirmed

This recognition meant, of necessity, that Scheme L must confirm and establish the tendencies in air policy which had first clearly appeared in Scheme K. That the only increase over the Scheme K first-line strength was allotted to fighters, and that the Scheme K full scale of reserves and readiness were again retained only for the Fighter Command and Coastal Command squadrons proved conclusively that the requirements of 'close defence' now took first place. They were to be satisfied, as in Scheme K, by the sacrifice of the bombers' reserves. These were again fixed at the figure which it was estimated would cover only nine weeks' wastage. The truth was that, difficult as it might be to provide the numbers of fighter aircraft required - and the Air Staff believed that "if the full first-line strength of 38 fighter squadrons is to be maintained,.....a material increase<sup>(4)</sup> will have to be made in the productive capacity allotted to fighters

Defence  
has first  
claim

- it was still more difficult to provide the bombers. They were, especially the newer types, larger and more complicated; they took longer to construct and required much more extensive and varied equipment to make them effective. What was worse, they did not require merely a pilot, as did a fighter; or merely a pilot and observer, as had the old light bomber. All of them required crews. Even the Blenheim and the Battle needed a crew of three,<sup>(5)</sup> while the larger aircraft needed four, five, and with the P 13/36 six. This meant that, as well as pilots, air observers, air gunners, and wireless operators had to be found and trained. Moreover, reserves had to be provided for all these various members of the air-crew and it was now coming to be realised that these reserves, too, needed training. Yet, as we have seen, the operational squadrons were the only source from which more instructors (or at least flying instructors) could be drawn. There was therefore a very definite limit to the number of aircrews who could be trained by 1940 without excessively denuding the squadrons of their experienced members - a

/ limit

- (1) Air Staff Note, April 4 - A.H.B. V.5/11/7.
- (2) Paper by D. of O., April 26, A.H.B. V.5/10/17.
- (3) Air Staff Note, April 4 - A.H.B. V.5/11/7.
- (4) Brief for S. of S., April 11 - A.H.B. V.5/10/3.
- (5) A.M. File S.25873/IX/16A.

limit that was naturally more sharp in bomber crew training than in fighter pilot training. The full Scheme L numbers of trained bomber aircrews, first-line and reserve, could not therefore be produced before 1940. The Air Staff was accordingly faced with the choice between using its bomber force 'to destruction' in the first few weeks of war or of conserving that force by 'rolling up' a proportion of its squadrons to form a reserve behind a reduced first-line.

Conservation of the bomber force

There could be no doubt which of these two courses the Air Staff must choose. They must conserve the bomber force by 'rolling up' its squadrons and reducing its offensive effort. This, indeed, was the policy which they now accepted. In a 'brief' for the Secretary of State on Scheme L, of 11 April 1938, they explicitly stated that if war broke out in 1939 they would "operate only 50% of the Force, or the whole Force at only 50% intensity". By March 1940 the position would be somewhat better. "Most of the experienced personnel which we shall have had to take from the squadrons to form the extra training establishments for Scheme L, will be being released back to the squadrons. But.....even the Scheme L force by March 1940 will not have the necessary trained reserves behind it, nor will the additional productive potential, to be provided under Scheme L, be in full production. It will, in fact, not be till well on in 1941 that we have any chance (on our present voluntary system) of having a force of the strength of Scheme L which will be capable of sustained operations at its peace strength."<sup>(1)</sup> At the best, as another Air Staff paper pointed out, in 1940 the Scheme L force would be in the same position as the Scheme K force. "A striking force with a peace first-line of 1,350 aircraft with only nine weeks stored reserves, if it is to be able to continue operations at the same degree of intensity for sixteen weeks, will have to be reduced in effect to under 1,000 first-line aircraft. Our effective bomber strength will therefore be to that extent inferior to that of Germany in 1940, even assuming no further expansion of the German Air Force." And in all probability it would be inferior to an extent still greater than this. For the recent inquiries of the Director of Aircraft Production showed "that the maximum effort of existing industry and 'shadows' on a wartime three shift basis is 800 aircraft of all types per month in the most favourable circumstances; and that this maximum output will not be reached until at least the eighth month". The situation would eventually be improved "by the provision of extra productive potential which is allowed for in Scheme L to the tune of £10 to £16 million; but this cannot begin to take effect for two years at least, even if work began at once."<sup>(2)</sup> The effect of all this upon the bomber force, even as late as 1940, may be judged from the fact that, while "if we are to maintain Scheme L at full strength throughout the first year of war we shall (on the basis of preliminary calculations) require from industrial sources no less than 19,000 aircraft in that year,.....we still have no industrial capacity to produce more than.....7,000"<sup>(3)</sup> "The effect of this on the bomber force", to quote the Air Staff again, "in addition to that of the shortage of reserves.....will again be either that our operational effort will have to be still further drastically reduced at the outset, if we are to have any chance of sustaining operations at the rate at which we begin the war, or that its bombing effort will suffer a disastrous decline about the fifth month of the war onwards to approximately 35% of the effort which we now consider necessary."<sup>(4)</sup>

Significance of Scheme L

The adoption of Scheme L, then, did not merely mean that the Air Staff and the government had been compelled by lack of resources to abandon parity as a practical aim and the primacy of the offensive as a governing principle. It meant also the acceptance, at least until

/ 1941,

(1) A.H.B. V.5/10/3.

(2) A.H.B. V.5/11/7.

(3) Minute by S.9, April 23 - A.H.B. V.5/10/5; A paper by W.O.1 of May 10 showed the monthly total requirement as 1,803 against industry's best output of 800 - A.H.B. V.5/10/10.

(4) A.H.B. V.5/11/7.

1941, of a policy of conserving the bomber force by drastically limiting its offensive operations; of a policy so 'conservative' as to be virtually defensive.

(f) The improving prospects of 'close defence'.

Emphasis  
now on  
defence

The adoption of Expansion Scheme L meant that, if war with Germany broke out in 1938 or 1939, Great Britain could no longer hope to rely principally upon her bomber force to reduce the intensity of German air attack. To avert defeat from the air in the opening phase, she must now - quite contrary to the traditional R...F. doctrine - rely principally upon her 'close defence'.

Improved  
prospects  
of  
defence

This revolution in policy was, as we have seen, forced upon the Air Staff by the limitations of Britain's man power and industrial capacity. It was never accepted as an ideal strategy. But by 1938 it was no longer the desperate gamble that it would have appeared to be in 1934. For by 1938 the chances of a successful 'close defence' had been very considerably improved. The detailed story of this improvement belongs, of course, to the Narrative of the Air Defence of Great Britain, but its outlines must be briefly summarised here if the evolution of bombing policy is to be clearly appreciated.

The dif-  
ficulties  
of 'close  
defence'

There had always been four great obstacles to a successful 'close defence'. There was the difficulty of obtaining forewarning of the approach of enemy bombers in time to allow the fighters to take off and climb to operational altitude before their arrival - a problem made more acute by the steady increase in bomber speeds. There was the difficulty of guiding the fighters, when they were in the air, to the correct point for interception. There was the difficulty of providing fighter aircraft with the fire power to 'kill' in a single attack and the margin of speed to regain an attacking position if they failed at the first attempt. Finally, there was the difficulty of producing anti-aircraft gunfire sufficiently concentrated and sufficiently accurate to be a real menace to the bombers.

These dif-  
ficulties  
lessened  
by 1938.

R.D.F.

By 1938 these obstacles, though still far from being totally removed, had all been appreciably lessened. The progress of R.D.F. has already been referred to. It had now passed out of the merely experimental stage. It had been so successfully tested, for example in Fighter Command Sector Exercises in August 1937,<sup>(1)</sup> that the Home Defence Research Committee felt justified in advising the construction of a chain of twenty-two R.D.F. stations. When this chain was established, it might be possible to discover the enemy bombers early enough for the defending fighters to take off and climb to operational altitude by the time the bombers reached the shores of Britain. Raids might thus be intercepted at the coast instead of sixty or more miles inland - a very great improvement, especially for the defence of Britain's most important target, London.

Ground  
control of  
fighters

With the R.D.F. to detect them over the sea and the Observer Corps to plot them over the land, the enemy bombers might be watched, and their position and track might be plotted, sufficiently early and with sufficient accuracy for their interception to be reasonably likely, provided that the information could be passed promptly to the fighters. And, thanks to the development of radio-telephony, this, too, could now be done. R/T sets, sufficiently compact and efficient for use in fighter aircraft, had been developed to permit intercommunication by speech not only between fighter and fighter but also between fighter and ground station up to a radius of fifty miles or more. It had thus been possible to develop a system of controlling the fighters' movements from the ground on the basis of the information supplied by the

/R.D.F.

(1) A.M. File S.41464.

R.D.F. and the Observer Corps. The defending aircraft could thus be guided into the vicinity (1) indeed, by day frequently to within sight, of the raiders. (1)

New  
Fighter  
aircraft

No less important was the improvement in the fighter aircraft themselves. The first of the new monoplane types were just beginning to come into service in the summer of 1938. By September of that year it was expected that there would be five or six squadrons armed with Hawker Hurricanes, machines carrying eight Browning machine guns in their wings and capable of flying at speeds approaching 340 m.p.h. There was also to be one squadron equipped with the similarly armed but even faster Supermarine Spitfire. (2) These two types were now going into quantity production. In addition, the promising twin-seat Bolton Paul Defiant, with its power-operated turret of four machine guns, had just passed its trials. Prototypes were also being built of a single-seat fighter to carry four 20 mm. cannon in its wings; and of a twin-engined, two-seat machine to carry two such cannon in its nose as well as four machine guns in a turret on its back. At the beginning of 1938 the Air Ministry had gone even further by ordering from Boulton and Paul two prototypes to a new specification (F 11/37) requiring a turret with four 22 mm. cannon and a speed of 370 m.p.h. (3) All these machines would have a margin of speed, as compared with the newest bomber aircraft, sufficient to allow them to regain position for a second attack. All could produce a fire power which, if accurately directed, should make a second attack unnecessary. When once they came into service, as they were already beginning to do, Fighter Command would have the weapons to exploit decisively the opportunities provided by the R.D.F. and ground control systems. It might reasonably hope not only to fix and to find, but also to destroy, its enemy.

Ground  
defence

This, in its turn, had meant that the ground defences could be much more concentrated. The 'Outer Artillery Zone', a chain of thinly-spread guns, had already been dispensed with and the guns concentrated around the most important targets. These, assisted (at least around London) by the newly established Balloon Barrage, they might hope by concentrating their fire to make it much more deadly. It was this, as well as the improvements made in the guns and predictors themselves, which produced that greater hopefulness about the effectiveness of anti-aircraft gunfire which has already been noticed.

The night  
raider  
problem

The problem of finding and destroying the enemy in darkness was, it is true, still far from solution. Neither the R.D.F. nor the Observer Corps could plot a bomber's course with the degree of accuracy required to guide a fighter to within sight of it at night. Yet even here there was some improvement. The R.D.F. and ground control systems could at least guide the fighter into the right general area. The searchlights might help a little further. And investigations into the best methods of visual interception were being supplemented by more complicated experiments with, for example, the use of infra-red photography. Whether these would lead to useful results, whether indeed it might not eventually prove possible for the fighter to do its own close-range radio-location, could not yet be foretold. But the ways to further progress were not obviously barred. Meanwhile the slight improvement in the night fighter's chances; the improvement in the concentration, range, and accuracy of anti-aircraft gunfire; and the use of balloon barrages - all these would tend

/ to

- (1) For brief summaries of this progress, see Air Liaison letters 1933-7 A.M. Files S.25873/IV/45A; VI/12B,32A,54A; VII/9A; VIII/9A.
- (2) Mobilisation committee, 17th meeting, 10 March 1938 - A.M. File S.37613.
- (3) Air Liaison letters - A.M. File S.25873/VIII/18A, 29A; IX/8A,22A,35A.

to make the night bomber's task less easy and to force him to operate at levels too high for accurate aiming. The Air Staff, as we have seen, had anyway no great faith in the possibility of effective night bombing. The slight improvement by 1938 in the prospects of night defence at least served to encourage their hopes that the night bomber was not an enemy too greatly to be feared.

Influence  
of these  
changes  
upon air  
policy

Now it is true that these various improvements in the prospects of successful 'close defence' seem to have impressed statesmen and scientists rather more than they impressed the Air Staff.<sup>(1)</sup> Yet, even to the Air Staff, they suggested that a defensive strategy might not now prove quite so hopeless a gamble as it had formerly seemed. The air defence forces by themselves might not be able to provide, as could the defence forces in the other two elements, a shield behind which a victorious offensive could be prepared. But they might perhaps be able to bear successfully the increased burden which must be thrown upon them by a reduction in the intensity of the bomber force's counter-offensive. If they were to do so, however, they must be strong enough, ready enough, and well enough backed by reserves to sustain an effort whose intensity must be dictated not, as with the bombers, by the policy of the Air Staff but by the intensity of the enemy's operations. Here, then, was a strong argument to confirm the policy of Schemes K and L, of preserving an adequate first-line fighter force at instant readiness and backed by the full scale of reserves.

Tendency  
to give  
priority  
to  
fighter  
production.

Indeed, the implications of the argument went further. If the bomber force was going to be held back and conserved until 1941 or 1942, it would be all the more essential to provide the utmost fighter strength possible in the preceding years. The Air Staff anticipated that by October 1939, provided a reserve of 500 trained fighter pilots could be built up, the thirty-eight Scheme L fighter squadrons would be able to "operate at planned intensity for approximately two months, after which the effort, in so far as governed by aircraft production, would drop to the equivalent of 16 full squadrons in about the 26th week". This would mean "that we shall be unable to put up an effective close defence at all". By March 1940 the period of full intensity might be prolonged beyond the two months, but eventually "the effort must drop to the 16 squadrons....since this is dictated by the productive capacity of the industry.. If the full first-line strength of 38 fighter squadrons is to be maintained it is clear that a material increase will have to be made in the productive capacity allotted to fighters".<sup>(2)</sup> Thus, even in April 1938, the improving prospects of defence and the inadequacy of the productive capacity allotted to realising those prospects were beginning to present a strong temptation to limit and retard still further the bomber offensive by diverting in the immediate future a larger proportion of the limited industrial and training resources from bombers to fighters. The temptation was none the less strong because a fighter aircraft could be made more easily, more quickly, more cheaply than a bomber; and because a fighter needed only a trained pilot whereas a bomber needed a complete trained crew. Fighter adequacy might still be an attainable aim, even though bomber parity was not. This fact in itself could not but tend to give the fighter priority over the bomber in the conditions of 1938.

/ (g)

- (1) e.g. the exchanges between Sir Thomas Inskip and the Secretary of State for Air, quoted above, pp.13 ff.  
(2) A.H.B. V.5/10/3; 5/11/7.



(g) Tendencies in bomber design and equipment 1937-8Changed  
idea of  
bomber  
offensive.(1)  
Character  
of its  
operations.

By 1938, then, a change was occurring in the conception of the bomber force's role; in the conception of the character, purpose, and timing of its offensive. The change in the conception of the character of its operations was a change in degree rather in kind. It arose as a consequence of the improved prospects of successful close defence. The Germans, it is true, had not yet discovered the possibilities of R.D.F., but should their armies occupy the Low Countries, that would enable them to establish an advanced warning system almost as efficient. The performance of their new fighter aircraft, in particular the Messerschmidt 109 and 110, was already feared and the day might not be very distant when they too would each mount eight machine guns or perhaps even small cannon comparable to the 20 mm. cannon with which the British were already experimenting. It was therefore more than ever hopeless for the bomber to dream of relying upon its powers of evasion. It could not hope either to outpace or to outclimb or to outmanoeuvre the contemporary fighter. To rely upon concealment by cloud or darkness would so reduce the intensity and accuracy of its attacks as to rob them of all decisive effect. If the bomber were to get through to its objective and get home safely, it must expect to fight its way through for a great part of both its outward and its return journeys. (1)

Increased  
bomber  
defensive  
armament

The bomber's defensive armament, active and passive, was continually being increased. Moreover, though it could still not dispense with forward-firing guns, its chief danger now came from astern and below, the most practicable direction for attack by the new high speed fighters. (2) It needed a rearward and downward defence to match an attack by eight machine guns or more - or perhaps eventually by four or more 20 mm. cannon. That is, it would need at least four to six machine guns firing backward and downward. For batteries of this size, turrets would be necessary - a two, or better a four-gun turret in the tail and a two-gun mid-under turret. Even by May 1938 the Bombing Committee had agreed that every bomber must have more than one turret, to give it an all-round field of fire so that it could defend itself singlehanded against the guns of contemporary fighters. (3) The turrets, too, had to be power-operated, since it had been found with the early Whitleys that manual operation was impossible at speeds in excess of 160 m.p.h. (4) All this of course increased the bomber's load and thus its all-up weight. Nor did it increase them merely by the guns, turrets, and ammunition. It also increased the numbers of the aircrew, for an air gunner had to be provided for each of the turrets. Furthermore it raised new problems in the fire-control of a bomber formation. There was more than ever need for a 'captain' who could see all round and give orders. Such a captain could hardly be provided in a small, one-pilot, medium bomber and in the Blenheim and the Battle only the back-seat gunner had a decent field of view. (5)

Need for  
armour

By 1938, moreover, it was becoming apparent that defensive armament alone was not sufficient. There was need for protective armour also. Experiments with thin sheets of armour plate and with bullet-proof glass were made in 1937 and 1938. (6) In the summer of 1938 the Bombing and Air Fighting Committees agreed that the bomber's crew and engines should be protected against machine gun bullets - more could hardly be done because, at least with the tail turret, the weight of the armour would upset the aircraft's centre of gravity. (7)

/ Self

- (1) Air Staff Note on Bombing Policy, 8 March 1938 - A.M. File S.43442/20F.
- (2) Air Fighting Committee 14th Meeting, 29 Nov. 1938, on tactical experiments with new fighters.
- (3) Ibid., 17th Meeting. By Sept. 1939 there was a definite ruling that all the new bombers must have tail and mid-under turrets as well as forward-firing guns - A.M. File S.32832/1/93.
- (4) A.M. File S.25873/VII/19A.
- (5) Air Fighting Committee, 14th Meeting.
- (6) A.M. File S.25873/IX/8A,35A.
- (7) 4th Interim Report.



Self-sealing petrol tanks were also being developed in 1938, but, although the tanks sealed themselves satisfactorily, they were twice as heavy as the ordinary tanks.<sup>(1)</sup> Weight of armour, as well as of armament, was forcing up the size of bomber aircraft.

Need for speed and performance

Yet, if the bomber was being forced to depend for safety upon guns and armour, this did not mean that its powers of evasion could be ignored. Speed still ranked high, if no longer highest, among its qualities. The bomber could not hope to outpace the fighter, but it must keep the margin of speed as narrow as possible.<sup>(2)</sup> It needed speed also to reduce the time which it must spend in flying across defended enemy territory.<sup>(3)</sup>

Need for good 'ceiling'

Equally it needed a good operational 'ceiling'. The ideal of 25,000 feet<sup>(4)</sup> might be unattainable, but the nearer it was approached, the less lethal anti-aircraft gunfire would become and the more the fighters would have to use up their limited endurance in climbing. For high altitude flying, however, more equipment was required. Oxygen apparatus was needed, even for heavy bombers now that they were no longer to be merely low or medium level night birds.<sup>(5)</sup> Heating had to be supplied, not only for the crew, but also for many of the instruments and for the machine guns - the new Brownings froze at -10° Centigrade, the equivalent of 15,000 feet in summer.<sup>(6)</sup> Icing also became a problem. In 1937 and 1938 a number of aircraft in the squadrons were experimenting with various devices for 'de-icing' their wings, engines, airscrews, and instruments as well as with windscreen wipers and projects for 'clear view panels.'<sup>(7)</sup> All this again meant an increased load, increased engine power, and increased aircraft size, however much performance might be improved by 'streamline' design and aided by internal bomb stowage and retractable undercarriages.

Low level needs

The bomber would also be required to operate sometimes at low level, as well as being driven down occasionally for purposes of evasion. The development of two-speed superchargers and of 100 octane petrol now made this possible without serious loss of performance.<sup>(8)</sup> Yet low altitude operations now entailed new problems of their own, particularly that of balloon barrages. It might be necessary to add to the bomber's equipment cable-cutting devices, possibly special balloon-destroying weapons.<sup>(9)</sup> Dive-bombing, too, it had already been decided in 1936, required the fitting of 'flaps' to the wings of modern aircraft.<sup>(10)</sup>

Every improvement in the weapons of air defence was thus making the bomber more complicated and larger.

(2)  
Change in purposes of the offensive

The change that was developing in the conception of the purpose of the bomber offensive worked in the same direction. Examination of the W.A. Plans was suggesting that the bombers could be used with much greater profit against Germany's industry and communications than directly against her armed forces. This was putting an

/ increased

(1) Ibid.

(2) The newly-evolved '111' attack, by which the fighter attacked from underneath after climbing steeply from 2 or 3,000 feet below the bomber, required a margin of 60 or 70 m.p.h. - 4th Interim Report, Bombing and Air Fighting Committees.

(3) e.g. specification B 1/35 - A.M. File S.35214/17A & B; Air Staff requirements for P.13/36 - S.38148/1A.

(4) Air Staff Note on Bombing Policy, 8 March 1938 - A.M. File S.43442/20F.

(5) A.M. File S.32832/I/6.

(6) Mobilisation Committee, 17th Meeting, 10 March 1938 - A.M. File S.37613/(unpaginated).

(7) A.M. File S.25873/IX/8A,35A.

(8) Minutes of 1st Meeting of Bombing Policy Committee, 22 March 1938 - A.M. File S.43442/25A.

(9) Air Staff Note on Bombing Policy, 8 March 1938 - A.M. File S.43442/20F.

(10) A.M. File S.25873/VII/9A.

Need for large bombload

increased premium upon bombload and range. So far as bombload was concerned, it was clear that there were few industrial or transportation targets which could be put out of action by bombs of less than 250 lbs and some which would call for a 1,000 lb bomb or heavier - canals, dams, bridges, railways, for example. (1) As it was not to be hoped that in war more than 10% of the bombs dropped would hit their target, this meant that each bomber ought (if it was to have a reasonable chance of success) to be able to carry at the very least ten 250 lb bombs (2,500 lb in all), perhaps ten 1,000 lb (10,000 lb. in all) or even, for attacking the enemy's armoured ships, ten 2,000 lb. (20,000 lb in all). (2) And in the interests of speed and performance, these bombs must be internally stowed.

Need for range

Range was no less essential. Even the Ruhr would entail a long flight from the United Kingdom, especially if the Low Countries were neutral. And there were other important factories and communications which lay much deeper in the interior of Germany. The minimum operational radius of action thus required of a British bomber was 750 miles, which meant a range of 2,000 miles at least. (3) For the greater part of this distance the bomber would be over either enemy territory or the sea. Reliability was therefore a first necessity. Two engines were essential - two had always been insisted upon for over-sea operations - and four might be desirable, (4) especially as such distances must lend enchantment to any improvement in speed and performance. The bomber must also carry a dinghy and marine distress signals - even the narrow-fuselaged Hampden was now required to find space for a dinghy as an 'alternative load'. (5)

New navigational requirements.

But increase in range meant increase in size quite apart from questions of extra fuel, extra reliability, extra rescue apparatus, and extra ammunition. It added immensely to the complication of navigation. At such distances the bomber must be capable of operating accurately by night as well as by day, for long periods over cloud and out of sight of land. It must carry flares as well as incendiary bombs. It would need an automatic pilot. It must have adequate W/T and R/T equipment, including D/F loops, for direction-finding, communication with other aircraft, and blind-landing by radio. It would need a screened observation hatch for astro-navigation; a chart table; gyro horizon and turn indicators; station-keeping lights; and a terrifying array of instruments, many of which must be engine-driven and heated to prevent freezing at high altitudes. (6)

Increase in crew

All these things added directly to the weight and size of the bomber. They also added indirectly by making necessary a larger aircrew and more space for them. Navigation had become a whole-time occupation, pursued at chart table and in observation hatch. The W/T operator, likewise, would soon be kept too busy to have time to spare

/ for

- (1) Development of the 1,000 lb bomb was authorised in 1938 - 4th Interim Report, Bombing Committee.
- (2) A.H.B. V. 5/11/1.
- (3) This was agreed by the Bombing Committee at its 17th Meeting on 4 May, 1938.
- (4) A.M. File S.32832/I/7.
- (5) Minute by A.C.A.S., 14 July 1938 - A.M. File S.40110/27.
- (6) Automatic pilots were already standard equipment in all new bombers - e.g. B 1/35 - A.M. File S.35214/17A & B. A standardised W/T & R/T set, with D/F facilities, had been introduced since 1935 and D/F loops began to be installed in 1937 - A.M. File S.25873/VI/12B; VIII/29A. The installation of observation hatches in aircraft and the training of pilots in astro-navigation had begun in 1937 - *ibid.*, VIII/9A; IX/8A. All this entailed chart table work and meant placing drift sights, etc., where the navigator could see them without leaving his seat - *ibid.*, IX/22A. Gyro horizon and turn indicators, engine-driven, had to be fitted even to Battle and Blenheim aircraft from 1937 - *ibid.*, IX/8A. Service trials of Lorenz blind landing by radio equipment were to begin in 1938 - *ibid.*, VIII/9A; 29A; IX/22A.

for any other duties, except to act as an emergency air-gunner. The pilot could not possibly perform the duties of either of these men and fly the aircraft as well. A crew of three thus became essential, even on the Blenheim and the Battle. Aircraft equipped with tail and mid-under turrets needed in addition two extra air-gunners. A crew of at least five was thus becoming normal. Two pilots for each of the newer bombers had already been authorised. Already Bomber Command was pressing for a 'crew policy' which would make each member a whole-time specialist with a wide enough knowledge of his fellows' work to enable him to take over some part of their duties in an emergency. (1) The most revolutionary and most difficult consequences of this increase were felt in the training of bomber aircrew and therefore lie outside the scope of this Narrative. (2) But to a lesser degree their effect upon bomber design was also important. It meant that the fuselage must be much roomier - the navigator must have his chart table; all must have their rest stations, even a lavatory, as well as their action stations. There must be a new intercommunication R/T set added to the existing equipment, which lacked the power to supply intercommunication between more than two points. (3) The bomber, if it was to be accurately navigated with an adequate bombload over the required distances, must now be comparatively large and commodious and heavy.

(3)  
Change in  
timing of  
the  
offensive

The change in the timing of the offensive made it both possible and necessary to plan the creation of a force of such machines. The diminishing emphasis upon the prompt counter-offensive as a method of reducing the enemy's initial air attack made possible the policy of conserving the present force until a more adequate one could be built to replace it. The virtual abandonment of the principle of parity did much to weaken the fetish of mere numbers. The tendency to postpone the bombers' major task until the second phase of the war - until the preparation of victory by action against the industrial and transportation bases of the enemy's belligerent power - placed a greater value than ever upon the weight and intensity, the continuity and accuracy, of their offensive. These qualities could now be achieved only by aircraft larger and more powerful than the Blenheims and Battles, or even the Hampdens, Wellingtons, and Whitleys of the pre-1936 specifications.

Inadequacy  
of pre-  
1936  
bomber  
designs

Blenheim  
and  
Battle

Henley

It was becoming less and less practicable to crowd into these machines of pre-1936 design all that by 1938 a bomber was considered to require. There was little or nothing that could be done to increase the very inadequate range and bombload of the Blenheim and the Battle. (4) They could not be given tail turrets or any real downward defence. Nor, despite the addition of a few extra instruments, was there room for their navigational equipment and accommodation to be much augmented. Both were too small for what were now regarded as the minimum requirements of an efficient bomber. Their inadequacy made it useless to proceed with the light bomber of the 1934 programme, the P 3/34, and at the end of 1937 the Hawker Henleys which were being built to this specification were relegated to target-towing. (5) For the same reason the light-medium bomber specification of the 1936 programme was abandoned without so much as tenders for its design being invited. (6)

/ Even

(1) e.g. letters from Air Chief Marshal Steel, 1 Sept. 1937 - B.C./7813; Air Chief Marshal Ludlow Hewitt, 10 Nov. 1937 & 14 July 1938 - B.C./S.20711, 21116; Bomber Command Instructions for Operational Training, 1937, appendix A.

(2) See the Narrative of Training prepared in this Branch.

(3) A.M. File S.36066/20, 21, 23.

(4) 14th Meeting of Mobilisation Committee, 11 June 1937 - A.M. File S.37140/43A; 17th Meeting, 10 March 1938 - A.M. File S.37613 (unpaginated).

(5) A.M. File S.32831/57.

(6) A.M. File S.39435/9B.

Whitley

Even the pre-1936 heavy and heavy-medium bombers could only partially and with difficulty be adapted to 1938 standards. The Whitley, in spite of the equipment of the later Marks with Merlin engines and two-speed superchargers, was still too slow and lumbering.<sup>(1)</sup> Its defence was being improved by the substitution of a four-machine gun, power-operated tail turret in place of its original one-machine gun, manually-operated, turret; and by the addition of a retractable 'dustbin' two-gun mid-under turret.<sup>(2)</sup> These, however, increased 'drag' and so did not help its performance. Nor was the Whitley's space for navigation very satisfactory.<sup>(3)</sup>

Hampden

The Hampden, though its performance was better and its range (1,500 miles)<sup>(4)</sup> and bombload (3,225 lb)<sup>(5)</sup> fairly good, was even more cramped for crew space than the Whitley. Eventually, towards the end of 1937, the problem of providing a minimum of accommodation for navigation was more or less solved by the sacrifice of the nose turret. Bomber Command were then satisfied with it on that score<sup>(6)</sup> but the Commander-in-Chief still feared that its armament - a two-gun mid-under turret and a fixed gun and a 'loose' gun forward - would prove too weak.<sup>(7)</sup>

Wellington

The Wellington, a larger and later machine, was much more satisfactory, at any rate after the re-designing of the navigational accommodation for the Mark II.<sup>(8)</sup> Yet even its armament - a one-gun nose turret, a two-gun tail-turret, and a two-gun mid-under 'dustbin' - was none too powerful.<sup>(9)</sup>

Warwick

The Vickers Warwick, representing the B 1/35 specification<sup>(10)</sup> and modelled closely upon the Wellington, had had most of the up-to-date requirements incorporated in its design by the time the revised Air Staff requirements for it had been approved in March 1938.<sup>(11)</sup> The design had, however, made very slow progress, partly because Vickers were "somewhat wrapped up" in work on the Wellington, partly because of the continual revision of the Air Ministry's requirements.<sup>(12)</sup> It was still so far behind the 1936 designs that towards the end of 1937 suggestions were made for its cancellation or for its re-designing on the lines of the P.13/36.<sup>(13)</sup> The later history of this ill-starred aircraft seems to prove that with the Wellington the limit had been reached of what could be obtained from a twin-engined design. With the Warwick, a would-be super-Wellington, the two engines could not provide the power which its weight and size required.<sup>(14)</sup> Put into production in 1941, after long hesitations, it was destined to see its most active service in air-sea rescue work.<sup>(15)</sup> But even by

/ 1938.

- (1) A.M. File S.25873/IX/35A. None of these were to be in service until late in 1938 - A.M. File S.32832/I/56.
- (2) A.M. File S.32832/I/54A, 79A, 91A; S.25873/VIII/9A, IX/22A.
- (3) A.M. File S.32832/I/55.
- (4) A.M. File S.40110/4A.
- (5) Overload of 5,000 lb if this included two 2,000 lb bombs - A.M. File S.41432/47A.
- (6) A.M. File S.40110/4A, 10A, 11A, 33A, 33B.
- (7) A.M. File S.46368/1A.
- (8) A.M. File S.35214/49.
- (9) A.M. File S.25873/VII/19A.
- (10) The Armstrong-Whitworth and Handley Page contracts had been cancelled in March 1937 because of lack of progress - A.M. File S.35214/47A.
- (11) Ibid., 17A, 17B, 24A, 49, 50, 56A, 77A, 77B.
- (12) Ibid., 42.
- (13) A.M. File S.39369.
- (14) Remarks of A.C.A.S. (T), Dec. 1942 - Ibid., 139A.
- (15) Ibid., 107A, 145A.

1938 enough had been learned from its design to suggest that the bomber of the future might have to be four-engined rather than two-engined.

The 1937  
programme:  
search for  
smaller  
bomber  
than the  
P13/36

This of course might not necessarily mean that all future bombers must be as large as the B 12/36 or P 13/36, the only designs now left for consideration. The general limitations of finance, industrial and training capacity, and man power made it important to keep the size and complexity of the bomber as low as was compatible with offensive efficiency. So in the 1937 design programme the Air Staff included not only proposals for research by the R.A.E. into the possibility of a super-B 12/36, the B 25/37<sup>(1)</sup> and of a high altitude bomber to operate at 30-40,000 feet, but also for something smaller than the P 13/36.<sup>(2)</sup> This project, the B17/37, aimed at getting the speed and range required for the Metropolitan striking force from a small twin-engined development of the Blenheim, of 15-17,000 lb all-up weight. "We hope", the C.A.S. said, "in the course of our investigations to learn whether an economical limit of size for bomber types is yet in sight".<sup>(3)</sup> The chances of much immediate progress being made with such a design were small, for the design staffs of the firms were already overloaded from 1936. The Director of Technical Development indeed suggested that the 1937 programme could be included in the estimates only for purposes of record.<sup>(4)</sup> In the event, the preparation of the draft specification served only to "strengthen the opinion that the range, bomb capacity, speed, and defensive power which will be required in the future for the Metropolitan force cannot be obtained from an aeroplane as small as a Blenheim and that no more suitable equipment than the P 13/36 can yet be designed." Work on the B 17/37 was therefore abandoned. Instead, the Air Staff prepared an appreciation of the future bomber equipment which they required.<sup>(5)</sup>

#### (h) The 'Ideal Bomber'

Air Staff  
paper on  
the Ideal  
Bomber  
March  
1938

This appreciation, the Air Staff paper on 'Considerations affecting the Design of the Ideal Bomber Aircraft for the Royal Air Force' (March 1938),<sup>(6)</sup> is one of the most comprehensive and most interesting of all the pre-war papers upon bomber design. It began by laying down certain general principles. The first aim must be to produce a bomber suitable for operations against Germany and also for reinforcement by air of overseas Commands. A second aim must be ease, rapidity, and economy in production and ease and economy in the training of air and ground crews. This meant a reduction in the number of types, and the standardisation of equipment - the ideal would be a single standard type of bomber suitable for all squadrons at home and overseas. This ideal bomber should "be of the optimum size" both for operation and for administration. This meant first of all postulating a minimum bombload and minimum radius of action. At this time 1,000 lb was considered to be the minimum economical bombload, while the minimum radius of action required to reach eastern Germany would be 750 miles, the equivalent of a range of 2,000 miles in still air. This would also give the necessary minimum 'reinforcing' range, without bombs, of 2,700 miles.

The lower limit was therefore taken to be an aircraft, Type A, with a 2,000 mile range in still air with a bombload of 1,000 lb. For the upper limit the paper took the biggest machine that seemed capable of development in the next six or seven years - one with six engines, Type E. In between, three other possible types were considered. The main features of the five types were tabulated as follows:-

- (1) A.M. File S.41507.
- (2) A.M. File S.39435/1A,5B,9A,14A; S.41413.
- (3) A.M. File S.25873/VIII/29A.
- (4) A.M. File S.39435/3A.
- (5) A.M. File S.25783/IX/22A.
- (6) A.H.B. V.5/11/1.

THE IDEAL BOMBERTABLE OF PERFORMANCES

1	2	3	4	5	6	7	8	9	10	11	12
	Range 2,000 miles				Span  Feet	(Weights (lb.))		Cost for Aeroplane including engine	Number obtainable for £20,000,000	Total bomb lift of number of aircraft shown in Col.10	
	Take off 700 yds. over 50 ft. Screen in still Air conditions		Take off 1000 yds. over 50 ft. Screen in still Air conditions			Gross with bombload shown in Col.2.	Tare			With 700 yd. takeoff run	With 1000 yd. takeoff run
	Bombs lb.	Cruising Speed m.p.h.	Bombs lb.	Cruising Speed m.p.h.							
A	1,000	265	See note below		58- 60	18,000	9,000	£ 14,500	1380	616	616
B	2,000	270	8,000	266	80- 84	35,000	18,950	£ 29,200	683	762	2,434
C	4,000	273	12,000	270	96-100	55,000	27,000	£ 49,000	490	895	2,620
D	8,000	280	20,000	275	122-126	80,000	44,200	£ 62,000	323	1,153	2,884
E	10,000	275	44,000	270	172-180	160,000	91,500	£120,000	166	1,334	3,260

NOTES: 1. In order to obtain the performances shown in Col.3 it will be necessary to keep the body size so small that Type 'A' will have bomb cells for 1,000 lb. only, but theoretically for a take off run of 1,000 yds. with a range of 2,000 miles it could carry 4,000 lb. bombs at a cruising speed of 262 m.p.h.

2. It is probable that the costs of the larger types will be lower than the figures shown in Col.9, which are on the 'safe' side.

Bombload

The characteristics of the ideal bomber were then considered in relation to these five possible types. So far as navigational and bomb-aiming facilities were concerned, it was clear that the larger the aircraft the better. Type A - considerably larger, at 18,000 lb all-up weight, than the Blenheim - was the smallest that could carry the minimum 1,000 lb of bombs for a 2,000 mile range. But it could not take the 2,000 lb A.P. bomb necessary against capital ships - an essential requirement. Moreover, with 10% of hits as the utmost accuracy to be expected in war, the true minimum load was higher still, if each aircraft was to have a reasonable chance of getting one of its bombs on the target. Even with 250 lb bombs the total load should, then, be 2,500 lb - and there would be "very few targets for which one hit with a 250 lb bomb is too much". With 2,000 lb bombs, the total would of course be 20,000 lb. There was also the question of the "proportion of effort" required to get a given bombload to the target. Type A could carry 1,000 lb. If another single aircraft with the same crew could carry 2,000 lb with the same effort, the same fuel consumption, the same amount of time spent over enemy territory, the same amount of work from aircrew and maintenance staff, there would clearly be a great economy. It was true that as aircraft got bigger and ranges increased, the crew and ground staff, size and number of engines, fuel consumption, etc. also increased. But they did not increase in proportion to the bomb-lift. From this point of view, then, operational economy increased rapidly with size. More could be got for the money. But as the table shews, the great increase came between Type A and Type B. That between Type B and Type E was small compared to the reduction in the number of aircraft obtainable for the same money. It seemed therefore that "the smallest load worth considering is 2,000 lb", while there were advantages in having a normal load of anything up to 20,000 lb and there was no point in having a force of bombers of differing load-carrying capacities.

Armament

Next, the question of protection was reviewed. After marshalling the usual arguments against the fast but unarmed bomber, the paper laid down that the Ideal Bomber must have a defensive armament "capable of developing a volume of fire sufficient to engage the maximum number of fighters which can attack simultaneously and the fields of fire of the guns should allow of the smallest blind area possible". It therefore would need some forward defence, but especially it would need rearward defence. Experiment, and also the experience of the Spanish civil war, had shown "that the modern high performance fixed gun fighter can only operate successfully in the astern attack". The four-gun tail turret, power-operated in view of the aircraft's speed, was then essential to the Ideal Bomber. But with its 1,000 rounds per gun, this was a bulky object of unstreamlined shape and weighing 1,000 lb. It could not possibly be fitted to Type A, but it could be included in Type B, and more easily still in the larger types, "without serious interference with the structural design or the aerodynamic qualities of the aeroplane". The best gun defence Type A could carry would be two fixed guns with very restricted fields of fire in the nose, and a two-gun turret amidships with a large blind area rearwards and almost no field of fire downwards. Type B, and the larger types, on the other hand, could carry not only a two-gun nose turret and a four-gun tail turret, both power operated and leaving between them only a small blind area above and below. They could also carry a power-operated mid-under turret, to reinforce the downward field of fire and counter attack from below by, for example, turretted fighters armed possibly with cannon. They would, indeed, themselves be capable of mounting cannon in place of machine guns in all their turrets. The target area presented by the larger bomber did not increase in proportion to its bombload. Type C with 4,000 lb of bombs had a span of only 96 to 100 feet as against Type A's 58 to 60 feet for 1,000 lb of bombs. Besides, "its main load-carrying structure, being larger, is more able to resist damage by bullets or small shells."

/ Armour



Armour

Armour, too, was desirable, but this could not be provided for Type A. For an armoured box, big enough to accommodate the pilot and proof at 200 yards against 0.303 A.P. bullets, would weigh some 1,200 lb and would absorb more than all of Type A's bomb-carrying capacity. Here again, nothing smaller than Type B could be considered as an ideal.

Speed

The best speed compatible with bombload and defensive armament was also needed, to make more difficult the tasks of enemy fighters and anti-aircraft gunners. Again, the table showed that speed tended to increase with size until an all-up weight of 80,000 lb was reached. The giant Type E would be substantially faster than the small Type A.

Losses

From the point of view of protection, then, the balance was strongly in favour of Types B and C. An aircraft of either of those Types was much less likely than one of Type A to be destroyed by fighters or gunfire. The advantage, however, was not maintained with the two largest Types, quite apart from the fact that they might be valuable enough to be worth ramming. It was not of course possible to assess exactly the relative vulnerability of the five Types. But on the basis of cost and industrial effort, it would be rather easier to produce one Type E machine with a bomb-lift of 44,000 lb, or four Type B with a bomb-lift of 32,000 lb, than eight Type A with a total bomb-lift of 8,000 lb between them. Assuming a flat rate of wastage for all the Types, 8.4 Type A would be lost for every one Type E, two for every one Type B - and "we might well lose more than two Type A for every one Type B". Moreover, the loss of one bomber, of whatever size, entailed the loss of one automatic pilot, one bomb-sight and so forth. The loss of one Type E would mean the loss of two pilots and six crew, while the loss of eight Type A would mean losing sixteen pilots and six crew. On the point of losses and replacements, then, "Type B or possibly Type C, is probably the best compromise".

Ground requirements

The requirement of 'strategic mobility' pointed to a similar conclusion. So, too, did operational requirements on the ground. All the home, and most of the principal overseas, aerodromes would now permit of a take-off run of 1,100 yards. This, however, as the note appended to the table showed, could not be taken advantage of by Type A, whose 700 yards take-off load must therefore be compared with the 1,000 yards take-off load of the other Types. On the other hand, if the aircraft were made unduly heavy, reinforced runways would become necessary. Besides being conspicuous and vulnerable, these would limit the mobility of the too-heavy force - it could not operate except from such runways. "The optimum size of the bomber should not exceed that which can operate from natural grass surface". This ruled out anything larger than Type C. Consideration of vulnerability when on the ground and of ease and width of dispersal, gave a similar answer.

Economy in manning had also to be taken into account. Here again it was found that the larger the aircraft, the more economical it would be. Taking as the initial equipment the force that could be provided for £20,000,000 (column 10 of the table) and assuming a war wastage of 33% each month, the numbers of aircrew required would be:-

Type	Pilots	Air Observers	W/T operators - Air Gunner
A	920	690	690
B	455	342	683
C	327	245	735
D	215	162	646
E	111	83	332

/ The

The economy of effort was also illustrated by reference to the ratio between the weight of bombs carried and the number of the crew, thus:-

Type	Bomblift	Crew	Bombs per man
A	1,000 lb	4	250 lb
B	8,000	5	1,600
C	12,000	6	2,000
D	20,000	7	2,857
E	44,000	8	5,500

Calculating on the same basis the number of ground maintenance staff needed, yet another powerful argument in favour of Type B was discovered. The Type A force would need 17,940 officers, n.c.o.'s, and airmen; the Type B force 9,120; Type C 8,241; Type D 5,560; Type E 4,389. Such savings in manpower and training capacity were powerful arguments in 1938 in favour of the larger Types, not least because they would go a long way towards solving the very difficult problem of providing trained reserves.

#### Manufacture

Finally, the Air Staff paper enumerated the industrial advantages of the larger bomber. It would mean fewer aircraft for the same (if not a greater) total bomb-lift. It would therefore mean a great saving on accessories (automatic pilots, bombsights, etc.) and on jugs and tools. There would be room for more men to work at the same time on the same machine, and it would need less factory floor space to produce the 683 Type B than the 1,380 Type A.

#### Conclusions of the Air Staff Paper

Summing up, then, the paper pointed out that as a vehicle for carrying bombs, the bomber's efficiency increased with its weight, thus:-

Type	All-up Weight	Bombload	Bombload as percentage of weight
A	18,000 lb	1,000 lb	5.5%
B	35,000	8,000	23
C	55,000	12,000	22
D	80,000	20,000	25
E	160,000	44,000	27

Speed, protection, manning, all showed a similar result. But it was between Type A and Type B that the greatest advance in efficiency occurred. Beyond Type B there was only a small and gradual increase. And of course a machine larger than Type C could not meet the requirement to operate from grass-surfaced airfields. Moreover, the diminution in the number of aircraft larger than Type B obtainable for a given capital sum, was not offset by any sensational increase in efficiency. Accordingly the Air Staff paper "recommended that the Type B bomber should be selected for mass production as the standard equipment for the bomber force at home and abroad".

#### Discussion by the Bombing Committee May 1938

The Air Staff paper was considered from the tactical and technical point of view by the Bombing Committee at its 17th meeting on 4 May 1938. (1). Some doubts were expressed about the wisdom of "putting too many eggs in one basket", but the Committee reaffirmed all the operational characteristics required by the Air Staff. They added several details. The bomber must have facilities for rapid 'bombing-up'; for speedy 'baling out'; for good intercommunication between the members of the crew; for fire-fighting. It must be equipped for night bombing and be

/ capable

(1) 4th Interim Report.

SECRET

Specifi-  
cation  
B19/38;  
the  
'standard'  
bomber

capable of shallow dive and low level bombing. It should be designed around its gun turrets, to ensure a free and full field of fire and convenience in defence. Finally, like the Air Staff, the Bombing Committee recommended the adoption of Type B. Type A, they concurred, was too small. The larger Types they regarded as unpractical for ease of maintenance, handling, manufacture, replacement of spares, and (of course) use from grass airfields. They, too, suggested therefore that Type B should be adopted and that specifications should be drawn up for its designing. That was about how far the Ideal Bomber had progressed during the period covered by this section of the Narrative. The work of preparing the specification - B 19/38 - had barely begun when the Munich Crisis occurred.

Progress  
of 1936  
designs

B12/36

By that time, this embryonic specification and the two 1936 specifications, the B 12/36 and the P 13/36, represented - leaving aside the very doubtful B 1/35 Warwick - the only definite new bomber designs under consideration. With the 1936 specifications some progress had been made. In January 1937 the Supermarine design for the B 12/36 had been chosen and prototypes ordered.<sup>(1)</sup> The firm's slow progress, however, especially after the untimely death of R.J. Mitchell, caused the Air Ministry in the following summer to order two prototypes of a revised design by Shorts - the eventual Stirling.<sup>(2)</sup> Early in 1938 both firms had produced their 'mock-ups'. Further, in the hope of saving time on control and aerodynamic tests, Shorts began to construct a half-scale wooden flying model of their machine with four small Pobjoy engines.<sup>(3)</sup>

P 13/36

Meanwhile, in 1937 the Avro and Handley Page designs for the P 13/36 had been accepted, 'mock-ups' inspected, and prototypes ordered. In July 1937 the C.A.S., on the advice of the Air Staff and despite the doubts of the firm, had ruled that the Handley Page machine - the future Halifax - should be given four Merlin engines. The Avro was to go on with its two engines, a design which was eventually to lead, through the comparative failure of the Manchester, to the triumphant success of the four-engined Lancaster.<sup>(4)</sup>

Equipment  
position  
1938

By the summer of 1938, then, the bomber equipment position was growing clearer. There was just coming into service a force, built to pre-1936 designs, that was already recognised as inadequate to the tasks required of it. The Blenheims, Battles, Whitleys, and Hampdens - the Scheme F force it might be called - lacked the range, the bombload, the armament, and the accommodation even for their old primary role as the counter-offensive aspect of the Air Defence of Great Britain. It was not intended to place any more orders for these types for delivery after the early part of 1940. It was not contemplated that deliveries of even the more adequate Wellington would be called for after the beginning of 1941. From that time forward, the rearming of the squadrons would be with the B 12/36 and with the P 13/36 Halifax and Manchester, with possibly a handful of B 1/35 Warwicks.<sup>(5)</sup> Beyond these there was faintly in sight the 'standard', 'ideal', B 19/38.

Design  
and  
policy

From this side, too, then, the Air Staff was now virtually committed to the 'big bomber' policy. For even the smallest of the three future types now came into the class of heavy bombers rather than medium bombers. With the abandonment of parity, this meant that total bomb-lift instead of mere numbers was now the criterion. And the force of the future - B 12/36 and P 13/36, later perhaps B 19/38 -

/ would

- (1) A.M. File S.39435/9B.
- (2) A.M. File S.25873/VIII/18A, 29A.
- (3) Ibid., IX/22A.
- (4) A.M. File S.38148/45A; S.25873/VIII/29A.
- (5) A.H.B. V.5/10/2.

would possess a bomblift, as well as a speed, range, and armament, that should make it an effective weapon for the new primary task of Bomber Command - the preparation of victory by the destruction of the industrial and transportation bases of German belligerent power. With such a force, it would be possible to give at least a trial to the 'experiment' of an 'independent', 'strategic', air offensive. That force, however, would not begin to come into service until 1941. It became all the more important, therefore, to conserve the inadequate 'Scheme F force' so far as possible until these far more powerful replacements were available. The development of bomber design might thus encourage the Air Staff to profit by the increased reliance that they could now place upon 'close defence'. It might enable them to turn to advantage the lessons of operational planning. The bomber force might be a poor weapon for a direct counter-offensive against the enemy's air and land forces. But it now began to look as if there might be both the time and the designs available to build it up into one of the decisive instruments of final victory. If so, it should prove an instrument incomparably more economical of men, money, and material than the huge armies of 1914-1918 - if, at least, it should prove in fact capable of achieving all that the Air Staff hoped of it. For Great Britain such economy was now a first consideration. Bomber Command, therefore, might have for a time to yield pride of place to Fighter Command as the averter of defeat from the air. But, if Fighter Command did its work successfully, Bomber Command might still hope for ample opportunities to prove the revised case for the 'bomber experiment'.

V. THE MUNICH CRISIS AND THE LAST YEAR OF PEACE,  
1938-1939

(i) BOMBING POLICY DURING THE MUNICH CRISIS,  
SEPTEMBER 1938

Nature of  
the Crisis

The Munich Crisis developed out of German intervention in the quarrel between the Czechoslovak government and its Sudeten German subjects. That intervention had begun to threaten the peace of Europe as soon as the German occupation of Austria had been completed in March 1938. It threatened European peace because, apart from any question of 'collective security', Czechoslovakia had a treaty of alliance with France. If that Treaty were to draw France into war with Germany, Great Britain would hardly be able to stand aside. Already in May there had been serious international tension. It had relaxed, but by the end of August Sudetens and Czechs, despite the Runciman mission, were hardly on speaking terms and German troops were reported to be moving towards the Czech frontiers. The Crisis, however, really began with the annual Nazi rally at Nuremberg, which opened on September 5, and more acutely with Hitler's speech there on September 12. It rose in a steady crescendo of intensity through the incidents of Chamberlain's flying visits to Hitler at Berchtesgaden on the 15th and Godesberg on the 22nd to 24th, and was eventually ended, after Mussolini's mediation on the 28th, by the Munich agreement of the 29th.

Effects on  
policy

These three weeks of crisis marked the completion of the turn which had been developing in British air policy during the years 1937 and 1938. They placed before the Air Staff in the most urgent form, against a background of possible war tomorrow, all the problems which had been coming to the fore during those years. They raised also the possibility of a different kind of war - at least in its opening stages - from that envisaged in C.O.S. Paper 549, upon which planning had so far been based. Instead of an immediate and unrestricted German onslaught by air upon the United Kingdom or by land and air upon France and the Low Countries, there was the probability that the German Army and Air Force would at first be mainly occupied in central Europe against the Czechs and would for the time stand on the defensive in the West. If so, the 'gloves might not be off' in the air and the British would certainly not be so foolish as to be the first to take them off. Bombing would be restricted severely to 'military' targets, many of them too remote to be reached by the 1938 bomber force. The inadequacy and unpreparedness of that force at this time, and the probable character of the war which now seemed imminent, thus raised in an acute form the question whether Bomber Command would be allowed to execute, or would be capable of executing, the operational plans that had been prepared. They thus raised anew and in most urgent form the general question of the policy to be pursued in the use of the British air striking force. The answers then given and the experience then gained completed the evolution of the previous years. Upon those answers and that experience was founded British air policy during the remaining eleven months of peace.

(a) Bombing Policy during the Munich Crisis

Plans 5  
minute of  
Sept. 6:  
what is a  
legitimate  
target?

On September 6, at the very beginning of the Munich Crisis, a minute from Plans 5 to the Deputy Director of Plans raised the whole question of what was a legitimate target for air bombardment. (1) It pointed out that in war - whether or not it was the general policy that aircraft which could not reach their objective

/should

should bring their bombs back - a bomber pilot might have "to unload the bombs in order to ensure the safe return of the aircraft to friendly territory". He would have to exercise his own discretion about where the bombs should be dropped. It was therefore urgently necessary to define "the limits within which a pilot's discretion as to the selection of a suitable target must be exercised". It was necessary "(a) from the point of view of the pilot himself should he fall into enemy hands and be arraigned for illegal action, (b) from the point of view of His Majesty's Government who would have to deal with neutrals whose sympathies may be alienated by an unfortunate incident, (c) from the point of view of the Air Ministry who may be held responsible by His Majesty's Government, and (d) from the point of view of the civil population who may be subjected to reprisals or retaliation if the enemy civil population are illegally bombed".

Lack of clear rules and need for instructions There was unfortunately no general international agreement about the principles of air warfare and the nature of a lawful target. The Air Ministry and the Admiralty, too, had a long-standing difference of opinion on the subject, which had appeared sharply during the discussion of the proposed Air Pact of 1935<sup>(1)</sup> and during the Italo-Abyssinian war.<sup>(2)</sup> It was, however, the known view of the British government that air warfare should be governed by the same principles as land and sea warfare. The Prime Minister had on 21 June 1938 laid down those principles under three heads:-  
 "(1) it is against international law to bomb civilians as such and to make deliberate attacks upon civilian population;  
 (2) targets which are aimed at from the air must be legitimate military objectives and must be capable of identification;  
 (3) reasonable care must be taken in attacking these military objectives so that by carelessness a civilian population in the neighbourhood is not bombed". Yet even this contained no precise definition of what was or was not a 'military objective'. It was, therefore, the Plans 5 minute urged, most necessary to issue some provisional instructions at once without waiting for the government's considered decision.

Instructions to Bomber Command Sept. 15 From the Deputy Director of Plans the matter was referred to the C.A.S. on September 9 and by him on the same day to the Secretary of State for Air and to the Air Council.<sup>(3)</sup> As a result of these consultations it was decided to send provisional instructions to the Commander-in-Chief, Bomber Command, and also to prepare as soon as possible a draft set of rules for his more exact guidance. The draft rules, though approved by the D.D.Plans on September 16,<sup>(4)</sup> could not be issued before they had been examined by the legal adviser to the Foreign Office, Sir William Malkin. They were not sent to him until September 22, the day he flew with Chamberlain to Godesberg.<sup>(5)</sup> As a result, it was not until September 28 that his comments were received,<sup>(6)</sup> and it was until October 3, after the Crisis was over, that the rules were sent to Bomber Command. Provisional instructions were, however, sent on September 15,<sup>(7)</sup> after being approved by the D.C.A.S., C.A.S., and Sir William Malkin.<sup>(8)</sup> These instructions

/began

- (1) C.I.D.Paper 1163-B; C.I.D.Minutes, 268th Meeting
- (2) C.O.S.Minutes, 156th and 181st Meetings; C.O.S.Paper 471
- (3) A.M.File S.46239/2
- (4) A.M.File S.46105/3,3A
- (5) Ibid., 5A,5B
- (6) Ibid., 6A,7A
- (7) A.M.File S.46239/9A
- (8) Ibid., 5,6A,7.

began by repeating the Prime Minister's three principles and insisting that they must be observed. It went on to say that, if war came out of the Czech crisis, the bombing plans most likely to be adopted would be W.A.1 (attack on the German Air Force) and W.A.4 (attack on the German Army), most of whose targets seemed in themselves to be legitimate. Nevertheless, the Air Council insisted that, despite the severe tactical limitations which would result, no handle must be offered to the enemy's propaganda and his desire for retaliation for so long (or more probably so short) a time as "the gloves are still on". The British bombing targets must be manifestly and unmistakably 'military objectives' in the narrowest sense. They must be clearly identifiable. And even then they must not be bombed if they were situated in populated areas - the initial operation orders must therefore exclude all aircraft factories from W.A.1. Less restricted plans should be made ready, but meanwhile these instructions must be strictly observed.

Search for  
legitimate  
plans

These restrictions were reinforced by an Air Staff note of September 17 on the selection of objectives under plan W.A.4 for action against the German Army and its lines of communications in South Germany and Austria. (1) With the favourite W.A.5 (attack on German industry in the Ruhr and elsewhere) awhile ruled out and W.A.1 and W.A.4 so severely restricted, it was desirable to find other plans to employ the bomber force during the opening phase of the war. The Royal Navy's zeal for action provided one alternative. On September 16 the Admiralty Plans division sent to the D.D.Plans a note of the priority of their objectives. First, the destruction of naval forces, especially capital ships, at (a) Wilhelmshaven and (b) Kiel; secondly, the Kiel canal locks at Brunsbüttel; thirdly, German naval bases in general. (2) This was passed on to Bomber Command on September 19, (3) to whom the Air Targets Intelligence appreciation on plans W.A.9 (Kiel Canal) and W.A.10 (German mercantile ports) had already been sent five days earlier. (4) About the same time, the War Office passed on from a Major Freeth a suggestion, on the lines of W.A.11, for the firing of German and Italian forests. (5) This, however, was hardly a plan to be considered for a period of restricted operations. Much more attractive to many of the Air Staff was the suggestion which on September 14 had come - surprisingly enough - from the Commander-in-Chief of Bomber Command himself. (6) This was that "skilfully dropped propaganda, distributed by aircraft, may prove a more potent weapon than bombs". Air Chief Marshal Ludlow Hewitt did not altogether disbelieve in bombs. Nor did he wish to suggest that no bombing at all should be attempted. But he was very doubtful about his squadrons' present ability to do any effective bombing. "You have," he wrote, "probably seen my appreciation of Plan.W.1, in which I have been unable to express any great confidence in the results of our bombing offensive under that Plan". More will be said later about the fruits which this suggestion of leaflet-dropping was to bear.

/Meanwhile,

- (1) A.M. File S.46368/4A
- (2) A.M. File S.43296/5B
- (3) Ibid, 5A
- (4) Ibid., 4A
- (5) A.M. File S.41734/12A,B,C,D.
- (6) A.M. File S.46650/1B



Further  
instructions  
to Bomber  
Command  
Sept. 19

Meanwhile, the progress of events, and of discussions at Air Ministry, enabled the C.A.S. to send further instructions to the Commander-in-Chief of Bomber Command on September 19. (1) It seemed probable, he now said, that in the opening phase of a war against Germany in support of the French and Czechs, the German Air Force would concentrate upon the Czechs rather than attempt to knock out the United Kingdom or France. If so, the operations of the R.A.F. would have to be limited to 'military objectives' in the narrowest sense. Plan W.A.1 would be in great part inapplicable - at any rate it might be wiser to conserve English resources than to risk them on such of its targets as would be permissible objectives. And the whole basis of W.A.4 would be upset, since the German Army was in effect already mobilised and concentrated. Yet the German Air Force might conceivably open with an onslaught upon Britain or France: sooner or later they would certainly turn against those countries. Plans for meeting such an onslaught would therefore still be needed, though for a later phase. Now, the Air Staff fully shared the Commander-in-Chief's opinion about the small value of Plan W.A.1 for such a purpose, especially in view of the serious shortage of reserves. They also agreed fully with him in regarding an offensive against the Ruhr as the most promising bomber answer to a German air offensive against Great Britain. The Commander-in-Chief was therefore to get operational instructions prepared for the eventual launching of Plan W.A.5. In the meantime he was to work out ideas for the first phase, of restricted operations. He should consider, for example, attacks upon any undeniably military objectives connected with the German Air Force and the German Army, and he should prepare plans for bombing the German fleet in Wilhelmshaven and Kiel and for destroying the Kiel Canal locks at Brunsbuttel. But he must not risk his squadrons unduly upon such enterprises. The very serious shortage of reserves, both of men and equipment, made it essential to conserve the strength of the bomber force at any rate until the Germans turned to attempt a 'knock out' blow against Britain.

The C-in-C's  
views  
Sept. 19

These were all conclusions to which the Commander-in-Chief himself had also come, after talks with the C.A.S., D.C.A.S., and D.D.Plans. He had already issued operational orders on the lines laid down by his instructions of September 15. Those instructions had only increased his pessimism about Plan W.A.1. They virtually limited its objectives to military airfields and to very few of those now that 5 Group had found that the Blenheim's operational range was only 700 miles instead of 792. This discovery meant that no more than two German airfields would be within reach of the great majority of the British bombers. The Plan would involve heavy losses and would "fritter away our resources on a futile and ineffective enterprise". It was moreover desirable to break in gently the inexperienced crews, for the general standard of efficiency was still very low. If therefore the Germans did not attack the United Kingdom at the outset, Bomber Command ought also to hold its hand. There was very little that it could do to help the Czechs anyway. Furthermore, if the Germans

/attacked,

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(1) A.M. File S.46368/3A

attacked, but attacked only naval and air bases, the Commander-in-Chief thought that Britain should still not retaliate. Certainly, Plan W.A.1 should not even then be adopted. He was considering certain exposed targets in North-West Germany, but attacks upon them might involve civilian casualties. It would therefore be better to evacuate the East Anglian airfields of 3 Group, continue to hold back the bomber force, and use some of the Blenheims to reinforce Fighter Command, an idea which he proposed to work out with the Commander-in-Chief of Fighter Command. Only if the German Air Force launched a full-scale attack upon London should Bomber Command be called into vigorous action. And that action should then take the form of an all-out onslaught upon the Ruhr. Until that time, he proposed to conserve his slender resources. (1)

His letter  
of Sept. 25

Soon after writing this letter, the Commander-in-Chief discovered by chance and for the first time that the Air Staff were thinking of 'rolling up' 50% of his first-line strength on mobilisation and setting it aside to serve as a reserve. This news naturally strengthened his conviction that it was impossible to devise an effective bombing role for his Command in the opening phases of the war. Leaflet dropping might give some employment. But the best use for the medium bombers, which composed the bulk of his force, would be to support the land operations of the French army in co-operation with the French Air Force. Apart from this, the East Anglian airfields should be evacuated, and some of the Blenheims should each have six forward-firing Browning machine guns mounted in their bomb cells and should be used to reinforce Fighter Command. (2)

His letter  
of Sept. 28

Consideration of Plans W.A.7, 9, and 10, when completed on September 28, only confirmed this pessimism. W.A.10 (mercantile ports, especially in the Baltic) was out of range for all but a few heavy bomber squadrons and in any case involved targets of doubtful legality. W.A.7 (naval bases) was, at least with Wilhelmshaven, more reachable, but accurate bombing would be required to avoid civilian casualties, 1,000 lb bombs (or perhaps torpedoes) would be needed, and Bomber Command crews had not been trained in ship recognition. As for W.A.9, the Kiel Canal locks were poor targets and would also require the 1,000 lb bomb; Kiel itself was beyond the reach of the medium bombers; and even Brunshüttel would leave them little margin. (3)

Air Staff  
Note on  
employment  
of Bomber  
Force  
Sept. 28

The Air Staff, when they had considered the position more fully, went even further than the Commander-in-Chief. On September 28 their policy was communicated to Bomber Command, so far as "this very indefinite situation" would permit, in an Air Staff Note on "The General Policy for the Employment of the Air Striking Force at the Outbreak of a War". (4) Originally prepared for the use of the C.A.S. in his discussions with ministers, this Note supplemented the instructions of September 19 and adopted most of the Commander-in-Chief's contentions. It began by insisting that Bomber Command must conserve its resources, since the German Air Force was the stronger and the R.A.F. would be restricted in its operations

/by

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- (1) C.-in-C. to Under-Secretary of State, 19 Sept. 1938 - A.M. File S.46368/6A.
  - (2) Ibid., 7A.
  - (3) A.M. File S.43296/6A and B.
  - (4) A.M. File S.46368/10A, 11A.

by rules imposed by the government. If the Germans began unrestricted bombing of the Czechs or the French, British policy would have to be decided by the Cabinet. But even if they began unrestricted bombing of the United Kingdom, Bomber Command was not to retaliate against the Ruhr until it could do so effectively. It was now definitely ruled that the medium bombers were not to be sent to the Ruhr by day on the North Sea route. As French landing-grounds for refuelling would not be available for some time after the outbreak of war, this would mean that during the opening phase the only attacks that could be made upon the Ruhr would be by the heavy bombers at night. Such attacks must be so sporadic and ineffectual that the effort would not be worth while. Even the heavy bombers would not therefore be employed against the Ruhr at first. Different plans must be made. Leaflet raids might be one - the Air Ministry was considering this. Others should be for strong initial attacks upon the stores at Hamburg and Bremen and the ore supplies at Emden. Meanwhile, preliminary arrangements had been made with the French about landing grounds. A few medium bombers should be able to begin operations, re-fuelling in the Reims area, by about zero day plus two or plus three. These medium bombers should act primarily in support of a French offensive against the Siegfried Line, for which detailed plans could not be made. From zero day plus seven the first echelon of the A.A.S.F. would be able to support them and efforts would be made to hasten the arrival of the second echelon now due on zero day plus 28. In the event even of an unrestricted initial German attack upon the United Kingdom, then, Bomber Command was to do no more than drop leaflets, attack stores in the nearer North-West German ports, and provide army co-operation for the French. It was not an impressive role for the striking force upon which so much money had been spent and in which such roseate hopes had once been placed.

If the Germans at first limited themselves to purely military objectives, then, of course, Bomber Command's role would be less impressive still. The Ruhr would be ruled out altogether and the operations of the A.A.S.F., as well as those of the home-based force, would be severely restricted. Any chance to attack the German Air Force would be taken, but there would be few permissible targets except airfields, upon which the effort would be mere waste according to current views. Besides that, leaflets could be dropped; the German fleet could be bombed; and the Wilhelmshaven naval base and the Kiel Canal would be legitimate targets.

Whatever happened, and especially if the German Air Force concentrated its attacks upon the United Kingdom, some of Bomber Command's Blenheims would be employed to 'thicken up' Fighter Command. For Fighter Command, now in an early stage of re-equipment with new types of aircraft, had altogether inadequate reserves. Its strength might therefore fall away even faster than that of Bomber Command. As there was so little effective bombing that Bomber Command could do, some of its Blenheims would be more usefully employed as fighters than as bombers.

(b) The Mobilisable Forces during the Munich Crisis

How serious were the deficiencies of both Bomber and Fighter Commands during the Munich Crisis may be seen clearly from the records of the Mobilisation Committee. This Committee met on September 15 for its usual review of the

/mobilisation

Mobilisation  
Committee  
Review  
Sept. 15

mobilisation arrangements for the next Phase of the W Plan, Phase VI which covered the period 1 October 1938 to 31 March 1939. (1)

Mobilisable  
bomber  
force

When this meeting took place, the Air Staff's intention of operating the bomber force at only 50% of its first-line strength had not been translated into a definite ruling. The figures arrived at by the Committee therefore represented something like double the strength which was actually to be available for operations. These figures showed that at the end of September and in October there would be 42 mobilisable bomber squadrons. Of these 32 would be medium bombers - 13 Battle, 16 Blenheim, 3 Wellesley - and 10 heavy bombers - 5 Whitley and 5 Harrow. In addition to these there would be 15 Regular squadrons which were not mobilisable - 5 (4 Battle, 1 Blenheim) because they had only just begun to re-arm with new types of aircraft; 10 (1 Hendon, 6 Heyford, 3 Hind) because they were equipped with aircraft now regarded as operationally useless. (2)

Lack of  
reserves

Behind these 42 mobilisable squadrons there was practically nothing in the way of reserves, either of aircraft or of men. The current ruling was that squadrons were to be considered mobilisable "after being in possession of full initial establishment for a clear month", that is, without any reference to reserves. In fact, there was a complete shortage of aircraft and crews; and at least a 50% shortage of aircraft spares, to replace casualties. As the Director of Operations wrote, "broadly it is true to say that we have practically nothing behind what is now in the units we propose to mobilise and that in consequence, if we go to war in the near future, our effort must start to decline immediately and rapidly". (3) The Committee, too, noted these points. It also noted that, of the total R.A.F. pilot reserve of 2,500, no more than 200 were fit for immediate inclusion in service units, while the deficiencies in regular and reserve airmen were equally serious.

Lack of  
training

Nor was the training of the crews that were available very far advanced. It had been seriously retarded by the difficulties over getting instrument panels, turrets, blind flying equipment, and so forth of which the Commander-in-Chief had complained in his report of 10 November 1937. Those deficiencies had by no means all been remedied by September 1938. Moreover, of the 42 mobilisable squadrons, one of the Harrow squadrons had only become operational in June 1938 and no less than 12 other squadrons (5 Battle, 6 Blenheim, 1 Harrow) had possessed their present types of aircraft for less than five months - two of them (Blenheims) for less than one month. It is hardly to be wondered at that Bomber Command regarded their readiness for war as unsatisfactory. "Generally speaking, less than 50% of the crews in the mobilisable squadrons would be fit for operations as judged by Bomber Command's peacetime standards. (4)

/Moreover,

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- (1) A.M. File S.37613 (unpaginated).
  - (2) There were also the 11 Scheme F A.A.F. squadrons. These are not included in the above figures. They were not mobilisable and were armed (so far as they were armed) with obsolete Harts and Hinds. Under Scheme L 8 of them were due for conversion this autumn, 4 into fighters and 4 into G.R. squadrons.
  - (3) A.M. File S.38656/73.
  - (4) Ibid.

Lack of  
equipment

Moreover, as we have said, the deficiencies in aircraft equipment had by no means all been remedied. All the Battles now had blind flying equipment but the engine-driven pumps needed to make it efficient were lacking. Some of them had bombsight and gun defects; and none of them had containers for the container-carried smaller bombs. Two of the Battle squadrons were also so short of men that, if they were mobilised within the next three weeks, one of the re-arming squadrons would have to be broken up to supply them. Of the Blenheims, one squadron was short of turrets and two more of bomb carriers and items of gun equipment, though these should be supplied by the end of the month. None of them could carry the small bomb containers except with their bomb doors open and at a sacrifice of load. Up to twelve aircraft from the Wellesley squadrons were always unserviceable for four months at a time owing to blind flying modifications. During the next two months some ten Whitleys would also be unserviceable from the same cause, for only half those squadrons yet had their blind flying instrument panels. Only two of the five Whitley squadrons yet had their tail turrets, though they should all have them by October 1. No forecast could be made of when these and the other five Whitley squadrons would have their nose and midships turrets completed.

Effects on  
policy

Under the Air Staff's new policy of using the bomber force at only 50% intensity, then, its immediate offensive effort would be limited to much less than the Mobilisation Committee's 42 squadrons - in fact to 28 or 29 squadrons. Besides this, many of the aircraft lacked the range and bombload, and almost all of them lacked the armament, required for serious attacks upon Germany. Their casualties in such operations would be heavy and must be replaced by men who, in Bomber Command's estimation, were not yet fit for operations. It was these considerations, as well as the problem of finding legal targets, that led the Air Staff and the Commander-in-Chief to re-examine their plans for employing the 'mobilisable force' on the outbreak of hostilities and to frame the very unambitious policy of the Note of September 28. With bomber forces so weak and ineffective as these, first trust had obviously to be placed in the improved hopes of successful 'close defence'. First place had now to be given, at least for a time, to Fighter Command, and if the bombers could directly reinforce the equally ill-supplied fighter squadrons, so much the better.

## V. THE MUNICH CRISIS AND THE LAST YEAR OF PEACE, 1938-1939

## (ii) EXPANSION SCHEME M, NOVEMBER 1938

Character of Scheme M The lessons drawn from the Munich Crisis were embodied in various decisions arrived at in Air Ministry conferences during October 1938 and in a new Expansion Scheme, Scheme M, which was authorised by the Cabinet on 17 November 1938. (1) These were designed to improve the Metropolitan Air Force by 31 March 1940 by extending and accelerating the Scheme L programmes. They were further designed to carry on expansion for two years longer than Scheme L, so as to provide a powerful, balanced, and effective Metropolitan Air Force by 31 March 1942.

The effort involved The effort which this would involve may be judged from the fact that the Secretary of State for Air, in presenting the new Expansion Scheme, asked for authority to order at once, for production by the summer of 1941, some 6,000 aircraft of all types; and for approval in principle of a repetition of this order later. These orders would of course be additional to those already placed for some 17,500 aircraft of all types (12,000 for production by March 1940 and 5,500 after that date). (2) Of those 17,500, only 1,960 had so far been delivered and it had not been anticipated that more than another 9 or 10,000 could be delivered by March 1940. (3) Production was now to be accelerated, but even so the effort was immense. It was therefore obviously necessary to allocate this effort wisely among the various classes and types of aircraft required. It was all the more necessary since the Munich Crisis had shown that war might come suddenly and at any moment. The Air Ministry had not merely to provide the largest force they could as soon as they could. They had further to make sure that the most essential needs were soonest satisfied. First things must emphatically come first, which meant above all else providing first the aircraft most capable of averting an immediate 'knock out' blow from a German air offensive against the United Kingdom.

(a) The priority given to Fighter Command

Reasons for fighter priority Those aircraft could not be the bombers. For the only bombers that could be produced during the next two years or more were the Battles, Blenheims, Hampdens, Wellingtons, and Whitleys whose incapacity for decisive action against Germany had become so painfully apparent during the Munich Crisis. Was not the Commander-in-Chief himself of opinion that the best air defence of Great Britain would be the combination of the North Sea and the strongest possible 'close defence'? Moreover, those responsible for 'close defence' were beginning to feel, and to inspire in others, some confidence in their ability to avert defeat from the air even without the bombers' aid. Given adequate numbers of modern fighters and trained pilots, and aided by adequate ground defences and by fully developed systems of R.D.F., ground observation, and ground control,

/Fighter

- (1) The following Sections (ii) (a) and (b) are based upon:- the Secretary of State's proposals, Oct. 25 - C.P. 212(38); the Cabinet's approval in principle, Nov. 17 - Cabinet 53(38); Outline of Scheme M - A.H.B. V.5/6; D.C.A.S. conference, Oct. 6 - A.H.B. V.5/10/23; D. of G. conference, Oct. 18 and 4th Meeting of Committee on Expansion of Operational Commands, Nov. 7 - A.H.B. V.5/10/20,21,22; and the documents mentioned in the ensuing notes.
- (2) Notes by D.D. Plans, Oct. 31 - A.H.B. V.5/11/2
- (3) D.G.P. production forecast, Oct. 10 - A.H.B. V.5/11/4.

Fighter Command was beginning to believe that it could by its own efforts reduce the intensity of a German air offensive to manageable proportions. Already the guns and the searchlights were beginning to appear; the chain of R.D.F. stations was to be completed by April 1939; the Observer Corps was being expanded to cover most of the country; and the ground control system was fairly well developed. Above all - and this was Fighter Command's great advantage over Bomber Command - the types of fighter aircraft required for effective 'close defence' were the types - Spitfires, Hurricanes, Defiants - which were already beginning to reach the squadrons. Better fighters still - Typhoons, Tornados, Whirlwinds - might be coming after them, but they themselves were already competent to do the work if only there were enough of them. Fighter Command, unlike Bomber Command, need not wait until 1942 to get machines adequate to its tasks.

Fighter  
needs more  
easily met

In 1938, however, there were far from enough of these new fighters. Indeed, Fighter Command's position was even worse than Bomber Command's. The deficiencies were, none the less, more easily remediable. The appropriate types of aircraft were already in quantity production. They could, being smaller, be built more quickly, easily, and cheaply than bombers. And, needing for the most part only a pilot, they could be much more easily manned than the bombers, which needed a full crew. It was therefore natural, it was mere common sense, to give first place to the claims of Fighter Command.

Orders  
placed for  
1,850 more  
fighters

This was what Scheme M did. In the long view it added twelve squadrons to the Scheme L fighter force. It thus aimed to provide by 31 March 1942 fifty fighter squadrons (fourteen of them A.A.F.), each of sixteen first-line aircraft, a total of 800 machines. These were to be backed by fully adequate reserves, amounting to 2,700 aircraft or some 337% of the first-line strength.<sup>(1)</sup> The Secretary of State was accordingly authorised by the Cabinet on November 17 to place orders immediately for 1,850 fighters of the most modern types and approval was also given in principle to his proposal that another 1,850 should be ordered later.

Efforts to  
accelerate  
fighter  
output

These, however, were long term projects. Other measures were also introduced with more immediate improvements as their aim. First place was to be given at once to the manufacture of fighter aircraft, and, while the development of the latest designs was pressed forward urgently, every effort was to be made to accelerate the output of the most up-to-date types that were already in production. In these ways it was hoped to produce by March 1940 a fighter force of forty squadrons armed entirely with Spitfires, Hurricanes, and Defiants - 640 aircraft in all, backed by reserves (over 1,100) for from four to six weeks of war operation. Arrangements were also being made which would produce equal reserves of trained pilots and ground staffs.<sup>(2)</sup> Fighter pilots to complete the full establishment of the forty squadrons were to be trained as early as possible, though this would mean a deficiency in both Bomber Command and Coastal Command; and Fighter Command was given "priority on the output of pilots from the R.A.F.V.R." In these ways 200 additional Regular and 340 Reserve fighter pilots were to be trained and made available by March 1940.

/Yet

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- (1) Notes by D.D.Plans, Oct.31 - A.H.B. V.5/11/2.  
(2) D.D.Plans and D.D.W.O. revised forecast, Oct.24 - A.H.B. V.5/11/3



Blenheims  
as  
fighters.

Yet even March 1940 was still a long way ahead. Measures were therefore introduced to strengthen Fighter Command in the more immediate future. The remaining three A.A.F. bomber squadrons, as well as the four already due to be converted to fighters under Scheme L, were to be immediately re-equipped and transferred from Bomber to Fighter Command. The shortage of fighter aircraft was met principally by adapting a number of Blenheims as fighters in the manner which the Commander-in-Chief of Bomber Command had suggested. They were given, besides a free Browning machine gun in their after turret and a fixed one in their wing, four forward-firing Brownings in their bomb cell. They were fitted with the standard fighter R/T set and manned by a crew of two, the W/T Operator being omitted. Blenheims thus converted were to be used to re-equip four squadrons now armed with obsolete aircraft. Also, two Army Co-operation squadrons, due to be re-armed with ordinary Blenheims, were now to be given the converted Blenheims and to be trained in fighter as well as army co-operation work, time being found for this by omitting high-level bombing from their training syllabus. Besides this, the seven single-engined Army Co-operation squadrons (Scheme M provided for only nine Army Co-operation squadrons instead of Scheme L's eleven) were to be given some fighter training. And five Blenheim medium bomber squadrons were to be given 'fighter conversion sets' and to do such an amount of fighter training as would not interfere with their training as bombers. In these ways Fighter Command would be given a mobilisable strength by April 1939 of 31 squadrons (496 first-line aircraft). They would have negligible reserves of their own, but they might in extremity be able to call upon seven Army Co-operation squadrons of 84 first-line aircraft with 45 in reserve; and upon five medium bomber squadrons. By August 1939 the mobilisable first-line strength would be 36 squadrons of 576 aircraft, with some 325, mostly Blenheims, in reserve. In addition there might then be the full nine Army Co-operation squadrons (108 first-line aircraft with 106 reserves) as well as the five medium bomber squadrons of Blenheims as an ultimate reserve. (1) Even this did not wholly satisfy the Air Staff, for they also investigated the possibility of rearming a further seven fighter squadrons (four Regular and three A.A.F.) for the time being with the converted Blenheims. Yet, even without this last measure, the desperate weakness of Fighter Command over the next twelve months would be in some degree remedied. So did the Air Ministry put into practice the principle laid down at a conference on October 18 "that, while every effort must be made to build up the operational strength of all Commands, the claims of Fighter Command must have priority where interests conflict".

(b) Scheme M and the Bomber Force

Effects of  
fighter  
priority

A.A.F.

Blenheims

The Command which suffered most from the effects of this ruling was inevitably Bomber Command. That it was promptly deprived of its three remaining A.A.F. squadrons, as well as of the other eight taken from it by Scheme L, did not much diminish its mobilisable strength or even, perhaps, its reserve strength. Nor did the diversion of Blenheims to Fighter Command make a very great difference. It was a temporary measure and "there should be more Blenheims available by 1.4.39 than there would be crews to fly them". By the time the crews were ready, the new fighter aircraft would be ready also and the Blenheims would be released.

Lack of  
Pilots

The diversion of pilots was a more serious matter. It had previously been estimated that there would be a deficiency in the

/whole

whole R.A.F. of 900 trained Regular pilots by March 1940 and that this gap between supply and demand could not be filled until November 1940. The decision to provide 200 extra pilots for Fighter Command by March 1940 must therefore mean a sharp worsening in Bomber Command's position. It might, though this was considered unlikely, mean a shortage of 'spare crews', of the crews allotted to man the squadron's immediate reserve aircraft. It would certainly mean a shortage of 'second pilots', now regarded as essential on all except the Blenheims and Battles - the Commander-in-Chief was prepared to accept second pilots still under training, but he could not do without them altogether. The reserve position would of course be still more serious. And, besides Regular and Reserve pilots, Bomber Command needed air observers, air gunners, and W/T operators. Here, too, the deficiencies would be serious.

Remedies attempted

Every effort was made to mitigate so far as possible the deficiencies imposed upon Bomber Command by the priority given to Fighter Command's claims. Short Service pilots due to go to the Reserve and airmen pilots due to revert to trade were to be encouraged to stay on. The opening of three new Flying Training Schools, already authorised, was to be accelerated to May 1939. Investigations were to be made into the possibility of opening at an early date a further two Flying Training Schools and four Elementary Flying Training Schools. The output of all these schools was to be increased, though without shortening the courses. More trained pilots were to be sought from the Dominions. A new scheme for recruiting more pilots at home was pressed forward. The recently instituted direct entry scheme for air observers was expanded to recruit by February 1939 160 observers a month instead of 40 a month. To train them, the capacity of the six civil navigation schools was doubled, two armament training stations were converted into Air Observer Schools for armament training, and the crews of two non-mobilisable Heyford heavy bomber squadrons were posted to them as instructors. The numbers of pilots and aircrew required could only be obtained by drawing upon the R.A.F. V.R. Volunteer Reservists were therefore encouraged to enter "for an initial period of six months continuous service in Regular units". For their training more of the non-mobilisable bomber squadrons were to be used until March 1940 - under the new 'rolling up' ruling they could accommodate 200 pilots, 102 observers, 144 W/T operators, and 72 air gunners. Even with these measures the deficiencies would still be considerable - the greatest number of observers that could be trained by August 1939 would be 1,265 against a total requirement of 1,479 and a Bomber Command requirement of 1,240. Moreover, the Volunteer Reservists would at the end of their six months' training go to the reserve and their places would be taken by more untrained men. Nevertheless, in all these various ways it was hoped by August 1939 to provide 240 trained reserve crews for the Battle and Blenheim squadrons; to complete the establishments of the non-mobilisable heavy bomber squadrons with reserve crews under training; and to bring the mobilisable squadrons to full establishment by posting to them the trained officers and men thus released from the non-mobilisable squadrons.

Reduction of the mobilisable force

This must of course mean a considerable lessening in the efficiency of the non-mobilisable squadrons. It also made more than ever necessary that reduction in the number of mobilisable squadrons, that 'rolling up', which the Air Staff already had in mind. This reduction was now definitely determined upon. "As regards Bomber Command," it was laid down, "the intention is to build up adequate reserves behind mobilisable squadrons rather than to aim at a large number of mobilisable units without adequate reserves behind them ..... The aim should be to keep up the strength of the mobilisable squadrons, including the 'spare crews', at the expense of the non-mobilisable squadrons". The rolling up was not quite so drastic as the original intention of a 50% reduction. But it did none the

less entail a very sharp decrease in the mobilisable striking force. The Mobilisation Committee had estimated on September 15 that there would be on 31 March 1939 at least 50 mobilisable bomber squadrons. (1) Under the new ruling there would be no more than 34. On the other hand, whereas the 50 would have had little behind them in the way of reserves, the 34 would be backed by a reserve in the form of 23 non-mobilisable and not fully trained squadrons. (2) The change was in that sense only a recognition of facts. It did none the less entail a radical change of policy, a definite enunciation of the doctrine of conserving the bomber force until it could be efficiently equipped.

The bomber  
force for  
1939-40.

The decision to give the bomber force eventually that efficient equipment was announced no less clearly in Scheme M. Both the Air Staff and the Cabinet were well enough aware that, though defeat may be averted, wars are not won by defence alone. They were equally well aware that Bomber Command would not always remain so inadequate to its task as it now was. It was already becoming possible to count upon the arrival of the new and much more powerful Stirlings, Halifaxes, and Manchesters of the 1936 specifications. Even before they arrived, it would be possible to replace some of the Battles and Blenheims by Wellingtons, Hampdens, and the improved Hampdens now known as Herefords. It would also be possible to replace the Harrows, the antiquated Heyfords, and the stop-gap Wellesleys by the later marks of Whitleys. The priority given to Fighter Command's claims on pilots and on aircraft production would delay these improvements for a time. Scheme L, for example, had looked forward to a bomber force of 47 heavy bomber and only 26 medium bomber squadrons by March 1940. All that could now be looked for by the date was 41 heavy and 29 medium bomber squadrons, of which only a proportion would be mobilisable. The Battles and Blenheims must now remain a little longer; the Stirlings, Halifaxes, and Manchesters arrive a little later. It was no longer possible to dream, as a perhaps over-optimistic Air Ministry branch had dreamed in August 1938, (3) of having four squadrons of Manchesters, two of Halifaxes and four of Stirlings by April 1940.

An 'all-  
heavy'  
bomber force  
for 1941-2

Nevertheless, the Air Staff intended to bring in these more powerful aircraft as early as they could. And they now had the highest authority for their 'big bomber' policy. For the government agreed on November 17 "that the Secretary of State for Air should give further consideration to the policy of concentrating on the development and construction of the large high performance bomber capable of carrying a very heavy bombload, in the light of the discussion at the Cabinet". The Cabinet had also agreed that, subject to the above decision, "approval should be given for the placing of sufficient orders for bombers to avoid substantial dismissals in the aircraft factories concerned and to maintain an adequate flow of production, and, in the case of any national factories designed for this work but as yet under-employed, to secure a normal complement of employment". Bomber production, though it was not to receive the stimulus and priority given to fighter production, was to maintain its industrial potential relatively unimpaired. In fact, by March 1939 Treasury sanction had already been granted for the ordering of the additional 1,750 heavy bombers asked for in the Secretary of State's paper of October 28. With the 2,687 heavy bombers already on order,

/this

- (1) A.M. File S.37613 (unpaginated)
- (2) Mobilisable: 10 Battle, 10 Blenheim, 3 Hampden, 2 Wellington, 3 Harrow, 6 Whitley Non-Mobilisable: 6 Battle, 6 Blenheim, 2 Hampden, 1 Wellington, 2 Harrow, 3 Whitley, 2 Heyford, 1 Wellesley - A.H.B. V.5/10/21.
- (3) W.O.1 table, Aug.16 - A.H.B. V.5/10/16.

this meant that the Air Staff could hope to get delivery within the next three or four years of some 4,437 heavy bombers. Not all of these would be of the 1936 specifications, for only 500 of the 2,687 already on order were of those types - the rest was made up of 412 Whitleys, 575 Hampdens, 150 Herefords, and 1,050 Wellingtons. (1) But, making no allowance for peace time wastage or for further orders, there would be enough heavy bombers of various kinds (when they were all delivered), to get rid of the inadequate Blenheims and Battles. There would be enough to provide a bomber force of some 85 heavy bomber squadrons, each at an initial establishment of 16 aircraft, a total of 1,360 first-line aircraft, backed by reserves amounting to some 325% of first-line strength. This was the bomber force which Scheme M was designed to produce by 31 March 1942. A substantial part of it would be available in 1941, for it was hoped that by April 1941 there would be 76 heavy and only 6 medium bomber squadrons, and that substantial though not fully adequate reserves would be provided for them by that summer.

The 1942 force

The 1942 force would thus in a large measure realise the Air Staff's ambition for an 'all heavy' bomber force. It would not even then completely represent the 'big bomber' policy. Some of its 85 squadrons would still be equipped with Whitleys, Hampdens, Herefords, and Wellingtons. But in due time these types would disappear, as the Blenheims and Battles would have disappeared before them. In their place would come more of the great four-engined Stirlings and Halifaxes and (it was then still anticipated) the twin-engined counterpart of the Halifax, the Manchester - perhaps eventually the B 19/38 'ideal bombers'. Then Bomber Command would indeed be an 'all big bomber' force. It would have the trained crews and the reserves to make 'rolling up' unnecessary. It would be able to strike with its full strength. And its full strength - or so it seemed in 1938 - should be sufficient to make Germany, rather than Britain, fear the possibility of defeat from the air. Then at last the advocates of the 'bomber experiment' would have the means for testing their theories - and for discovering how difficult was a long range 'independent' air offensive even when attempted with reasonably adequate weapons.

Policy of conservation strength-ened

Meanwhile, however, the Cabinet's approval of the Air Staff's 'big bomber' policy made it more than ever necessary not to fritter away the trained crews the 1942 force would need by attempting too vigorous a use of the 1939 bomber force. The policy of conserving the bomber force until it could be re-equipped with 'heavies' and backed by adequate reserves was thus firmly and explicitly established by the lessons of the Munich Crisis distilled in Expansion Scheme M. For the remaining months of peace and through the early years of the War of 1939-1945 it was to govern the life and actions of Bomber Command.

(c) The Progress of Bomber Equipment, 1939

Character of 1939

The story of the progress of the bomber force's equipment and efficiency between the authorisation of Scheme M and the outbreak of War in September 1939, need not detain us long. It is for the most part the story of the slow remedying of already discovered deficiencies and defects; of the development of aircraft and equipment already existing or projected; of the continuing struggle to improve war readiness and hasten training in face of the familiar handicaps. Most of these are matters for the Technical Narratives rather than for this Narrative. For in bombing policy the great decisions had been already taken by November 1938 and in 1939 they were very little modified. The imminence of war and the pressure of

/existing

(1) D.G.P. forecast, Oct. 10 - A.H.B. V. 5/11/4.

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existing programmes and projects upon industry, design staffs, Air Ministry departments, and Bomber Command itself, all compelled an emphasis upon making the best of what there was rather than upon planning for an ideal future.

Progress  
with the  
newer  
designs

B 1/35

Progress with the new designs of aircraft, for the bomber force of 1942 and after, nevertheless continued steadily if slowly. Work was concentrated chiefly upon the 1936 specifications for heavy bombers, the B 12/36 and the P 13/36. The B 1/35 Vickers Warwick was no longer looked upon as a probable bomber of the future. An Air Ministry Progress Meeting in December 1938 had decided not to put it into production, unless that were necessary to keep geodetic development alive. The Air Ministry technical branches had advised in February 1939 against pursuing the project beyond the prototype stage. The Supply Committee, in June, though it allowed jigging and tooling to continue, decided that no orders should be placed until after the prototype's flight trials, which were about to take place when war broke out. (1) The Warwick, then, was practically abandoned.

B 12/36  
Stirlings  
and  
P 13/36  
Halifaxes  
and  
Manchesters

The new orders, authorised by the Treasury in the early part of 1939, were concentrated upon the 1936 designs - the four-engined Short Stirling to the B 12/36 specification, and the four-engined Handley Page Halifax and the twin-engined Avro Manchester to the P 13/36. Type requirement specifications for the production of Stirlings were issued during the summer of 1939; (2) the Halifax and Manchester were making fair progress; and consideration was being given just before the outbreak of War to the provision of armour and even cannon in all three types. (3) More powerful bombs, such as they could well carry, were also just beginning to come into sight. At the end of August 1939 the new 1,000 lb G.P. bomb was practically ready for production. (4) A project for a 4,000 lb 'mine bomb' had also reached a stage where its development could be discussed. (5) The days when it was considered that four-engined bombers were too large for Bomber Command's needs and that no bomb heavier than 500 lb could be required had indeed passed away.

B 19/38

Beyond the Stirlings, Halifaxes, and Manchesters the prospect was somewhat more speculative. A draft specification for the B 19/38 'standard' or 'ideal' bomber had been prepared, (6) and consideration of requirements for the B 17/38 'rapid production' bomber (7) had led to some investigation into the possibility of simplifying aircraft designs in order to facilitate production (8). For the 1939 aircraft design programme the Air Staff had originally included an ultra-long range bomber, possibly with a pressure cabin for high-altitude flying. They had agreed, however, at the conference on the programme in December 1938, to let this be dealt with under the 1938 programme as a variant of the B 19/38 adapted for re-fuelling in the air. Such an aircraft would not in any event be needed for more than three or four squadrons (9).

B 11/39

In addition, the Air Staff had also asked for a 'light bomber' to be included in the 1939 programme. It might be, they thought,

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- (1) A.M. File S.35214/107A.
  - (2) A.M. File S.1581.
  - (3) A.M. File S.47165,47286,49307.
  - (4) A.M. File S.43296/14A.
  - (5) A.M. File S.55780.
  - (6) Bombing Committee, 4th Interim Report.
  - (7) A.M. File S.44739.
  - (8) A.M. File S.46242.
  - (9) A.M. File S.45556/10A,11A.

that the total number of bombers required for political and tactical reasons would compel the Air Ministry to accept in the bomber force a proportion of machines cheaper and smaller than the 'standard' B 19/38. The requirements of reconnaissance and of Army Co-operation, too, might call for a high performance bomber of smaller size. It was therefore agreed that it would be desirable to prepare a specification for such a machine. So, as the B 11/39, this project took its place in the 1939 programme and was duly considered by the Bombing Committee. (1)

Arrears of  
design  
work

Its chances, or indeed the chances of any of the 1938 specifications, of getting very much further than this in the immediate future were, however, slender. For the design staffs of the aircraft industry were still overwhelmed by the accumulated arrears of the years of rapid and continuous expansion. They could in 1939 deal with no more than seven new types - and the ten items of the 1939 programme and the seven items still outstanding from that of 1938 between them totalled seventeen. (2)

Outlook  
for 1942  
and  
beyond

Nevertheless the outlines of a force beyond the 1942 machines were beginning to take shape - the 'standard' four-engined B 19/38 heavy bomber, with a few ultra-long range squadrons using a variant thereof; and the smaller B 11/39 to co-operate with the army and swell the total numbers, if that were needed. Something even beyond this might be faintly discerned. For the theoretical investigations into a 'super B 12/36', initiated in the 1937 research development programme, had begun to take shape by the close of 1938. The research branches could by then suggest the practicability of a four-engined heavy bomber or flying boat, with the greatest possible bombload, a four-cannon turret amidships; a 6,000 mile range; and a speed of between 350 and 400 m.p.h. at 25,000 feet. None of these various items had, it is true, yet progressed beyond the stage of being mere projects. But they were sufficient to make clear that even the 1942 Stirlings, Halifaxes, and Manchesters need not be regarded as the last word in bomber design and development.

Progress  
with the  
1939-41  
force

While the 1942 bomber force was thus being prepared and even its successor being investigated, a good deal was done to make the best of the existing 1939 force. The last of the A.A.F. squadrons had gone from the Command by the end of January 1939, and shortly afterwards two of the regular Blenheim squadrons were sent overseas. The total force was thus reduced to 55 squadrons. But if the total number of squadrons was diminished, those that remained were considerably better equipped. The obsolete and stop-gap types of aircraft had been finally replaced by newer machines and the proportion of heavy bomber squadrons had been increased. Between October 1938 and the end of August 1939 24 of the 55 squadrons had been rearmed. Ten squadrons - three Hind, one Wellesley, three Blenheim, two Battle, and one Whitley - had been re-equipped with Hampdens. Another ten - one Wellesley, one Hendon, five Harrow, and three Heyford - had been re-equipped with Wellingtons. Four more - one Wellesley, and three Heyford - had been re-equipped with Whitleys. When war broke out, there were thus 27 medium bomber (15 Battle and 12 Blenheim) and 28 heavy (10 Wellington, 10 Hampden, 8 Whitley) bomber squadrons.

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- (1) A.M. File S.1382 A twin-engined monoplane for day bombing and reconnaissance had also been included in the 1937 research development programme A.M. File S.39435/14A. The C.-in-C., Bomber Command had urged the need for such an aircraft for harassing attacks - A.M. File S.43442/25A.
- (2) A.M. File S.45556/11A.

A beginning had also been made with increasing the squadrons' initial establishments towards the 24 aircraft for medium and 16 for heavy bombers, which they were scheduled to reach by March 1940. Thus although the 12 Blenheim squadrons remained at 16 aircraft each, the 15 Battle squadrons had already gone up to 24. Of the heavy bombers, three Whitley and two Hampden squadrons had reached the full 16 aircraft each, though the remainder still had only 12. The nominal first-line strength of the bomber force had thus been raised to 552 medium and 356 heavy bombers.

Reserves  
and the  
mobilisable  
force

Reserves of these modern aircraft and of trained crews were, however, still exceedingly slender. A considerable 'rolling up' of squadrons would still be necessary on mobilisation. Yet even here there was some slight improvement by the end of August 1939. By that date, despite the loss of two squadrons gone overseas, it was possible to count upon a mobilisable force of 38 squadrons - 20 medium (10 Battle, 10 Blenheim) of 400 aircraft and 18 heavy bomber (6 each of Wellingtons, Whitleys, and Hampdens) of 232 aircraft. These would be backed by 17 non-mobilisable squadrons as a reserve - 7 medium (5 Battle, 2 Blenheim) of 152 aircraft and 10 heavy bomber (4 Wellington, 4 Hampden, 2 Whitley) of 124 aircraft. (1)

Its inad-  
equacy

Yet, despite these improvements, the bomber force at the outbreak of the war was still a force quite inadequate for a decisive air offensive against Germany. More than half of it was still composed of medium bombers which it was considered impossible to employ on the North Sea route to the major German targets. Arrangements with the French were being perfected to allow the use of French bases and refuelling grounds; but upon the outbreak of war there must inevitably be some days' delay before these bases and grounds would be available. Nor would the Blenheims and Battles be very formidable weapons when they were based on the Continent. Even if armour protection could be given to their pilots, (2) nothing could be done substantially to improve their range, bombload, or armament. Moreover, of the heavy bombers, the Whitleys could be used only by night owing to their low speed and performance, while the Hampdens and Wellingtons were already coming to be regarded as heavy bombers only by courtesy. The Wellington's armament was being reconsidered and by September the decision had been made to give it a mid-under as well as a tail turret. (3) The armament of the Hampden was less easily augmented. It was thought by the Commander-in-Chief of Bomber Command to be quite as inadequate as the machine's navigational facilities, for "in this aircraft we have quite definitely had to put quarts into pint pots". (4) The experience of the earlier months of the War was only to emphasise the doubts felt before September 1939 about the 1939 force's capacity for a daylight offensive against Germany.

Training  
and  
Tactics

The standard of the aircrew's training likewise left a good deal to be desired. (5) The efficiency of the non-mobilisable squadrons had not been improved by the dilution of

/their

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- (1) For details of these figures, see Appendix II.
  - (2) A.M. File S.45863,47002.
  - (3) A.M. Files S.32832/I/93; 46041.
  - (4) A.M. File S.46368/IA; 40110/37A,40.
  - (5) See the Narrative of Training prepared in this Branch.



their crews with direct entry pilots and observers and other recruits and with reservists still under training. Moreover, all but pilots and observers were still trained in the squadrons, and the pilots and observers who came on from the Flying Training Schools and Air Observers Schools still lacked many things. Operational training - including a good deal of their navigational, night and instrument flying, and gunnery training - still fell upon the squadrons, for Group Pools, though projected, had not yet been introduced for Bomber Command. In addition, although the beginnings of a 'crew policy' might be discerned in the scheme for the provision of full-time observers, trained in navigation, in crew training the squadrons were still left to work out their own salvation. Finally, the deficiencies in equipment, of which the Commander-in-Chief had complained in November 1937, had been remedied but slowly and incompletely. In such conditions it had not been possible even yet for the bomber squadrons to practise very thoroughly the more advanced aspects of their art or to experiment greatly with complicated or novel tactics. The reiterated appeals of the Bombing Committee had, it is true, at length secured the establishment of a bomber development unit, but its time had been short. There had been some experimenting, made more informative by the use of cine-guns, with methods of defence and evasion to be used against modern fighter aircraft. There had been a little more investigation of pattern bombing, for which an improved distributor gear was now being produced; but "the application of the theory was not yet completely understood." (1) A few experiments in target illumination at night with 5.5" flares had also been made over Salisbury Plain as well as over water. (2) Some of these experiments had, admittedly, been carried out by Bomber Command squadrons. Nevertheless, it was still, broadly speaking, true that the great majority of those squadrons had little or no experience of anything very far beyond the more elementary bombing tactics. The problem of securing heavy bombing concentration and of handling large mass formations of aircraft were only just beginning to receive attention even at the Air Ministry. (3)

Thus from the point of view of training and experience, as well as of equipment, it was already obvious that the policy of conserving the 1939 bomber force until a better could be developed, was not so much a matter of choice as a matter of necessity.

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- (1) 4th Interim Report.
  - (2) A.M. File S.32229/164A, 177A, 178A.
  - (3) A.M. File S.1646

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PART TWO

THE LAST YEAR OF PEACE

CHAPTER 6

BOMBING POLICY OCTOBER, 1938 TO SEPTEMBER, 1939

CHAPTER 7

PLANS FOR BOMBER COMMAND IN WAR

CHAPTER 8

INTELLIGENCE: AN ASPECT OF POLICY AND THE  
BASIS OF PLANNING

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FOREWORD

The primary object of this work has been to complete the history of the "pre-war evolution of Bomber Command". This is the title of the first volume of the Bomber Narrative, and the author of that volume had originally intended to carry his work down to the outbreak of war on 3rd September, 1939.

This unfortunately proved to be impossible, and a second narrator has therefore attempted to do it.

The first part carries the story to the time of the Munich crisis, but the ending is not abrupt. It has therefore been necessary, sometimes to look back at events before that crisis, and sometimes to realise that in certain aspects the first part has already taken the story beyond it. Thus in part II the origins of bombing policy have been traced back to the Great War, but little or nothing has been said of expansion and equipment, for this has already been carried down to the outbreak of war in Part I, with one exception.

This exception is the remarkable episode of the Ideal Bomber. Only the origins of this have been previously discussed, but the subject does not accommodate itself to the main theme of the second part so it has, in view of its great intrinsic interest, been dealt with in a special annex.

A secondary object of this work has been to present it in a reasonably self-contained form. It can obviously be read with the greatest advantage as an epilogue to the first part, but it is also intended to be a prologue to the narratives which deal with Bomber Command at war.

This task has been considerably eased because the main omissions in the first part are in the field of policy, planning and intelligence. These three are related subjects and they compose the main theme of this part. In completing the first volume it has therefore been possible to create a related thesis.

To gain this self-sufficiency it has been found desirable in some instances to go over ground already covered in the first part. Such repetitions are clearly indicated to the reader and, in apology, it can only be pleaded that this has been done in the interests of clarity and continuity, and so of self-sufficiency.

Finally it should be known that the author of the first part read the drafts of the chapters which follow as they were produced and made many valuable suggestions. In this way, it is hoped, a certain continuity has been preserved over the whole period from 1917-1939.

## CHAPTER 6

BOMBING POLICY OCTOBER, 1938 TO SEPTEMBER, 1939Introduction

During the years between the two World Wars air bombing was a constant topic of discussion between nations at Geneva and the Hague, between government departments in London, between members in Parliament, between writers in the press, and between ordinary men in the streets. Experts and amateurs alike were concerned about this new method of warfare which might effect them all so vitally. For Great Britain, in particular, bombing seemed to raise problems of especial importance. London was the largest city in the world, and presented to the bomber a target which in "importance and vulnerability" could not be found in any other quarter of the globe. Its destruction would not only throw British trade and production out of gear, but also a large part of the trade of the world as well. Also Britain depending as she did, and does, for her existence upon imports had another weak spot; her ports. If these could be destroyed she could not survive. A psychological build up of the terrors of air bombing coupled with these more material considerations gave birth to the idea of the "Knock out blow". It was this idea which was to be the fundamental motive of British air policy after 1933. It could, however, produce two results in so far as the prospect of a war with Germany was concerned. Britain could make the assumption that it would be Germany who would deliver the knock out blow, or she could concentrate on a plan to knock Germany out, for in the Ruhr lay the world's most highly concentrated industrial zone, whose operative area was little larger than greater London.

C. O. S. 786  
App. II to  
Annex.

Ibid

The disarmament policy of the British government and the subsequent failure of the various R.A.F. expansion schemes to achieve air-parity, however, made the second of these alternatives only a long term possibility. The Air Staff never lost sight of the Ruhr, but as war drew nearer they came to realise that an opportunity to bomb it effectively could only come after London had been saved. Britain therefore planned to escape a "knock out blow" and then in the light of war experience and when her own force had grown strong enough to deliver one against her enemy. To grasp this is to grasp the whole import of British Bombing Policy, which it is intended to reveal in this chapter. Britain sought to achieve this aim by adopting for the initial phase of the war a policy of restricted bombing, but to understand the reasons for this it is essential to take a wider view, and look back over the years between Versailles and Munich. (1)

Britain aimed to secure immunity from a knock out blow. There seemed to be four possible methods of achieving this:-

1. The enforcement of a Code of Air Warfare Rules,
2. The abolition of military Air Forces, or of bombing Aircraft, and if this failed, at least the restriction of bombers in size and numbers.
3. The provision of a bombing force sufficient for effective retaliation.

(1) It is not the intention here to examine developments in these years in any great detail. The sole object is to provide the clue necessary to an understanding of Bombing Policy after Munich.

#### 4. The diversion of the enemy to another front.

Of these four possibilities the first two obviously depended upon some form of international agreement, and the acceptance by the world of the validity of international law. The second section of this chapter will therefore discuss the attempt and failure to reach an international agreement.

The second two methods were less ambitious and more practicable, for they did not depend upon any 'legal' conceptions, but on the contrary purely upon national expediency. It proved, however, impossible for Britain to secure air parity with Germany in peace time, and her various expansion schemes did not in themselves constitute a sufficient threat of retaliation. (1) This fact combined with the apparent character of German Policy made the last method appear more promising, for ignoring the precepts of Bismark, Hitler displayed aggressive intentions simultaneously towards the East and the West. Yet it gradually appeared more and more likely that the initial German offensive would come in the East. In these circumstances Britain might hope to escape a "knock out blow" at the outset provided nothing was done in the West to draw the Germans back from the East. This depended upon the French abstaining from a land, and the British from an air, offensive in the initial phase. In any case the "Maginot" complex and the limited size and striking power of Bomber Command appeared to make this policy inevitable. The third section will accordingly discuss the British policy of restricted bombing.

There was, however, another aspect of this second front theory which threatened its validity. Bismarck's main object had always been to avoid a war on two fronts. The Western allies were now hoping to gain temporary immunity while Hitler struck in the East, and to ensure this they considered any attack by themselves would be inadvisable (always assuming it was not impossible). Would this not therefore mean that Hitler would fight not one war on two fronts, but two wars on one front? It is therefore apparent that there was a challenge to the policy of restricted bombing which became apparent when the question of the Polish guarantee arose. This will be discussed in the fourth section of this chapter.

Finally it must be remarked that the eventual conclusion was that, if the air force was guided by the 'legal' aspect, it could bomb almost anything, but if it was guided by

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(1) For the details of the Expansion Schemes, and the whole question of air parity see Part I of this Volume.

Also see Chapter 7, of this volume "Plans for Bomber Command in War" for such retaliation plans as were made. e.g. W.A.I.

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immediate expediency it could bomb almost nothing. For obvious reasons, the Government always substituted the word 'legal' for 'expedient' and 'illegal' for 'legal'.<sup>(1)</sup>

### The Search for an International Agreement

COS 786

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On 24th October, 1938 The Joint Planning Committee reported that it was a British interest to aim at "the highest possible degree of immunity from bombing". The "ideal solution" would have been the abolition of bombers, but the best that could be hoped for in practice was the restriction of bombing to battle zones. This last idea had already been suggested by the German Government two years before, and the Joint Planning Committee were now of the opinion that it offered a good basis for an international agreement.

There was, however, nothing new in the German proposition, or in the report of the Joint Planning Committee.<sup>(2)</sup> The whole question of an international agreement had been under consideration for twenty years. No international agreement was ever reached, but the lines of the policy of restricted bombing which was eventually adopted by the British Air Staff were indicated during these abortive negotiations made to regulate bombing. This aspect of the problem therefore assumes more significance than might be imagined from the failure of the League of Nations.

### The Draft Hague Rules Of Air Warfare (3)

AHB  
IIA/1/34C  
Folio 167

At the Washington Conference in 1921, Britain, the U.S.A., France, Italy and Japan, the victorious allies, agreed to set up a Commission to consider the revision of the laws of warfare.

- (1) This should be borne in mind when the question of Planning (Chapter 7) is considered. Owing to the confused way in which the term 'legal' is used in connection with Air bombing it is thought desirable to explain the use of the word in this narrative. It is unavoidably employed in two senses. Since there was no law of the air it cannot obviously have a simple meaning. In the first sense it is used to denote what would be legal if certain codes of warfare for instance the Hague Rules, had been ratified; or if certain other codes, for instance the Hague Conventions of 1899 and 1907 had been interpreted to include aerial warfare. In the second sense it is used to denote what conformed to British Policy. For instance a W.A. Plan is called 'legal' if it was within the restrictions of the 22nd August, 1939 issued to commanders by the Government. Since however these restrictions were based upon expediency and not upon 'law', which didn't exist, the term in this second sense is employed to conform more with usage than with logic.
- (2) Which merely confirmed, for instance, a conclusion reached at the 284th meeting of the C.I.D. on 19th November, 1936 which stated "That it would be to our general advantage to have an international agreement restricting aerial warfare".
- (3) See Appendix 4.

Ibid  
Folio 146

Naval and Land warfare had their rules, but air warfare did not. During the Great War bombing had been restricted, even in theory, only by the limitations of the machines available. Indeed British airmen had been instructed to bomb German towns to destroy industry and also "to weaken the morale of the civilian inhabitants, and thereby their will to win, by persistent bomb attacks which could both destroy life (civilian and otherwise) and should, if possible, originate a conflagration which would reduce to ashes the whole town".<sup>(1)</sup> The "revision" of warfare rules therefore obviously implied the creation of an air code.

H.R.

It was in these circumstances that a body of internationally representative jurists drew up a Draft Convention of Rules of Air warfare in 1922 - 23. In 62 articles which are given in Appendix 4, many aspects of Aerial Warfare were dealt with. Only on the question of aircraft rights against merchant ships<sup>(2)</sup> was no agreement reached. From the point of view of actual bombing the important articles were numbers 22-26.

Ibid

These articles prohibited bombing "for the purpose of terrorising the civilian population" (ART.22) and laid down that bombing was only legitimate when directed at military objectives (ART.24. 1) and also that these must not be bombed if an undue risk to civilians would be involved (ART.24. 3).<sup>(3)</sup>

This at first sight no doubt seemed simple enough, but the effect of such a code depended in the first instance upon the interpretation of the articles, and in the second upon some method of enforcing international law.

(a) The Question of Interpretation

Banning methods of warfare was hardly likely to succeed if the rules could be variously interpreted.<sup>(4)</sup> For instance, the German Navy had on 16th December, 1914 bombarded Hartlepool, Scarborough and Whitby apparently in contravention of the Hague Convention of 1907. They had however found no difficulty in making out a case to prove that they had adhered to the Convention.<sup>(5)</sup> Prohibition of air bombing in the next war was hardly likely to be more effective than the prohibition of gas in the last. There would always be a difference of opinion as to what an article meant. In the instance of the Hague Rules this was demonstrated at once.

The British Air Staff, anxious to preserve the efficacy of air power, in 1924 decided to interpret Article 24 of the Hague Rules to the effect that "reasonable precautions" would be taken to spare civilians. In other words civilians would not be bombed on purpose, but it would not be an offence to bomb them by mistake.

A.H.B.  
IIA/1/34C  
Folio 120

Ibid  
34A Folio 14

AHBIIA/1/34C

- (1) Attempts were made to carry out these orders by dropping "inflammable bombs" (as the Germans did over London on 5/6th December, 1917) and by dropping "man-killing" bombs (as the Germans did over London on 31st May, 1916).
- (2) I.E. ART.49A
- (3) The wording of these articles however did allow "loopholes".
- (4) See an article by Gen. Sir George Macdonogh in "La Protection des Populations Civiles Contres les bombardements" published by the Red Cross Society.
- (5) See the official German Naval history. (Der Krieg Zur See; Der Krieg in der Nordsee Vol. III p.p. 119-120)



Ibid  
Folio 4.

In this case however the article was so worded as to leave it open to doubt whenever any protection to civilians had been provided at all. So much depended upon a definition of the term "military objective" and there was a view that a whole nation was a military objective. The Great War had suggested that victory in the field was perhaps no longer the decisive element in war. Propaganda, starvation and fear of injury were, in the opinion of the Committee on the limitation of Armaments, in 1921 the three main factors in a nation's morale. The destruction of morale might prove to be the quickest way to end a war, and so the civilian population might become the prime military objective.

(b) The question of Enforcement

Ibid  
34C  
Folio 133

There can moreover be no law without a Sovereign to enforce it, and between nations there is no Sovereign. The question was then, was it worth creating a code of air rules, if there was no method of enforcing compliance with them? Mr. Baldwin asked this question in the House of Commons on 10th November, 1932 and answered himself that he doubted the efficacy of "any form of prohibition whatever by convention, treaty, agreement or anything you like - experience has shown that the stern test of war will break down all conventions".(1)

Ibid.  
Folio 134

Nevertheless the idea of developing the Hague Rules into a form of international law died hard. The Air Ministry persevered with the idea not so much inspite of, as because of, its obvious shortcomings and the alternatives which recognition of these seemed to present. In November, 1932, the same month in which Mr Baldwin had made the statement quoted above, an Air Ministry memorandum was drawn up in which the Hague Rules were defended on the grounds that they would, in their existing form, prevent indiscriminate bombing, and that they could be extended to give further protection to civilians. Such a supposition appeared to ignore the well known and widely appreciated limitations of international rules. It had, however, to be borne in mind that the Air Staff were waging a war against the possible abolition of air forces, and that the championship of the Hague Rules was inspired by the intention to avoid the more drastic solution of the problem: the abolition of military air forces, or at least of bombing aircraft.

Plans for the Abolition of Bombing

Ibid.  
Folio 129

Before the end of 1932, then, the weakness inherent in any system for restricting bombing by international convention had been fully revealed. Air forces remained a "Lawless Arm."(2) Nor was the problem of the "knock out blow" any nearer to solution. "Our main preoccupation," the Foreign Secretary telegraphed from Geneva on 13th April, 1932, must remain "the danger of London being heavily and suddenly bombed by way of a knock out blow."

But if bombing could not be restricted, might it not be abolished? Abolition if practicable, would after all bring greater security at less expense. So in 1932 and 1933, under the shadow of the 1931 financial crisis, discussion turned from the question of restriction to the possibility of abolition.

(1) See also BOYCE: Aerial Bombardment (Vinal and Co. NY. 1928) on this whole question.

(2) See an article under this title by J. M. Spaight in the Army Quarterly for Oct. 1935.

(a) The attitude of the Air Ministry

The Air Staff were naturally in strong opposition to the proposal to abolish bombing aircraft. They claimed that this suggestion was not practicable as any aircraft could so easily be converted into a bomber. In this connection the C.A.S. quoted to the Secretary of State for Air a verse which had appeared in a "leading aeronautical journal."

Ibid.  
34 B  
Folio 117

"I'd been on the tarmac admiring a plane  
And was just then about to depart,  
But something induced me to turn round again  
For a last final look at the Hart,(1)  
I turned, but I found it had altered its view  
It suddenly seemed to be lighter  
For where a day bomber I'd recently seen  
There now stood a two-seat fighter(2)  
I said to myself, "This is all very strange!"  
As I went for another looksee,  
And the two-seat fighter appeared at close range  
To be fully equipped for "A.C."(3)  
I asked a mechanic the name of the kite  
And he mumbled to me through his teeth  
"Some call it an Audax, but 'ere in the Flight  
Its an 'art with an 'ook underneath!"  
I felt pretty sure he was telling me lies,  
But I took down some int'tresting notes;  
Then when I looked up I'd another suprise  
For the Audax was sitting on floats.  
"Great Scott! What is that? I exclaimed with a cry,  
"It has changed its complexion again!"  
"Oh no that's an Osprey!" I heard him reply,  
"Its a regular Fleet air Arm Plane!"

Ibid.  
34 C  
Folio 128

The Air Staff were sceptical about the possibility of carrying out such a plan for, in addition to the difficulty of distinguishing the bomber among military aircraft, there was the problem of preventing the conversion of civil aircraft to military purposes. They were also anxious that the scheme should be abandoned as, in their view, the defence of London would be prejudiced, and the 'policing' of the Empire made impossible if it was agreed to abandon bombing. The Prime Minister had pointed out that it would be difficult to say "that we were horrified at the idea of bombing, but that while we would agree not to bomb others, we must still reserve the right to bomb our own people". Despite the opposition of the Air Ministry this was however, in effect, what the British Government did say.

(b) The Failure of the Scheme

On 22nd February, 1932 the United Kingdom disarmament proposals were published, and they advocated "The practical examination of the whole problem of bombing from the air in its widest possible form", and soon afterwards a Foreign Office Paper(4) appeared advocating the prohibition of bombing against any other Sovereign State.

Conf. D.95

DC(M)(32)13

- (1) The Hart was in 1932 thought to be the most effective bomber.
- (2) There was a school of thought that a "two-seat" fighter was more effective than the single seat machines.
- (3) Army Co-operation.
- (4) The "Leeper Paper".

DC(M)(32)14  
CP127(32)

This view was supported by the War Office and by the Admiralty and by 8th April, 1932 even the Secretary for Air was prepared to consider the abolition of heavy types of bombers.

CAB 27 (32)

AHB. IIA/1/34C  
Folio 128

Ibid  
Folio 132

Ibid  
Folio 154

On 11th May, however, the Cabinet accepted a recommendation from the Coast Defence Committee (1) not to proceed with the plan. This did not lead to the result hoped for by the Air Ministry. On 8th July, 1932 the Foreign Secretary telegraphed from Geneva that he expected a "strong move" in favour of total abolition. He also anticipated that if Britain opposed this she would find herself isolated with Japan, and ten days later he was able to tell the Secretary for Air that the Cabinet had decided that Britain must avoid such isolation. Accordingly on 23rd July, the British delegation voted in favour of the Benes Resolution. (2)

This resolution proposed that "The High Contracting Parties shall agree as between themselves that all bombardment from the air shall be abolished subject to agreement with regard to measures to be adopted for the purpose of rendering effective the observance of this rule."

CP272(32)  
CAB 49(32)

AHB. IIA/1/34C  
Folio 166

The Secretary of State for Air made a vigorous protest against the Benes Resolution, but on 30th September, the Cabinet authorised the Foreign Secretary to accept it, though they suggested that he should draw attention to the practical difficulties of carrying out such a proposal. This however the Foreign Secretary did not do.

In view of the Air Ministry's conviction that the scheme was impracticable they need hardly have shown such alarm.

Conf.D.154

AHB. IIA/1/34C  
Folio 166

On 30th January, 1933 the United Kingdom Delegation suggested that an Air Committee should be set up to devise means for the abolition of military aircraft and the control of civil aviation, and on 20th February, the Secretary for Air addressed the first meeting of this committee. He pointed out that no scheme for abolition could be effective unless there was control of civil aviation. This control, Lord Londonderry said, must guarantee that civil aircraft could not be converted to military purposes, but at the same time it must not hamper the development of civil aviation. Inevitably no one could think of any method of achieving this double aim, and the Air Ministry recorded, it may be suspected with satisfaction, that the Government were in "some difficulty" having suggested a policy but being unable to think of any method of carrying it out. (3)

#### International Agreement: Conclusions

Thus the impossibility of restricting or abolishing bombing by international agreement was demonstrated at Geneva. Logically further efforts should have been abandoned in 1933, but the "bomb" had excited public opinion. There was a general tendency to associate it with pre-war anarchists and to regard its use as "barbarous".

Ibid  
Folio 154

- (1) Presided over by Mr. Baldwin
- (2) Though according to the Air Ministry, this was accepted by the Foreign Secretary without the authority of the Cabinet.
- (3) A discussion of the real motives of the Government, and the divisions in the Cabinet in this matter are beyond the scope of this narrative. The Prime Minister however regarded it as essential to co-operate with the U.S.A. who supported abolition.

Probably mainly for these reasons the attempt to reach an international agreement dragged on until 1938. At no time however was there any prospect of success. The prospect of averting the "knock out blow" by this means therefore became remote. In the absence of air parity, there remained only one other way in which this threat might be averted, or at least delayed, and that was the possibility of the 'enemy' attacking on another front. If he showed such an inclination, then Britain should do nothing to divert him, nothing to precipitate an onslaught by the German Air Force. Her correct policy, on these premises, would be one of 'restricted bombing.'<sup>(1)</sup>

#### British Policy of Restricted Bombing

It was not until the end of 1938 that the hope of an international agreement on bombing was finally abandoned. But that hope had for years been exceedingly faint and as early as 1934 Britain had felt compelled to seek security in national rearmament rather than in international agreement. By 1938, however, the series of R.A.F. Expansion Schemes had clearly failed to produce an effective deterrent to German aggression. Britain was farther than ever from parity with German air striking power, and the Air Staff had been driven to rely upon "close defence" rather than counter offence to parry the "knock out blow." As the efficiency of such defence remained to be proved, "maximum immunity" from bombing during the initial phase of the war became more than ever desirable. Moreover the momentous decision of November, 1938 to concentrate production upon fighters meant delaying, until 1941, the creation of a really effective bomber force, whose offensive action was still regarded as an essential preliminary to victory. Hence followed the further momentous decision to conserve the 1939 force, whose trained crews must provide the nucleus of the 1941 force.<sup>(2)</sup> To secure "maximum immunity" for the untested resources of "close defence", and circumstances favourable to the conservation of the 1939 force, the only way was to adopt a policy of restricted bombing and hope that the enemy, at any rate so far as Britain was concerned, would do the same.

Spaight

Indeed the Air Staff had now come to regret their attitude of the early thirties and on 1st March, 1938 an Air Staff memorandum had expressed a wish for an international agreement by which "air forces, while they remain valuable auxiliaries to surface forces, cannot in themselves be a decisive factor in war."

It is not, then, suprising to find that in the Munich crisis, when immediate war became probable rather than possible, a policy of severe restriction was imposed upon British Commanders.<sup>(3)</sup> This was, however, an emergency measure. The question was, when the crisis had subsided, would this policy be continued, and if so what were its prospects of success from the point of view of averting the "knock out blow" and enabling the Air Staff to conserve the 1939 Force.

(1) For the genesis of this policy during the Munich Crisis see Part I of this Volume. Only an outline of the decisions before October, 1938 is given here.

(2) These sentences are based on conclusions reached from Part I of this Volume.

(3) See Part I of this Volume "Bombing Policy in the Munich Crisis".

Foundations of the Restricted or 'Legal' Policy

A.M. File  
S.46105  
Enc. 6A  
Ibid  
Encl. 12C

In these difficult conditions the Air Staff made an effort to lay down a domestic law of bombing in a note of 28th September, 1938, which though it stated that there was no recognised formula on which to base rules of air warfare, used the three points made by the Prime Minister in the House of Commons on 21st June, 1938. These were:-

Ibid

- (a) It is against international law to bomb civilians as such and to make deliberate attacks upon civilian population.
- (b) Targets which are aimed at from the air be legitimate military objectives and must be capable of identification.
- (c) Reasonable care must be taken in attacking those military objectives so that by carelessness a civilian population in the neighbourhood is not bombed.

The Air Staff note pointed out the difficulty of defining a "legitimate military target" and expressed a doubt as to whether this could ever be done. An attempt was nevertheless made to place targets in three categories, (a) "definitely illegitimate" under the Red Cross Convention. (b) "Unquestionably legitimate", and (c) those targets whose legitimacy it was then considered impossible to determine. Thus attacks on hospitals and civil population were "definitely forbidden" (Category (a)) while attacks on military forces, works, depots, aerodromes, Naval dockyards, and lines of communication, the latter "in the area of land operations", were sanctioned (Cat. B). As to Cat. C. the view was that attacks on those doubtful targets might be undertaken later. The note observed that "the policy governing the choice of targets is a matter for decision by the Government."

Ibid  
Encl. 12A  
Ibid  
Encl. 12B

This note was intended to form the basis of a "General Instruction to R.A.F. Commands", and it endeavoured to "steer clear of contentious matters at present under discussion."

Ibid. Encl. 15A

Yet as the Admiralty pointed out on 8th November it might have been better if the Air Staff had waited for a declaration of policy from the Government before issuing this rather nebulous note which did little more than beg the question which had been asked by Plans 5 on 6th September, 1938 what is a military target?(1) Despite this unsolved problem the Prime Minister's three points had formed the basis of a directive issued to the A.O.C.-in-C. Bomber Command on 15th September, 1938.

A.M. File  
S.46239/1  
Enc. 9A

(a) The advantages and disadvantages of the Restricted Policy

Apart from the perennial difficulty of drawing up regulations for restricted bombing, what were, from the British point of view, the advantages of persevering with such a policy as against the disadvantages of abandoning it?

(1) See Part I of this Volume.

C.O.S. 786

The position was admirably summed up for the Chiefs of Staff by the Joint Planning Sub-Committee in a report dated 24th October, 1938. The chief disadvantages were considered to be:-

1. The loss of deterrent value on the potential war maker which might be exercised by a powerful striking force.
2. The loss of power to apply "economic pressure" on Germany from the air, which might become more important as Germany became increasingly self sufficient and so more dependent on her home industries.
3. The loss of power to reduce the enemy's air strength, and so to avert the "knock out blow" by a direct method.

On the other hand the advantages of restriction were:-

1. The validity of sea power would tend to be restored.
2. The danger of a German air offensive would be reduced.
3. If Germany did resort to unrestricted bombing world opinion, and particularly that of the U.S.A., would be "mobilised" on the British side.

The Report therefore assumed that any limitation of bombing would be to the British advantage.<sup>(1)</sup>

(b) The Comparative Vulnerability of Germany and the United Kingdom

Some indication of whether Germany would be likely to restrict her air offensive in the West, at least in the initial phase of the war, might be gained from a comparison of the vulnerability to air attack of Germany as against Britain.

Germany with her land frontiers, and her programme of ever increasing self sufficiency would not be vulnerable to air attack on her sea trade, though she could not entirely dispense with this. On the other hand as her self sufficiency tended to make her immune under this head, it made her correspondingly more vulnerable to an industrial attack, particularly in a long war. Furthermore German production was thought to depend to a large extent upon the "uninterrupted activity of a single industrial district - that of the Ruhr - Rhineland - Saar". It was estimated that 80% of the total output of coal, coke and steel, came from here, and the "operative area" in the Ruhr was approximately the same size as Greater London.

Great Britain was comparatively less vulnerable as far as industry was concerned. There were districts where heavy damage might "gravely reduce" output, but industry was on the whole much less concentrated than in Germany. On the other hand Britain was dependent "for her very existence" upon sea trade and was, under this head, much more vulnerable than Germany. Also it was stated that no other country had a target comparable to London in "importance and vulnerability". The destruction of London, it was expected, would throw

(1) It should be pointed out that the hope of reaching an international agreement on bombing was still entertained when this report was written.

C.O.S. 786  
App. II to  
Annex

Ibid

British trade and production (and a large part of world trade) "out of gear".

Even assuming that the two countries could have mustered striking forces of equal strength Britain would still be the more vulnerable. In fact Britain with her much smaller air force was in eminently the more dangerous position.

It therefore appeared that the Air Staff had no alternative to the policy of restriction which had been adopted during the Munich Crisis.

(c) Continuing Possibility of a "Gloves on" Period in the West

A.H.B.IIA1/4

The possibility of Germany launching a full scale air offensive in the West at the outset of a war was in the mind of the Air Ministry when they compiled their appreciation on W.A. 5b in March, 1939.

On the whole, however, it seemed more likely that the initial German attack would be directed eastwards, and accordingly that there would be a period of lull in the West, during which, provided the Allies bombed only military targets, Germany would probably keep "the gloves on" as far as Britain and France were concerned. This was the conception which had governed bombing policy during the Munich Crisis, and it was this same conception which continued to govern it in the period under review.

This then was the cardinal point in the Air Staff's bombing policy. Britain had the weaker Striking Force, but had long range plans for the "big bombers". She wished to conserve the 1939 force, so that from it there could, in the years to come, be built up what was hoped would produce a war winning bomber command. In the meantime Bomber Command could not fulfil the war winning role which Lord Trenchard had hoped for, nor could it fulfil the defeat averting role to which Mr. Baldwin had alluded in 1934.<sup>(1)</sup> The averting of defeat was to be left increasingly to Fighter Command, with the consequence that the efficiency of Bomber Command had to be further delayed. In these circumstances it seemed gratuitous folly that Britain should provoke an air attack which she could, in the last resort, neither prevent nor counter.

It was this consideration which drove the Air Staff to a policy of extreme caution in the formulation of bombing policy. That this was not a policy of surrender, as will sometimes appear to be the case, is shown by the continuance of the policy of building up a big bomber force eventually to be composed of Stirlings, Manchesters (Lancasters) and Halifaxes, and by the preparation of various W.A. Plans which could not possibly be operated in a period of restricted bombing.

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(1) "It is quite true that the bomber will always get through any defence you can visualise to-day....if there is the possibility of retaliation at once, that again reduces the danger".

(Mr. Baldwin in the House of Commons 8th March, 1934).



Preparation and Issue of Instructions on Bombing Policy(a) Rules to be observed in the R.A.F. in War

By 19th May, 1939 the Air Ministry was discussing with the Admiralty draft instructions on rules to be observed by the R.A.F. in War, though at that date the draft had not "gone through the mill" at the Air Ministry. On the 16th June, however, the draft, provisionally approved by the Admiralty, was sent to Sir William Malkin who on the following day informed Plans 5 that he thought the instructions "excellent" and that he had made only a few amendments.(1)

On 14th August, 1939 The Admiralty made further amendments which tended to strengthen the validity of the Hague Rules, and suggested that it should be made clear that even a legitimate military target should not be aimed at unless there was a "reasonable expectation" that no incidental damage to non military objects would be caused. The Air Ministry having accepted most of these suggestions put the draft instructions into their final form on 17th August, 1939. These were issued on 22nd August, 1939.

These instructions began by asserting that every government was responsible for ensuring that war operations were conducted in accordance with international law. Occasions might however arise when commanders or captains of aircraft would have to decide for themselves on the spot, what action they would take. Such a situation had indeed been envisaged by the C.-in-C. Bomber Command, when he raised the whole question of alternative targets on 6th July, 1939.

The instructions now prepared were intended to be a guide for such circumstances. In the first place it was admitted that there was no firm international agreement on policy. A "considerable measure of guidance" was however taken from the Hague Rules, and for the rest "generally accepted principles" were adopted as the basis of the instructions. The second paragraph of the introduction cryptically stated that where no guidance was afforded, conduct was to be governed "by the laws of war and neutrality ... in virtue of the custom and practice of international law and the various declarations and conventions to which H.M. Government are party".

As far as bombing was concerned the Prime Minister's three points were quoted as the basis of policy, and very little was added to what had already been said in the Air Staff Note of 28th September, 1938.

(b) The Instructions Governing Naval and Air Bombardment

Meanwhile however an exchange between the Admiralty and the C.-in-C. Mediterranean had "alarmed" the Deputy Director of Plans at the Air Ministry.

- On 14th July the C.-in-C. Mediterranean had informed the Admiralty that he had plans to bombard military objectives in Libyan ports in conjunction with the R.A.F. and that he was preparing similar plans for Sicily. He emphasised the importance of operating these plans immediately on the outbreak of war so that he would gain the initiative.

(1) Sir William Malkin was the legal adviser to the Foreign Office. He was killed in an air crash when returning from the San Francisco Conference in 1945.

He asked for definite instructions regarding the bombardment of shore targets which might incidentally involve civilian casualties, and he interpreted the C.O.S European Appreciation for 1939/40 as sanctioning the bombardment of defended ports. He suggested that in any event he should be allowed to operate his plans if the enemy bombed Malta and caused civilian casualties. The C.-in-C. continued "much as I dislike thus surrendering initiative to the enemy this proposal seems to be the only reasonable alternative". He concluded that if bombardment at the outset was ruled out, fleet operations will be "very tame affairs".

Ibid  
Encl. 23B

The Admiralty replied on 29th July enclosing a copy of the most recent statement of government policy which they had communicated to the C.-in-C. Mediterranean on 17th July, 1936.

Ibid  
Encl. 23E

This statement was to the effect that in war the three services were to avoid the initiative in bombing civilians, that if the Italians bombed only military objectives, British forces should do the same. Even if however the Italians began a policy of unrestricted bombing there was to be no retaliation until orders had been received from London. As far as air bombardment was concerned Arts. 24-25 of the Hague Rules were quoted as the guide.

Ibid  
Encl. 23B.

The Admiralty reply to the C.-in-C. Mediterranean on 29th July, 1939 emphasized that the 1936 instruction did not preclude an offensive against military objectives. It also stated that the Hague Convention No. IX authorised the bombardment of defended towns and military objectives in undefended towns by warships, but the Admiralty now inserted the proviso that an attack on military targets must be ruled out if there was any doubt about identification, or incidental risk to civilians. Pending further discussion, and the Admiralty had not consulted the Air Ministry before sending this reply, the C.-in-C. was informed that the following were military objectives:-

1. Military and Naval and Air Forces.
2. Coast Defences works.
3. Naval and Military and Air Establishments.
4. Military communications and military trains.
5. Wharves etc. in commercial harbours being used for military purposes.

Factories not forming military establishments were not to be attacked. The question of oil was said to be under consideration.

A. M. file  
S.46239/1  
Encl. 24A

Ibid  
Encl. 25A

The Deputy Director of Plans thought this "tentative" reply contained "some very dangerous possibilities", and once again emphasized the importance of securing the approval of the U.S.A. He thought it important that Britain should "not start on the wrong foot in this matter." This view met with the approval of the C.A.S. who on 4th August wrote to the C.N.S. suggesting that the whole question of bombing policy should be dealt with by a committee of the three services with Sir William Malkin in the chair. Again he emphasized the importance of securing American approval, and it was for this reason that he claimed that restrictions must be more severe than in the letter sent by the Admiralty to the C.-in-C. Mediterranean. The C.A.S. also pointed out the necessity of having one policy for all theatres.

It might have been embarrassing if while British Forces held their hand in Western Europe, they were killing civilians in Taranto and Tobruk, even if Malta had been bombed by the enemy.

The C.A.S. suggested that C.-in-Cs abroad must be given clear instructions from London even though this might entail a regrettable loss of initiative. He enclosed a draft of these instructions for the consideration of the Admiralty.

Finally the C.A.S. raised the question of the French attitude. The French C.-in-C. Mediterranean was reported as having told the British C.-in-C. Mediterranean, that the French would be bound only by the restrictions of the Treaty of London. Apparently this statement was corrected by the French Admiralty but, as the C.A.S. pointed out, it showed that the French Commanders abroad had not received clear instructions. He therefore took this matter up with the Foreign Office.

Since the Foreign Office informed the Admiralty on 9th August that Lord Halifax was in general agreement with the communications the Admiralty had sent to the C.-in-C. Mediterranean. The intervention of the C.A.S. was timely from the point of view of a common attitude between the two services on bombing policy.

His intervention was also successful, for on 5th August before going on leave he was able to record that the C.N.S. was in agreement with his proposal to set up an inter-service committee under Sir William Malkin to examine the whole situation. Accordingly on 9th August the D.D. Plans informed Sir Alexander Cadogan of this decision and asked that Sir William Malkin should be the chairman of a committee consisting of the Joint Planning Sub-Committee at which instructions to be sent to Commanders abroad might be prepared for submission to the Cabinet. Sir Alexander Cadogan acceded to this request the next day. Meanwhile the D.D. Plans had sent Sir William Malkin copies of the two instructions sent to Commanders during the Munich Crisis, and the Air Ministry Draft of the Instructions now proposed.

On 11th August this committee met and issued a report which was circulated for ministerial approval on the following day.

The report came to grips with the whole problem of bombing policy, and relations with potential allies on this subject. It is therefore worth examining in some detail. It stated that agreement had been reached with the French on a policy to bomb purely military objectives in the narrowest sense of the word at the outset, and to avoid inflicting civilian casualties.

The various courses of action open to 'allied' air forces at the outset had been examined "on broad lines" in a report by the Chiefs of Staff on the attitude of Italy in War, and the problem of Anglo-French support for Poland,<sup>(1)</sup> assuming that Germany stood on the defensive in the West. No definite recommendation was then made, but the fact remained that bombardment policy must be decided by the highest authority, and be in accord with definite rules. In particular large numbers of civilians must not be bombed or the good opinion of neutral countries, and "notably the U.S.A." would be forfeited.

(1) See C.O.S. 939.

Ibid  
Encl. 36A

Ibid  
Min. 26

Ibid  
Encl. 27A

Ibid  
Encl. 30A

Ibid  
Encl. 28A  
and 29A

C.O.S. 959

Ibid  
Encl. to  
Appendix

Ibid

C.O.S. 939 had suggested that discussions with the French might lead to decisions on courses of action. It was also important that Poland should be consulted, and that she should not follow an independent policy which might provoke the Germans to make an unrestricted air attack on the United Kingdom. It was however equally important that British Commanders should have precise instructions from London regarding the restrictions of bombing, and that they should adhere to them at all times. This would not mean that the government were permanently committed to a policy of restricted bombing, but it would ensure that commanders would not compromise the government at the outset, in the way, for instance, that the C.A.S. had indicated the French C.-in-C. Mediterranean might have compromised the French Government.

Ibid

The report stated that army bombardment was not in question but that the draft instructions, which were attached to the report, should be sent to all C.-in-Cs, General Officers and Air Officers. Approval was sought:-

1. To telegraph the instructions to all commanders at home and abroad.
2. That the U.K. delegation to the Anglo-French staff talks should ask the French to inform their commanders.
3. That the Dominions office should inform the Dominions of the instructions.
4. That the 'Governor'(sic) of India should inform all Indian commanders.
5. That the Foreign office should instruct the Ambassadors in Ankara and Warsaw to persuade the Turkish and Polish governments to instruct their commanders similarly.
6. That the British delegation to Russia should seek to secure Russian adhesion.

The report concluded with a warning that in the approach to France, Poland and Turkey, purely legal questions might arise. It was hoped these could be avoided by emphasizing that the instructions were purely temporary.

D.C.O.S.164  
Annex to  
Encl.

The draft instructions attached to the report, prepared by the Joint Planning Sub-Committee under the chairmanship of Sir William Malkin, and based on the Air Ministry draft which the C.A.S. had sent to the C.N.S. on 4th August divided the opening period of the war into three phases.

During Stage 1 only enemy warships, troop transports, land and air forces were to be bombed, and even these only when there were no civilians in the neighbourhood.

During Stage 2 objectives of a purely military nature as agreed with the French could be bombed. These would include Naval, Army and Air Force establishments. It was hoped that the Stage 2 programme would avoid all danger of the opinion being formed that indiscriminate bombing had been resorted to, as the restrictions would remain more severe than those required by international law. Stage 2 was to supersede Stage 1 on the code word "Malkin".

During Stage 3 the restrictions were to be based upon the Hague Convention IX of 1907 for the Navy, and the Hague Rules 1922/23 for the air force.

A.M. file  
S.46239/1  
Encl. 49B

On 18th August the Foreign Office informed the Secretary of the Committee of Imperial Defence that Lord Halifax was "somewhat perturbed" by the report of the J.P.C. He feared the effects on allies if bombing was confined to "enemy war-ships, troop transports, land and air forces". Lord Halifax was surprised that aerodromes were not included as a means of reducing the scale of the German air attack on our allies. In view of the fact that the Air Staff had been thinking about the effect of German bombing ever since they had envisaged a war with Germany, and in view of the results of their investigations into the possibility of attacking aerodromes which are dealt with elsewhere, their reception of this comment can easily be imagined.

A.M. file  
S.46239/1  
Encl. 38A

All the same since Stage 1 was originally included to meet the expected views of the Foreign Office, Lord Halifax's comments simplified, rather than complicated the problem before the Chiefs of Staff. On 21st August Stage 1 was accordingly eliminated and after some last moment objections by the Deputy Chief of Naval Staff had been met, the instructions were issued to air force commanders under cover of a letter on 22nd August.

A.M. Letter  
S.46239/S6  
22 August 39

S.46105  
Encl. 87A

These instructions were not cancelled until the 4th June, 1940.

A.M. Letter  
S.46239/S6  
22 August 39

The covering letter explained that the instructions were more severe in their restrictions than the Hague Rules, but went on to point out that they might "well have to be modified" if the enemy resorted to indiscriminate bombing. The disadvantages consequent upon the loss of initiative were thought to be outweighed by the advantages of gaining neutral sympathy. Also it was again emphasized that this was not a permanent policy. The instructions were to be communicated to all, down to Squadron Commanders.

C.O.S.961

Paragraph 8 of the instructions gave the list of targets which might be attacked during the period of restricted bombing. These were:-

- (a) Naval Forces, Naval Ships, dockyards, barracks manned by military personnel.
- (b) Army units, fortifications, coast defence works, camps, barracks, billets, depots, dumps, and establishments manned by military personnel.
- (c) Air Units, military aerodromes, depots, storage units, bomb stores and establishments manned by air personnel.
- (d) Troop transports at sea and in harbour, roads, canals and railways used as military communications, military road and inland waterway transport.
- (e) Military, naval, and air force stores, but NOT factories.
- (f) Military, naval and air force fuel installations and dumps, but NOT Bulk stocks of fuel.

Commanders were urged to use their own discretion where necessary, and to obey the "spirit" rather than the "letter" of the instructions. The test was to be whether there was a risk of causing civilian casualties.

Thus at the eleventh hour a formal bombing policy for the war which was about to start had been laid down for the guidance of the Commanders. The text of the instructions contained little or nothing which might not have been said in September, 1938. It can therefore be asserted that bombing policy underwent no significant change during the last year of peace.

Perhaps the most significant aspect of the instruction 22nd August was that they constituted the achievement of a united policy among the allies.

A.M. file  
S.46239/1  
Encl. 53C

On 23rd August the Foreign Office sent telegrams to Sir H. Kennard in Warsaw, Sir Eric Phipps in Paris, and also to Sir Hugh Knatchbull Hugesson in Ankara, giving the terms of the instructions, and asking them to obtain the concurrence of the governments to which they were accredited.

Ibid  
Encl. 53B  
Ibid  
Encl. 54B

On 27th August Sir H. Kennard telegraphed "Polish Government Agree" and on the same day Sir Eric Phipps informed the Foreign Office of French agreement.

Appeal of the President of the U.S.A.

Ibid

Sir Eric Phipp's message of 27th August also contained information, which had reached the French, that the President of the U.S.A. was considering making an appeal to the prospective belligerent powers not to resort to indiscriminate bombing. The French thought that a Joint Anglo-French declaration on the subject should be made or at least that an answer should be ready. Sir Eric Phipps forwarded a French draft of such a declaration to London.

Bomber Narr  
A.H.B. Vol. II  
App. A.

On 1st September the expected appeal by the President of the U.S.A. was made. It stated that the "ruthless" bombing of civilians in wars of the past few years had maimed and killed thousands of women and children, and had "profoundly shocked the conscience of humanity". The President continued, "hundreds of thousands" of innocents would die if the major powers now resorted to this ruthless bombing. President Roosevelt then appealed to every government engaged in war, "publicly to affirm" that it would not bomb civilians or unfortified towns upon the understanding that the same rules were observed by their opponents. He requested "an immediate reply".

C.I.D.  
374th Mtg.  
Annex.

The following day brought to light the Joint Anglo-French declaration, which affirmed an intention "to spare the civilian population" and to preserve the "monuments of human achievement".

Bomber Narrative  
AHB Vol. II  
App. A4

The German Government stated that it too welcomed the appeal of the President of the U.S.A. and said that orders had been given that military objectives only were to be bombed. The German Government however accused the British Government of dishonouring her word by the way in which she was by then enforcing a blockade.<sup>(1)</sup> It also accused the Poles of making open towns the focal point of their operations, and of using poison gas.

Thus, if it was necessary, the futility of declarations was clearly demonstrated. However, the British and the French had been given the opportunity of making a public declaration of a policy, which as has been seen, they

(1) The war had, by this time, begun.

clearly intended to follow during at least the initial phase of the war, and if possible, until the balance of air power had swung sufficiently in their favour to make an all out attack on German industry and morale possible and expedient.

#### Restricted Bombing Policy: Conclusions

As hopes of an international agreement receded the necessity for Britain to prepare her own policy had become apparent. In this respect the Munich Crisis had found the Air Staff somewhat unprepared. In the succeeding months a precise set of instructions was worked out and a few weeks before the war began instructions were sent to commanders home and abroad. British diplomacy was enlisted to secure the acceptance of these principles by the allies. The result of the instructions of 22nd August, 1939 was, in effect, to prohibit the effective use of Bomber Command.

This was a grave and a historic decision. The object was twofold. Firstly to avert the "knock out blow", and secondly to conserve the 1939 force. All the same whether this policy would, in the event, avert a German unrestricted air attack and so enable the Air Staff to conserve the 1939 force remained a doubtful point. There was certainly nothing in the policy itself to guarantee it. The inescapable conclusion therefore is that the real explanation of this policy was Britain's lack of material means to launch a "knock out blow" against Germany. This meant that if the Germans did attack in the West the counter attack in the air would have been delayed and ineffective. The real hope lay in the German tendency to look eastward. Nevertheless, it was that very tendency which provoked, almost inevitably, a challenge to the whole policy of restricted bombing.

#### The Challenge to British Bombing Policy

##### The Influence of France

Some reference has been made to the importance which was attached to securing a common 'allied' bombing policy. This was the logical result of the successful effort to secure a common policy for the three British services, for that would be of little avail if the French, for instance, embarked upon an independent air offensive. Retaliatory bombs would be just as likely to fall on London as Paris.

##### (a) Doubts about French intentions

On 9th September, 1938 the Chief of Air Staff in a minute addressed to the Secretary of State for Air expressed his apprehension about, and ignorance of, French plans. He suggested that Britain could not be the first to "take the gloves off", and went on to say "I am rather apprehensive about what the French plans may be, and am raising with the Chiefs of Staff the question of whether the time has not come to find out what their plans are". This was the prelude to the Staff Conversations which had been so firmly resisted by the Cabinet<sup>(1)</sup> and the Chiefs of Staff up to now. The real doubt was whether the French would challenge the restricted bombing policy. There is plenty of evidence that the British approached these conversations determined to

A.M. file  
S.46239/1  
Min.2

(1) With the notable exception of Mr. Eden. For fuller particulars of this question see Mr. Churchill's War memoirs. (The Gathering Storm.)



adhere to it,<sup>(1)</sup> and if necessary to bring the French into line with it. This is evidence that the British policy of restricted bombing was native, and not inspired by Paris.

(b) The doubts resolved. The Anglo French Staff Talks

A.H.B.  
Narrative  
The Campaign  
in France and  
the Low  
Countries.

This anxiety about French intentions was however misplaced. A militant bombing policy was as far from the French as the British mind. There was accordingly no difficulty in reaching agreement on the principle of bombing only "military objectives in the narrowest sense of the word", at any rate during the initial phase of the war. In the second phase of the war however, in which it was planned that Italy should be eliminated, an air attack on German industry was envisaged.

During the second stage of the conversations (between April 24th and 3rd May, 1939) this policy was developed in somewhat greater detail.

The British delegation offered four documents which they considered would provide the necessary guidance. These were:-

1. ART 24 of the Hague Rules which prohibited the bombing of cities and villages not in the immediate vicinity of the fighting, and also prohibited the bombing of military objectives if this involved an incidental risk to civilians in the neighbourhood.
2. A Foreign Office Telegram to Tokyo of 17th August, 1938 which stated that when bombing military objectives there must be a reasonable assurance that the bombs will hit only the target.
3. Mr. Chamberlain's Three Rules which have been quoted above - qualified by Mr. Chamberlain's own words "But it is obvious that when you come to put them (the Three Rules) into practice they give rise to considerable difficulties."
4. The Report of the J.P.C. (October, 1938) "Most of a country's industry and a great part of the population must be regarded as the armament industry of modern war".

The logical conclusion to be drawn from these documents was that there can be no distinction between military and non-military targets, or rather that in modern war all targets are military. The French and the British had however no difficulty in agreeing that the final selection of targets must be a matter of expediency. In the meantime neither had any doubt that it would be inexpedient to bomb any but military targets in the "narrowest sense of the word".

The French influence merely confirmed British Policy.

- (1) E.G. The attitude of the C.A.S. quoted above. Also the comments of the D.D. Plans on W.A.14 on 17th September, 1938 - see A.M. file S.46650/1 Encl. 3A. Further confirmation of this view, is provided by the discussions which took place in connection with plans to check the advance of the German army, and the British conviction, not actively shared by the French, that the initial German attack would be eastwards. See Chapter 7 of this narrative. In this connection the indication is that as regards air warfare the French were more militant, if less practical than the British. See also S.1132 Encl. 5A - A Plans memorandum of 26th April, 1939 clearly demonstrating the British intention to adhere to a policy of restricted bombing.

Wheeler -  
Bennet  
Munich:  
Prologue to  
a Tragedy.

The Implications of the Polish Guarantee

On 31st March, 1939 the British Government guaranteed Poland and thus "placed the decision as to their declaration of war in the hands of a state ruled by an incompetent and purblind oligarchy..."

In the following month the conscription bill passed through all stages in parliament.

For the first time for many months Mr. Churchill and Mr. Chamberlain argued the same case on the floor of the House of Commons. These two major decisions were indeed charged by subsequent events with profound significance. As it was, war with Germany drew appreciably nearer. Ultimately it was now virtually inevitable. What effect then did the Polish guarantee have on British bombing policy? It is essential to examine the answer to this question in detail, for it tested to the full the policy of restricted bombing and provided the greatest challenge to the maintenance of that policy which anything short of an all out attack on Britain by German bombers could have done.

C.O.S.870

On 28th March, 1939 the Minister for the Co-ordination of Defence called for a report "as a matter of great urgency" on the implications of a military guarantee to Poland and Rumania which was due to be discussed by the Cabinet on the following day. It is to be presumed that Lord Chatfield had ascertained the views of the Chiefs of Staff before he reported to the Cabinet on 29th March.

C.O.S.872

It was not however till 3rd April that the Chiefs of Staff report on this subject was produced in a final form. The Chiefs of Staff observed that if all four powers could be assumed to have accepted identical obligations the issue of peace and war had been "surrendered... to the action of other governments over whom we have no control, at a time when our defence programme is far from complete." Having accorded this cool reception to the guarantee the Chiefs of Staff proceeded to explain that their report would deal only with the situation as it was changed by the guarantee from what they had already examined in Paper D.P.(P) 44. In so far as the air aspect was concerned it was the view of the Chiefs of Staff that much would depend upon whether Germany stood on the defensive in the West until she was victorious in the East, or, on the other hand, launched a simultaneous offensive on both fronts. They considered that Poland had a "reasonably efficient air force" which included thirty long range bombers, two hundred Bomber reconnaissance aircraft with a four hundred miles radius of action and each capable of lifting 1500 lbs. of bombs.

They therefore calculated that Germany would not be able to afford to ignore the Polish air force, but they were realistic enough to add that any Polish air offensive would be short lived unless the Russians afforded help in the same way as they had done for Republican Spain during the Civil war. All the same they estimated that Germany would have to keep 20% of her first line fighter strength on the Eastern front. They could not say whether Poland would also contain some of the German Bomber Force. On the whole however it was thought unlikely that Germany would have seriously to reduce the scale of attack on Britain, unless she was concentrating at full pressure on the eastern front. Germany's air defence system would, however, have to be more widely dispersed. After more detailed examination of the effect of the guarantee on the military situation which was regarded as of much greater significance, the Chiefs of Staff

concluded that "neither Great Britain nor France could afford Poland and Rumania direct support by sea, on land or in the air to help them to resist a German invasion".

Ibid

Somewhat optimistically the Chiefs of Staff assumed that even a defeated Poland would absorb almost as many German troops as had been required to achieve the conquest. The Chiefs of Staff therefore stated that they regarded the "ultimate issued with confidence".

(a) The Memorandum for the British Delegation to the Polish Staff Conversations.

C.O.S.872

The Chiefs of Staff resisted the idea of any staff conversations between Poland and Britain. Indeed they seem to have had an almost superstitious dislike of staff conferences, which in the circumstances can be readily appreciated. They had however reported that it would be necessary to co-ordinate plans with Poland, but had hoped that all the negotiations might be left to the French.

C.O.S.883

Before the Chiefs of Staff would consent to any direct staff conversations with Poland, even at attaché level, it was necessary for the Foreign Office to press them. On 18th April a Foreign Office letter, which was considered the following day by the Chiefs of Staff,<sup>(1)</sup> stated that it was "not at all sure that the Poles will be satisfied with this" (i.e. leaving all staff conversations with them to the French) as they "attach very great importance to their new relations with us and will we feel sure, wish to establish direct contact between their General Staff and ours, for reasons of national pride if nothing else".

C.O.S.903(JP)

Under instructions from the Chiefs of Staff<sup>(2)</sup> the Joint Planning Sub Committee on 15th May issued a report covering a draft memorandum which they had drawn up for the Chiefs of Staff approval. This was to be handed to the British delegation to the Anglo Polish Staff conversations, now avoidable no longer.

The Joint Planning Sub Committee report indicated that the question of informing Poland of British plans was somewhat difficult in view of the apparent lack of security consciousness in that country.

The representative of the R.A.F. at the talks was to be the Attaché (Wing Commander, subsequently Group Captain A.P. Davidson) and the head of the mission was to be Lieut. Colonel (subsequently Brigadier) E. H. Clayton.<sup>(3)</sup> It was expected that the conversations would concentrate mainly on the land war, that there would be less discussion of the air war, and practically none on Naval topics.

The Draft memorandum for the guidance of the British Delegation opened with a summary of the British undertakings to Poland.

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- (1) At the 290th meeting of the C.O.S.
  - (2) Result of C.O.S. 292nd meeting Min.6.
  - (3) Lt. Col. Clayton was on the retired list - but had experience of service in Poland.

C.P.83(39)

As the result of a meeting between the Polish Foreign Minister and the British Prime Minister and Foreign Secretary the following conclusions had been reached:-

1. If Germany attacked Poland, Britain would "at once come to the help of Poland".
2. If Germany exerted economic pressure on Poland, Britain would support Polish resistance, and if Poland was thus forced to undertake resistance (by force) Britain would "at once come to the assistance of Poland".
3. Poland gave reciprocal guarantees to Britain.

As regards the air war, the delegation were to use their discretion as to how much they said about the preponderance of German Bombers over British. It was not thought wise to give any details of the R.A.F. expansion programme, but if pressed the delegation was to say that aircraft production equalled six hundred per month (50% reserves) and that by April, 1940 the R.A.F. would be able to mobilise eight hundred bombers.

The delegation was to explain that nothing could be afforded except indirect support to Poland, and to invite Poland to say what she wanted.

Poland, though doubtless disappointed seems to have accepted the fact that Britain and France were either unable or unwilling to make any convincing contribution in the way of direct support to their operations. They therefore confined themselves to asking for supplies of war materials and financial aid.

C.O.S.917

(b) The Report of the British Delegations

C.O.S.927  
Encl.

In a report dated 12th June, 1939 the British delegation which had recently returned from Poland gave an account of the conversations held on 23-25th and the 30th May.

Poland was apparently unwilling to accept direct Russian support, but hoped to get war materials from her ex-enemy. Their strategic concept agreed with the British and they expected the initial German attack to be launched against them while the Germans stood on the defensive in the West.

The Poles had come into possession of a copy of a recent German secret publication "Luftkriegsführung" which indicated that the Germans intended to attack the following targets from the air:-

1. Air Force and ground establishments
2. Vital points on lines of communication
3. Industrial Establishments, especially those supplying armies.

The Poles did not think that the Germans would allow any consideration of civilian casualties to interfere with the attack on these targets.

The delegation realised that the Polish air force would be incapable of any serious air offensive against Germany as most of it would be required for army co-operation. The Poles had asked whether the R.A.F. would undertake an air offensive to delay the German advance, but the view of the British delegation was that this would not be worth the risk

Ibid  
Annex VII

DS 85048/1(40)

involved, (German concentrations in Poland would have been 650 miles from England) and they recommended that the only help to Poland that could be afforded was the operation of the normal Western Plan, and financial aid.

(c) Challenge to Policy of Restricted Bombing

Yet even if no direct support to Poland could be afforded a revision of bombing policy could be considered and perhaps a wider air offensive against Germany undertaken from the outset. There was already reasonable evidence that the Germans were preparing to bomb Polish industry from the air (see above) and this would seem to save the allies from the position of being the first to take the "gloves off".

C.O.S.940(JP)

Britain had been urging Poland to consider attack from the air upon German oil reserves at Stettin. This seemed to indicate that the British were thinking of initiating the oil plan, which would certainly call for the abandonment of the policy of restriction. On the other hand the Poles were at the same time being urged to adhere to the policy agreed between the British and French to bomb only military objectives in the narrowest sense of the word.

C.O.S.905

Certainly the Chiefs of Staff had second thoughts about bombing policy and also about their original attitude to the question of support for Poland.

In a bluntly worded memorandum of 3rd June they stated that they were not satisfied that the "two-front" war was going to be adequately exploited. They estimated that if Germany launched an initial offensive in the East she would have to leave only thirty to thirty five divisions in the West. The Chiefs of Staff thought something should be done to compel her to leave more. In the 1914 War they pointed out, Germany had been compelled to withdraw divisions which she needed on the Western Front to reinforce her position on the Russian front. "She won a battle - Tannenberg - but lost the war". The inference of this historic comparison was obvious.

The Chiefs of Staff continued that, as the French had failed to produce any plans for a land offensive which would meet the case, it would be necessary to re-examine bombing policy to find out if anything could be done from the air to prevent the defeat of Poland. "In our view" they said "We should find difficulty in justifying inaction in the air against Germany while Poland was being overrun, even though the alternative to taking such action against such military targets might well lead to indiscriminate air attacks by Germany on us".

The Chiefs of Staff thought that this matter was so urgent that they regarded it as their duty to bring it before the Cabinet. (1)

C.O.S.938(JP)

On 22nd June the Committee of Imperial Defence gave some attention to this crucial memorandum, which was the most outspoken challenge to the policy of restricted bombing which had come from a high level source since the initiation of that policy. The C.I.D. reached the following conclusions, which in themselves indicated that the challenge was not going to be taken seriously:-

- (1) The C.I.D. considered this memorandum at their 360th meeting.

A. That the following questions should be examined:

- (1) The strategical effect of Italy remaining neutral at the outset.
- (2) If she did, should steps be taken to compel her to declare her position?
- (3) If Italy was allied to Germany:

What effect would an immediate offensive against Italy have upon

- (a) Relieving Poland?
- (b) The British position in the Far East?

B. To re-examine the memorandum (C.O.S. 905) in the light of the conclusions reached.

C.O.S. 938(JP)

On 7th July the Joint Planning Sub Committee submitted a report for the Chiefs of Staff approval on the points raised by the Committee of Imperial Defence.<sup>(1)</sup>

This report was of major importance. The C.I.D. had clearly received the C.O.S. memorandum of 3rd June with little enthusiasm. The question now was would the C.O.S. stand their ground? If they did so, major alterations in bombing policy would have to be made. If not, then Germany would not be confronted with a second Tannenberg situation.

The report reached the conclusion that it was a British advantage that Italy should remain neutral, but if she did not an immediate offensive against her would do little to interfere with the German invasion of Poland unless it could immediately render Italy liable to capitulation in which case Germany might draw off from Poland. The question therefore resolved itself. Italy could not be defeated by naval war alone, and on land it was only the French who could do anything, and it was "manifestly impossible to count upon important results from action on land in the early stages". In the air "little or no immediate pressure" could be exerted unless war industry was attacked with "repercussions" similar to those mentioned in C.O.S. 905. This question was therefore answered. An attack on Italy would not relieve the pressure on Poland, and incidentally it would reduce British resources without inflicting any corresponding wastage on the more formidable enemy - Germany.

The report then came to the conclusion that the only way in which Poland could be saved was by "immediate and direct action against Germany". It continued, that the problem presented in C.O.S. 905 (2) "must be faced". Poland had to be regarded as a line of British defence, but if Germany "held" in the West Britain would be confronted with a difficult problem.

Thus far the report confirmed the views expressed in C.O.S. 905. It had pointed out the necessity of making Germany fight one two front war, and of preventing her fighting two one front wars.

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- (1) This report as approved by the C.O.S. was issued in final form on 18th July, as C.O.S. 939 (Revise)
  - (2) i.e. the C.O.S. memorandum of 3rd June.

(a) The Challenge Rejected

Ibid

When however the report came to the question of possible courses of action C.C.S. 905 was forgotten. These courses were:-

1. To take all preparatory measures including the despatch of the A.A.S.F. to France, but to attack only warships at sea.
2. To attack military targets in the narrowest sense of the word.
3. To attack a wider range of near military targets - e.g. Oil.
4. To take the "gloves off" from the outset.

An examination of these four possible courses produced the conclusion that none of them except the last would afford material assistance to Poland. The last course would result in an immediate attack upon London, and would place the allies in an invidious position after the declarations they had made.

It was therefore recommended that it should be publicly announced that the R.A.F. would not bomb civilians, and that it should be ensured that the Poles come into line with what had been agreed between the British and French.

C.O.S. 970

On 28th August Course I (i.e. the bombing of warships at sea only) was recommended for the first phase of the war by the J.P.C.

Conclusion

Thus the challenge of the 3rd June was rejected, and Poland in the end exerted no important influence on bombing policy. The guarantee did however test British adherence to that policy to the full. The outcome revealed the strength with which that policy was backed, and the episode is of the utmost significance revealing that its main object was to secure at least a temporary immunity from the German "knock out blow". The second object was to secure the good opinion of America. The serious military results of this decision, so amply forecast in C.O.S. 905 would seem to indicate that the explanation of its adoption is to be found in practical expediency rather than in any humanitarian argument. It was not considered that Bomber Command could do enough damage to Germany to justify increasing the risk of a German air attack on Britain.

As an offensive weapon, therefore, Bomber Command had small value in 1939. As a defensive weapon its value was also strictly limited.

Bombing Policy: Conclusions

A.M. file  
S.1132  
Encl.  
5A and 6A

In the absence of any definite ruling on the meaning of the words "military objective" and "civilian population" it was clearly difficult to determine any real law of bombing even if the Hague Rules were accepted as binding.

Military necessity might justify the bombing of almost any objective, and, therefore, in so far as the law existed at all, there were virtually no restrictions on bombing. The problem of "where to draw the line" was one not of legality but one of expediency.



Approval, or otherwise, of the policy which was adopted by the Air Staff should therefore be based upon an assessment of whether their appreciation of what was expedient was correct or not. In the circumstances in which Bomber Command was placed in 1938-39 it is hard to see that the Air Staff could have adopted any other policy unless they had wished to draw down upon London and the sea ports what they expected would be a series of devastating raids at a time when they could do nothing to stop the German bombers and very little to retaliate against them.

Temporarily therefore the Air Staff was forced into a defeatist policy, but they could not regard this as of a permanent character. The restrictions on bombing were as temporary as the weakness of Bomber Command. There was also the possibility that the Germans would after all make an immediate all out attack upon this country, in which case it would have become obligatory upon Bomber Command to make the best of its limited resources and strike back as hard as it could. Expediency and material limitations have not the unchanging characteristics of the law, and to that extent the British policy of restricted bombing was a temporary and flexible one. This explains why there were two sets of war plans, one of which conformed to the policy of restriction laid down on the 22nd August, 1939 and the other of which did not. The succeeding chapter will discuss these plans with the object of giving these two aspects of policy their due perspective.

CHAPTER 7PLANS FOR BOMBER COMMAND IN WARIntroduction

In the light of this policy of restricted bombing in the initial stages, what then were the plans which were made for Bomber Command in war?

Certainly these plans did not follow the lines of policy unimaginatively. Though it is true that there was a concentration of attention upon the 'legal' plans, with particular emphasis upon that to drop leaflets (W.A.14), and that to bomb the German Fleet, (W.A.7A), it was fully realised that the "gloves" could not be kept on indefinitely. Either the Germans would by their own action compel Britain to abandon her safety first policy, or she should have to abandon it voluntarily in an effort to make the first move to defeat the enemy. Plans for the destruction of a much wider range of targets than could be bombed within the limits of the restricted policy, and notably the plan to attack German industry, were therefore continued and developed.

The main limitations affecting the planners were in fact the practical difficulties of range and the limited destructive power of the bombs available, coupled with the shortage of modern bombers. The policy of restricted bombing had virtually no effect upon the continued development of the 'unrestricted' plans.

It can be said that planning proceeded on the assumption that an all out offensive would eventually be launched, with the qualification that in the meantime some plans must be made specifically for the use of Bomber Command during the period of the restrictions. This is a fundamental point for it gradually induced the opinion that it might not be worth while to undertake any bombing to speak of until an all out offensive could be launched. In other words was it worth wasting bombers from the limited 1939 force, which it was resolved must be conserved, unless some really vital damage could be done to Germany? This resulted in great importance being attached to the question of aircraft safety in the case of all the restricted plans. It might be worth losing several aircraft even from the 1939 force, if the Ruhr could be put out of action, but it was not worth, at any rate in the opinion of the Deputy Chief of Air Staff, risking Witleys over Berlin merely to drop paper.

A.M. file  
S.46650/1  
Encl.12A

The purposes of this chapter, in which the various plans will be examined, is to show the development of this idea in the face of the limitations of the 1939 force not only in numbers but in efficiency. The idea was gradually reached that Bomber Command could perform virtually no useful function until the restrictions had been removed and the force had been re-equipped with larger and faster aircraft, armed with heavier bombs. This drove the Air Staff to prepare plans for the immediate employment of the Command which only the most optimistic could really believe would have the slightest effect upon the apparently all powerful Germany.

This last point raises the question of what was really expected from the fulfilment of the legal plans. There was a certain amount of wishful thinking on the subject of the effects of leaflets on the course of the war, and also of the relatively small bombs upon the various targets. These wishful thoughts must be exposed and balanced against the more realistic estimates which were also made.

This chapter is therefore broadly divided into two sections in the first of which the 'legal' plans will be considered, and in the second of which the 'illegal' plans will be dealt with. After these examinations it will be possible to estimate how far the legal plans were really intended to have military results, and how far they were no more than extended training. It will also be seen whether there was any alternative to the policy of restricted bombing. In other words whether, if for one of many reasons the restrictions were abandoned, bomber command was capable of launching an offensive. This will show whether the restricted policy was forced upon Britain or whether it was simply an expedient.

First, however, something must be said of the machinery of planning and the basic assumptions which were made.

### Assumptions for War Planning

#### Reorientation After the Munich Crisis

The Munich Crisis had witnessed something like a panic in the affairs of air policy and planning. War seemed imminent, but preparations for it were inadequate. Even policy was hardly decided. It was therefore natural that as soon as the immediate crisis subsided, some attempt should be made to set the house in order.

Accordingly on 26th October, 1938 the Senior Air Staff Officer Bomber Command, on behalf of the Commander-in-Chief, asked the Air Ministry to return to Uxbridge all the plans which had been sent in "during the recent political crisis", as it had been decided that "certain major alterations" would have to be made.

#### The Machinery of Planning

Operational aspects of war planning, which had previously been considered at Bomber Command Headquarters, were by 4th November, 1938 the responsibility of the Air Ministry. The object was that the Air Ministry should produce an appreciation on each plan, and that on this the Commander-in-Chief Bomber Command would base his operational orders.

There were however certain disadvantages to this scheme which entailed possibly an over centralisation of planning.

The Deputy Director of Plans pointed out in a minute of 4th November, that the Air Ministry planning staff were held up for the lack of certain technical information. He therefore suggested that a special committee consisting of representatives of the Air Ministry and the commands should be formed as an advisory body to the planning officers. This idea was supported by the Director of Staff Duties (D.S.D.), who was of the opinion that the Air Tactics Branch should at the same time be expanded.

The A.C.A.S. however was not impressed with the idea of having yet another committee, and instead suggested that an 'ad hoc' discussion should meet the case. The proposal of the A.C.A.S. was that Plans should put questions to the Air Tactics Branch, and that if these could not be answered a ruling should be sought from the D.S.D. or from the A.C.A.S. himself. If the matter proved to be "very involved" then it was to be dealt with by an 'ad hoc' meeting called by the Air Tactics Branch and attended by Plans.

A.M. file  
S.41432  
Encl.72A

A.M. file  
S.47375  
Min.1

Ibid.

Ibid  
Min.2

Ibid.  
Min.3

A.M. file  
S.47375  
Encl. 6B

The Commander-in-Chief Bomber Command, however, on 30th November, was still resisting the centralised idea, and said that Bomber Command wanted a "memorandum" and not a "plan" from the Air Ministry. He wanted a "reasoned statement showing the best targets to go for and their order of importance. He would then decide which of these it was possible to attack and the best method of execution".

Ibid

The Deputy Director of Plans replied to this suggestion that the operational aspects of planning must be weighed in the Air Ministry Appreciation as these would to a "great extent" govern the selection of the targets. Group Captain Slessor however agreed that plans made in peace could only apply to the opening phase of the war since their practicability could only be tested in war.

This appears to have conciliated the C.-in-C. who was clearly nervous of being asked to execute plans the practicability of which was at least open to doubt.

This then was the machinery of planning, and the results can be judged subsequently.

#### The Conference of 30th November, 1938

A.M. file  
S.47375  
Min.1

The Deputy Director of Plans, as already mentioned, had raised the question of planning being held up for the lack of technical information. He had stated that the main basic assumptions which had to be made would be the solutions of the following problems:

- (i) Will Bombers' be able to penetrate Germany to their maximum radius action, or will enemy defences limit their penetration to some lesser average depth?
- (ii) If so, what depth of penetration should be assumed for Battles, Blenheims, Hampdens and Herefords, Wellingtons, Stirlings, Manchesters, Halifaxes, Whitleys and Harrows respectively by day and by night.
- (iii) If there was no limitation on penetration, what would be the relationship between depth of penetration and wastage of aircraft?
- (iv) In the event of the main bombing offensive being against war industry what would be the proportion of day raids to night, and what percentage of aircraft would find and bomb the target by day and night?
- (v) What would be the ratio between high and low level attacks?
- (vi) In the event of the main bombing offensive being against war industry what would be the accuracy of bombing by day and night, and from low level?
- (vii) What length of run would be required for take off in relation to bomb load?

That these problems were unsolved is an indication of the immature stage which planning had reached at this stage. It is small wonder that the C.-in-C. had shown his misgivings about the centralisation of planning.

Ibid  
Encl. 6B

On 30th November, 1938 an attempt was made to solve these problems by an 'ad hoc' meeting as had been suggested by the A.C.A.S., who now took the chair. The Commander-in-Chief Bomber Command was present.

At the suggestion of the C.-in-C. the conference agreed to accept three degrees of penetration as follows:-

1st degree - Medium types	80 miles
" " - Heavy types	1120 miles
2nd degree - All types	150 miles.
3rd degree - All types	200 miles.

The Commander-in-Chief, when pressed by the Deputy Director of Plans, insisted that two hundred miles was the "absolute limit" for "sustained attacks", though he thought that "sporadic" attacks might be made at greater range.

It was agreed that it was impossible to estimate the accuracy of night bombing, but it was believed that it would not achieve "appreciable results against precision targets". By day it was estimated that the average error from high level would be three hundred yards, and from low level seventy five yards. From 'shallow dive' it would be two hundred yards.

It was also agreed that when all types were capable of day and night operations, seventy five per cent of attacks would be made by day. In the meantime the proportion would depend upon mobilisable strength and the types available. Generally it was laid down that medium types would be used by day and heavy types by night.

It was agreed to assume that the number of aircraft bombing the target would depend upon penetration in the following way:

80 miles	80%
150 miles	60%
200 miles	40%

and that against "area targets" at night 75% of the aircraft sent out would find and bomb the target.

It was added that precision targets would have to be attacked from low level by day, and as a rough guide it was estimated that the proportion of high to low level attacks would be in the nature of 50:50.

The Senior Air Staff Officer Bomber Command pointed out that training had up to then been almost entirely confined to high level attacks as far as night bombing was concerned. It was his view that in war aircraft might approach the target in a glide and actually bomb from a low level. In this way he thought that there would be a better chance of evading the searchlights, A.A. fire and the fighters. He agreed to arrange some low level night bombing exercises.

Finally it was agreed to accept one thousand yards as the maximum take off run for all bombing flights.

On the question of range and load no conclusion was reached, and the D.T.D. would not commit himself until after he had seen the results of the full weight trails to be carried out at Martlesham.

#### Conclusions

The facts revealed at this conference were not very encouraging. These basic assumptions for planning proved to be the real limitation to the development of war-winning plans. If anything could be more remarkable than the inadequacy of the force available and the striking fact that the Commander-in-Chief was not prepared to send his aircraft, even his Stirlings,

when he got them, beyond two hundred miles into Germany, it was that this information should only have been impressed on the Air Ministry on this, the last day of November less than a year before the outbreak of war.

What then did the Air Ministry Planning Staff propose to do? Could Bomber Command be made to justify its existence at the outset of war, or at least at some later stage of the war? If Bomber Command was unable to play a major role at the outset then obviously any success it might have at a later stage would depend upon the success of other services notably Fighter Command, in averting the defeat of the country by the German Air Striking Force in the initial phase. This was the assumption which had been made in Expansion Scheme "M" in November 1938<sup>(1)</sup>.

#### The 'Legal' or Restricted W.A. Plans

##### The Significance of the Restricted Plans

One of the major problems confronting the Air Staff was that of how to employ Bomber Command during the expected period of restricted bombing. The search for targets vulnerable to the limited striking force available was not easy. The search for targets which were "unquestionably legitimate" was even more difficult.

The problem, then, was to find targets within the range and striking power of the 1939 force and within the "law" as indicated by the formulation of bombing policy. The question is, did the Air Staff solve or shelve this problem? In other words was there a group of plans which were at once 'legal' and militarily effective? Upon the answer to this question depends the significance of the unrestricted plans.

It may be claimed that this problem could not be solved, and that no bombing can be effective until it is freed from all restraint. Such a school of thought would suggest that the only military advantage to be gained from restricted bombing would be the training value. This was certainly a consideration which had a particular application to the plan to drop propaganda from the air.

On the other hand it might appear that even while the restrictions were in force, there was a certain class of targets whose destruction would have a more direct effect upon the course of the war. This seems to have been the case in the plans to attack the German Navy.

The evidence seems to indicate that the Air Staff did not limit their expectation of the restricted plans to their training value, though this was considered both from the point of view of the crews taking part, and from that of the planners. It was thought, at least at first, that the plan for the attack upon the German navy might produce substantial results, and it was also hoped that the leaflet campaign might serve a more useful purpose than merely giving the air crews a sight of Germany in war.

The restricted plans therefore had a military implication. The lack of striking power seemed to be a more serious handicap than the lack of freedom.

(1) See Part I of this Volume.

Plans for the Attack on the German Navy. (W.A.7., W.A.7a., and W.A.9.)

This argument is substantiated by the fact that within the group of legal plans were those for the attack on the German Navy. It is assumed that there were three major threats which confronted Britain in a war with Germany:

- (i) The 'Knock out' blow from the air.
- (ii) The invasion and defeat of France.
- (iii) The interruption of sea trade.

The first two of these threats could only be met by unrestricted plans which will be discussed later. however could be met by a legal plan<sup>(1)</sup>.

C.O.S.  
549.

Obviously the burden of this task would fall upon the navy, but paragraph 40 of Chief of Staff Paper 549 had called for airforce plans "drawn up in concert with the Naval Staff for the co-operation of shore based aircraft with naval forces ensuring the security of sea communications." This role was primarily the task of Coastal Command<sup>(2)</sup> but Bomber Command was called upon to play a major part in the attack on warships and the attempt to put the Kiel Canal out of action<sup>(3)</sup>.

A.M. file  
S.43296  
Encl. 5B

On 16th September, 1938 the Admiralty Plans Division informed the Air Ministry that "the greatest naval contribution that could be made by air attack would be the destruction of German naval forces", and the following priorities were laid down:

- 1 (a) Warships at Wilhelmshaven.  
(b) Warships at Kiel.
- 2 (a) Kiel Canal locks at Brunsbittel and Kiel.  
(b) Naval bases at Kiel, Wilhelmshaven, Cuxhaven and Bremerhaven.

(a) The Plan of Attack on the German Fleet at Wilhelmshaven. (W.A.7A)

A.M. file  
S.50128  
Encl. 1A

On 30th December, 1938 the secretary of the Committee of Imperial Defence wrote to the Chief of Air Staff about "certain plan" to be known as "K". This was the plan for the attack on Wilhelmshaven, later known as W.A.7A. This was the first priority which, as has been seen, had been given by the Naval Plans Division.

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- (1) It must be appreciated that some aspects of the plan for attack upon the German navy were 'illegal' just as some aspects of the plan for attack upon the Airforce were 'legal'. The classifications here adopted are based on the broad principles of the plans and not upon every detail. See tables illustrating this in AHB II/43/98A. Encl. 1A.
  - (2) See the Coastal Command Narrative prepared in this Branch.
  - (3) There were three Bomber Command Plans:
    - (a) Plans for attack upon bases of enemy surface submarine and airforces operating against our trade. (W.A.7)
    - (b) Plans for the attack on Wilhelmshaven, a specialisation of the above plan. (W.A.7A)
    - (c) Plans to put Kiel Canal out of action. (W.A.9.)



Ibid  
Encl. 4A

A copy of the plan was sent to the Commander-in-Chief Bomber Command on 27th January, 1939, and it was stated that this was intended to be operated at the "very beginning of a war". The Deputy Chief of Air Staff however pointed out to the C.-in-C. "I think you should know that we regard this plan as one of the many plans which it is our duty to prepare in peace, but that we do not consider that it is necessarily a good method of employing the Air Striking Force on the outbreak of war". The Chiefs of Staff had "in no way committed themselves in advance to recommending its adoption."

The Commander-in-Chief Bomber Command was asked to confine his comments to the tactical side of the plan, and to say nothing of the strategic aspect.

(b) Reactions of Bomber Command to the Plan

A.M. file  
S. 50128  
Encl. 5B

The comments sent by the Senior Air Staff Bomber Command to the Air Ministry were not very encouraging. They emphasised that the success of the attack would depend upon concentration and surprise. If surprise was to be achieved the major part of the attack would have to take place soon after dawn. This would involve extreme accuracy of navigation, and a low approach by fifty per cent. of the Blenheims engaged. If the attack was to take place soon after dawn the larger part of the flight would have to be made in darkness. The Bomber Command opinion was that it would be impossible to achieve a good concentration in view of the fact that the standard of training would not allow more than three aircraft to fly together in formation at night.<sup>(1)</sup> Even if formations of three aircraft could attack the target at intervals of five minutes, and this was thought optimistic, the whole attack would still last from two and a half to three hours. In any case Blenheims were considered incapable of flying in formation at night.

Worse than this however was the consideration that it was "highly improbable" that the bombers could find the target by day or night without making a preliminary land fall, which it was thought would remove the surprise element altogether.

Since the Blenheims could not navigate all the way at low level, they would have to approach the target at altitude, and bomb in a shallow dive from two thousand feet. This raised the question of whether it was worth making a "low level" attack at this height.

If there was to be a co-ordination of low and high level attack, then the false assumption that Blenheims could fly in company with heavy bombers, or in a formation of their own at night, or were "capable of very accurate navigation" would have to be made. After reading the Bomber Command comments the D.D. Plans came to the conclusion that the whole attack would have to be made in daylight, without "using the night at all".

A.M. file  
S. 50125  
Encl. 6A

At the Air Ministry, Plans division promptly accepted the fact that they would have to give Bomber Command greater tactical latitude, but they stuck to their point about the importance of concentration. The necessity for close co-ordination between the A.O.C.-in-C. Bomber Command and the C.-in-C., Home Fleet was also recognised. The Deputy Director of Operations continued to press the point

(1) See S.D. 131.

that the attack should be delivered from as low a level as possible.

Ibid  
Encl.7A

On 16th February, 1939 the D.D. Plans (deputising for the D.C.A.S. who was by this time himself absent), wrote to the C.-in-C. Bomber Command informing him that the plan had been amended so as to "overcome any difficulties or doubts" which the C.-in-C. had felt about tactics. He refused to take the Bomber Command doubts about low level attack as invalidating the plan. Dawn was however no longer to be regarded as zero hour. The attack was merely to take place as early as possible.

Ibid  
Encl.9A

The C.-in-C. nevertheless continued to regard the plan in a gloomy light. He thought that the Whitleys would suffer heavy casualties and he thought the air attack was unlikely to produce a naval engagement as he believed the Germans intended to keep their fleet in the Baltic.

Ibid  
Encl.17A

This latter view about the possibility of a naval engagement was also the conclusion of the Joint Planning Sub-Committee and by 28th March the Air Staff had come to the conclusion that the plan would not be a particularly effective or economical use for the Air Striking Force. Indeed the opinion was expressed that the Air Staff would not recommend the operation of the plan "except in a situation in which more effective plans cannot for political or other reasons be implemented".<sup>(1)</sup> All the same the D.D. Plans informed the C.-in-C. Bomber Command on 28th March that Bomber Command should, if it was impossible to drive the German fleet into the arms of the Royal Navy, aim to do all possible damage and to sink "at least one German battleship".

Ibid  
Encl.15A

Despite the fact that a system of co-operation between the Navy and Bomber Command could not be worked out for some time, and that in consequence, the Navy might not be there to co-operate even assuming the German fleet did put to sea, the plan was persevered with as a course of action immediately on the outbreak of war.

(c) The Air Staff Note of 2nd March, 1939

A.H.B.  
IIA1/7

An Air Staff Note under which Air and Naval Staff appreciations of the plan were issued, explained that the object of the air attack was to drive the German Fleet to sea where it could be intercepted by the Royal Navy. It stressed the importance of the attack being delivered as soon as possible after the outbreak of war, before German defensive measures were ready, and before German Naval patrols had become accustomed to their duties. This would mean that naval movement would have to begin before the actual outbreak of war, but the Naval Staff suggested that the attack should be undertaken, even if there were no naval forces available. At that stage the C.-in-C., Home Fleet had made no comments on the plan. The C.-in-C., Bomber Command had, however, already stated that, in his opinion, the German Fleet would not put to sea<sup>(2)</sup> and the C.-in-C., Home Fleet was about to confirm this view.<sup>(3)</sup>

(1) Underlinings by Narrator.

(2) On 20th February - A.M. file S.50128/9A - See above.

(3) On 30th March - A.M. file 11310/19B and 19C.  
See below.

(d) The Conference between the A.O.C.-in-C. Bomber Command and the C.-in-C., Home Fleet and the question of Naval co-operation

A.M. file  
S.50128  
Encl.19B

On 30th March, 1939 there took place a conference between the C.-in-C., Bomber Command, and the C.-in-C., Home Fleet. It was agreed to have a "general discussion" as the C.-in-C., Home Fleet was unwilling to discuss the Naval aspect in detail at that stage.

The C.-in-C. Home Fleet made it clear that he would not take surface vessels "in under the heavy enemy shore defences". He also thought it "most unlikely" that the German Fleet would put to sea as a result of the air attack: (1) it was to his mind, more probable that if any ships did move from Wilhelmshaven that they would proceed to the Elbe or Cuxhaven in which case it would not be possible for the Navy to intercept them, except by Naval A.S.F. In any case Naval A.S.F. would take one and three quarter hours to arrive over the German Fleet.

The C.-in-C. Home Fleet thought it might be possible to get carrier borne fleet torpedo aircraft off before light, and deliver an attack on the German ships at dawn. This however would only be possible if the German ships were anchored in the Jade or Schillig Roads, and not if they were in Wilhelmshaven itself.

The A.O.C.-in-C. Bomber Command said that in such circumstances the aim of Bomber Command would not be to drive the German ships to sea at all, but to destroy the ships. This he thought would require high level attacks (to get penetration) and a "large proportion" of S.A.P. 500 lb. bombs.

Ibid

Naval Officers estimated that the enemy warships could get under way in half an hour, but if the Scharnhorst and the Gneisenau were in the inner roads they could only get out within one or two hours either side of high tide. This suggested, of course that they would probably not be in the inner roads.

The A.O.C.-in-C. Bomber Command stated that in the interest of concentration Bomber Command could not attack until about two hours after dawn at the earliest. The C.-in-C. Home Fleet confirmed that a concentrated air attack would be much more difficult for the German ships to deal with. The A.O.C.-in-C. did not however think it worth while sending in the naval torpedo aircraft in an attempt to confuse the enemy. The C.-in-C. Home Fleet made the further suggestion that submarines might be moved into the area provided the navy had notice of the attack the night before it was delivered.

Finally it was resolved to implement the plan as follows:-

- (i) Bomber Command aim to destroy warships.
- (ii) Attack as soon as possible after outbreak of war.
- (iii) R.A.F. to select their own time, and the attack to be delivered without previous reconnaissance. (2)

(1) Thus confirming the view of the C.-in-C. Bomber Command and of the J.P.C.

(2) In the interests of surprise.

(iv) The first wave of the Bomber Command attack to report to the Navy on its way home if there were any warships in the area, and the result of the attack.

(v) The R.A.F. to give the Admiralty notice of the attack the night before.

Ibid.

The A.O.C.-in-C. instructed Wing Commander Pendred to find out if there would be any political restriction on bombing targets near the harbours at Wilhelmshaven, for instance the warships in the inner basin, and also what were the most important objectives.<sup>(1)</sup> The A.O.C.-in-C. added that Blenheims could not go beyond Wilhelmshaven, but that the Hampdens and Wellingtons could search Cuxhaven and Brunsbüttel if no ships were seen at Wilhelmshaven.

A.M. file  
S.50128  
Encl.19c

The next day in a letter to the Secretary of the Admiralty the C.-in-C. Home Fleet gave an account of this conference, and said that he did not think that his plan to proceed immediately on the outbreak of war to round up all German merchant shipping should be delayed on account of plan "K". If, however, the navy had not less than twelve hours notice of the attack, all naval forces could move to positions 100 miles North West of Heligoland. If the Bomber Command attack was then delayed for more than two days the ships would have to return for refuelling. He emphasised again that he did not think the German Fleet would put to sea, though he said he was in agreement with the idea of the attack.

(e) Doubts about the Plan

Ibid  
Encl.20A/1

Following this conference doubts were expressed at the Air Ministry as to whether the whole case for naval participation had not fallen through.

A.M. File  
S.50128  
Encl.19A

On 3rd April the A.O.C.-in-C. Bomber Command expressed a doubt as to Bomber Command's capability of hitting the German warships, especially as the majority of them might be underway by the time the aircraft got over them. He explained that Bomber Command had little experience of bombing ships on the move, and that only six of the squadrons which would be used were even then undergoing training in this type of bombing.

(f) The Air Staff Appreciation of 1st July, 1939

A.H.B.  
IIA1/7

Nevertheless these difficulties were cast aside no doubt because of lack of alternatives, and the plan, though modified, was continued. On 1st July an Air Staff Appreciation was produced.

This appreciation stated that the Naval Staff held the view that an air attack would "interfere seriously" with the operations of the German Fleet, and "may compel" warships to put to sea where the Royal Navy "may have an opportunity" of engaging them.

The Air Aim was stated to be to cause the maximum possible damage to warships lying in the Harbour or Roads of Wilhelmshaven and the Naval aim was to bring to action any German ships putting to sea.

A.M. file  
S.50128  
Encl.21A

(1) The Air Ministry informed the C.-in-C. on 5th June that this was not an urgent question.

The maximum bomber force available would be 10 medium and 11 heavy Squadrons. (1)

In so far as enemy defences were concerned it was estimated that the Germans had available only three fighter squadrons (27 1E and 9 1R.) This force might of course be increased, but it was expected that if the Bomber Command attack was concentrated in time there would be no great fighter opposition. Wilhelmshaven was known to be strongly defended by A.A. guns, but the small calibre guns would not cover ships in the Jade and Schillig Roads.

The ships expected to be in Wilhelmshaven on 1st July, 1939 were:-

Two Battle Cruisers - 700' x 100'  
Three Armoured Ships - 600' x 70'  
28 Cruisers - 630' x 70'  
Five 6" Cruisers - 570' x 50'  
About 40 destroyers

It was decided that air reconnaissance before the attack would compromise its secrecy, it was therefore hoped that Admiralty "sources" would provide information about the movement of the ships in and out of Wilhelmshaven.

The attack was to be delivered "as soon as possible after dawn" by all mobilizable Blenheim, Wellington and Hampden Squadrons with the greatest possible concentration, from high level to gain penetration of armoured decks.

In these circumstances the bombing error was expected to be 300 yards as agreed at the Air Ministry Conference of 30th November, 1938. (2) It was therefore calculated that the chances of hitting the targets were as follows:-

Battle cruiser	1.7%
Armoured Ship	} 1%
8" Cruiser	
6" Cruiser	

If each Blenheim Squadron could send off twelve aircraft, and each heavy squadron nine approximately seven hundred and eighty nine 500 lb. bombs could be dropped. The results expected accordingly were:-

Battle Cruisers	13.4 hits
or	
Armoured Ships	7.9 hits
or	
6" Cruisers	6.3 hits

Some consideration was also given to the question of alternative targets in conditions of restricted and less restricted bombing.

Ibid

As had been pointed out in the Naval Staff Appreciation dated 1st April, 1939 the total destruction of any warship in an attack armed with 500 lb. bombs was unlikely, though any damage to the ships was rather vaguely predicted to "interfere seriously with the operation of the German Fleet". The alternative attack on the shore installations, it was thought, would prove ineffective,

(1) The Whitley Squadrons (6 of them) were NOT to be used as this was a daylight operation.

(2) See above.

and in any case the Germans had plenty of alternative ports. From the naval point of view the main hope was therefore that the German Fleet would put to sea.

This, however, as has been seen, was unlikely, and the Naval Staff Appreciation seems to have recognised that it would only happen if the Germans lost their heads. As has also been seen the prospects of the Royal Navy actually being able to intercept the German Fleet, if it was foolish enough to put to sea, were by no means good.

(g) Conclusions

On the whole therefore, the prospects of the plan actually achieving any real success were remote indeed. Quite apart from this it must be recognised that even if the operation did succeed nothing would have been achieved towards reducing the scale of German air attack on Britain. In so far as this plan was concerned the primary role of Bomber Command had been abandoned, and the force was to be employed as a weapon of Naval Co-operation. The conclusion is therefore reached that, this plan was no more than a 'pis aller' which owed its conception to the policy of restricted bombing and the inability of the planners, limited by the inadequacy of the force available, to think of anything better. Something had to be done, and if only one German ship was sunk Bomber Command would at least gain a little prestige.<sup>(1)</sup>

The Plan to put the Kiel Canal out of Action (W.A.9)<sup>(2)</sup>

When on 16th September, 1938 the Admiralty Plans division gave the destruction of the lock gates of the Kiel Canal as their second priority for air attack, the Air Staff had for some time been considering this possibility.<sup>(3)</sup>

An Air Targets Intelligence Appreciation of 24th September, 1938 had concluded that the canal could be attacked in five different ways. These were the destruction of the lock gates, the breaching of the canal banks, the sinking of ships in the locks or canal, the destruction of bridges over the canal or the bombing of electric hydraulic plants. Of these the destruction of the lock gates was considered the best course of action, and if they could be destroyed at either end of the canal, traffic would have to be suspended. On the other hand the other methods would cause only temporary delays. Breaches in the banks could quickly be repaired, and would be difficult to achieve. Sunken ships would be unlikely to block the canal unless they were in a lock. The destruction of bridges, over the canal would have only a temporary effect, and the electric hydraulic plant provided only a reserve of power which came normally from the grid.

The recommendation therefore was that either the lock gates, or the electric grid should be attacked.

- (1) A modification of this plan, known as WA.7(b) which involved a bombing attack without Naval participation was carried out in the early days of the war. See Volume II of this Narrative page 56.
- (2) Many of the appreciations and comments on this plan also refer to W.A.7a and W.A.7. In the interests of clarity the three plans are here dealt with separately.
- (3) As early as 13th December, 1937 the Admiralty had approved an Air Targets Intelligence Appreciation on the Kiel Canal.

A.M. file  
S.43296  
Encl.5B

A.M. file  
S.43296  
Encl.2A

Ibid

A.M. file  
S.43294  
Encl.3A

Ibid  
Encl.3B

The C.-in-C. Bomber Command lost no time in pointing out the difficulties of carrying out this attack. He regarded the lock gates as a "difficult and unsatisfactory" target, against which torpedo or at least low level bombing would be necessary. Blenheims, he said, had not the range to carry out the latter, and we had no torpedo aircraft capable of reaching the targets.<sup>(1)</sup> The Bomber Command appreciation which accompanied the C.-in-C's letter recommended that the attack would not be worth while until suitable torpedo aircraft were available, or at least until heavier bombs had been delivered.<sup>(2)</sup>

The implication was that the plan was impracticable until further advances had been made with weapons, and then that the task would be primarily for Coastal Command.

A.M. file  
S.43296  
Encl.7A  
Min.1

Plans 3 was inclined to agree with this view, and did not think the plan promised "any great results". Neither as a military nor an industrial target did the Kiel Canal appear such an attractive target as on the one hand other canals, and on the other, the Ruhr.

Ibid  
Min.3

The general pessimism was strengthened further on 8th October, 1938 by an Air Tactics minute which drew attention to the poor results which had been obtained in 1917 and 1918 by the bombing of Zeebrugge lock gates<sup>(3)</sup> and went on to suggest that it was "pointless to elevate them to second place in the list of objectives".<sup>(4)</sup> This minute did however suggest that the torpedo was "by no means a dead letter".<sup>(5)</sup>

Ibid  
Min.4

On 4th November, 1938 the position was summarised by the D.D.Ops (H). He thought that a plan of this kind

A.M. file  
S.43294/3B

(1) Experiments to determine whether the Wellesley could be converted into a torpedo bomber were being conducted. No other aircraft of Bomber Command could carry a torpedo.

Ibid

(2) The only bombs immediately available to Bomber Command were 250 lb. and 500 lb. G.P. and S.A.P. bombs. (The S.A.P. were in short supply). The need for 1,000 lb. and even 2,000 lb. bombs was mentioned.

(3) In 1917 and 1918 forty-eight tons of bombs were dropped on Zeebrugge lock gates as follows:-

25 lb. and 50 lb. bombs about 15 tons  
230 lb. bombs about 15 tons  
112 lb. bombs about 10 tons  
250 lb. bombs about four tons  
550 lb. bombs about four tons

"On one occasion two aircraft each dropped one 250 lb. bomb from 200 feet, and it is believed that both hit. The lock gates were only temporarily put out of action. The locks and gates were only about half the size of those on the Kiel Canal". (See A.M. file S.43296/7A Min. 3).

(4) As Plans Division of the Admiralty had done on 16th September, 1938. (See above and A.M. file S.43296/2B).

(5) As this was a matter which primarily concerned Coastal Command it is not further pursued here, except in its relation to Bomber Command.



offered such poor prospects of success, that it should only be considered in the light of a restricted bombing policy and the decision to conserve the 1939 Force. He also made the significant observation that this plan had further emphasised "the futility of trying to obtain worth while results from the use of our striking force so long as the government restrictions hold good".(1)

(a) The Air Ministry Appreciation on the Plan. July, 1939

A.H.B.  
IIA1/10

It is then, not surprising to find that the Air Ministry Appreciation came to the conclusion that the attack on the Kiel Canal could not be carried out until more powerful weapons were available. The destruction of the lock gates would require at least a 1,000 lb. bomb, and these would be available before the end of the year(2) when there should be eighteen mobilisable squadrons to carry them.

Ibid

The question of sinking ships in an effort to block the canal was also examined. It was thought that it would be very difficult to catch a ship in a lock by day in war time, and that even if one was hit, it would probably clear the lock before it sank. If not the lock would form a dry dock and the ship could quickly be repaired. There would however be a good chance of finding and sinking a ship in the canal itself(3) but this would be of little advantage as the ship would clear the fairway before it was hit, or at least before it was sunk, and would therefore not cause an obstruction.

Ibid

When the "M" mine was available however a number of the these could be placed in the fairway of the canal without much effort, and these would sink ships so rapidly and without any warning, that there would be an excellent chance of obstructing the canal.

Ibid

There were thus four methods of attack open:-

(i) Destruction of the locks

(a) By 1,000 lb. bombs.

(b) By 440 lb. Torpedoes.

(ii) Destruction of the Locking mechanism

This was thought too small a target.

(iii) Blocking the locks

By bombing ships in the locks, which could be attempted but was not recommended.

(iv) Blocking the Fairway of the Canal

(a) The bombing of ships was unlikely to achieve the aim.

(b) By "M" mines. This would be "likely to result in at least one obstruction".

(1) Underlinings by the Narrator.

(2) Experiments with an 1800 lb. bomb were being conducted. (See AHB.II A1/10).

(3) It was estimated that at any one time there would be sixteen ships averaging 800 tons in the Canal. (1b10).

Ibid

Towards the end of 1939 course I would be possible, and "still later" the "M" mines would be available. Course ivb (The "M" mines) it was thought would achieve the best results.

(b) Looking Ahead: The Legal aspect of "M" Mines

It had therefore been decided that the Kiel Canal could not successfully be attacked until more advanced equipment was ready, notably the 1,000 lb. bomb and the "M" mine.

A.M. file  
S.43296  
Encl.10A

The Admiralty had accepted this, and were enthusiastic about the prospects of the "M" mine. They did not think this would greatly endanger their own position, as they believed the Germans intended to use similar mines against Britain in any event. Since however the emphasis was beginning to swing towards the idea of sinking ships in the canal, rather than destroying the lock gates, and this was intended to be a "restricted plan" the 'legal aspect' could not be overlooked.

A.M. file  
S.43294  
Encl.3A

The C.-in-C. Bomber Command had thought that it would be unwise to attack ships in the canal on account of the danger of sinking a neutral. In any case the restricted bombing policy did not permit attacks upon merchant ships at all.

A.H.B.  
IIA1/10

Sir William Malkin after consultations with the Admiralty, however came to the conclusion that it would be 'legal' to employ the "M" mine against a military target like the Kiel Canal. On this assumption it is difficult to see how the sinking of merchant ships could be explained even if the blockage they caused had a military implication. Probably on these grounds, as well as the danger to neutral ships, Sir William Malkin wanted to consider the political implications before the "M" mine was actually used. The Air Ministry sought to evade this difficulty by suggesting that the object of the attacks against ships in so far as bombing was concerned should be "cloaked" in operational orders as attacks on the canal installations. This however did not meet the case, as the "M" mines could hardly be "cloaked" as bombs, and it had already been decided not to bomb the ships in any case.

(c) Looking Ahead: The 1,000 lb. Bomb<sup>(1)</sup>

A.M. file  
S.43296  
Encl.8a

Meanwhile however there remained the possibility of attacking the lock gates when the 1,000 lb. bomb was available. Accordingly on 2nd June, 1939 the C.-in-C. Bomber Command was invited to examine the tactical aspects of such an attack.

Ibid  
Encl.11A

On 10th August a Bomber Command report on this subject was sent to the Air Ministry.

Ibid  
Encl.11B

The report pointed out that that it was impossible to draw anything more than tentative conclusions until details relating to the ballistics, explosive effect, and "other important characteristics" of the 1,000 lb. bomb were available. In the meantime however it was suggested that the Brunsbittel lock would be the best target, and despite the apparent difficulty in manoeuvring heavy bombers it was thought the attack with 1,000 lb. bombs would be practicable.

(1) For details of the design and trials of the 1,000 lb. bomb see A.M. file S.46970/1.

(d) Conclusions

Thus by August, 1939 it was possible to see two methods by which a successful attack on the Kiel Canal might be made. If the "M" mine raised the question of legality, the 1,000 lb. bomb, which would be ready first seemed to offer good prospects of at once keeping the plan legal and achieving the aim. Here was a restricted plan which offered real results.

The Plan for Attack on German Naval Bases. (W.A.7)

A.M. file  
S.43294  
Encl.2B

The third priority suggested by the Admiralty Plans Division was the attack on German Naval bases.

Ibid  
Encl.1A

The official definition of W.A.7 was "plans for counter offensive action in defence of seaborne trade in co-operation with the Navy, i.e. attack on the bases of enemy surface, submarine and airforces operating against our sea trade". The scope of this plan was wide, and it never reached a coherent shape. Indeed on 29th June, 1939 when the Air Ministry sent Bomber Command a list of W.A. Plans with an indication of the stage each plan had reached, both W.A.7a and W.A.9 were said to be under discussion, but no comment at all was made on W.A.7. This plan was therefore more in the nature of a general indication that Bomber Command was going to perform certain naval functions whilst W.A.7a and W.A.9 indicated in detail what those functions were going to be.

A.M. file  
S.41432  
Encl.79B

A.M. file  
S.43296  
Encl.5B

In so far as W.A.7 was a plan it covered the attack on naval bases which were not included in other plans. Emden and Hamburg were principally commercial ports, and were therefore not suitable for attack. There remained Kiel, Wilhelmshaven, Cuxhaven and Bremerhaven. Of these the possibility of bombing shore installations at Wilhelmshaven and Cuxhaven was taken into account as alternative targets in W.A.7a.

A.M. file  
S.50128  
Encl.19B

A.M. file  
S.43294  
Encl.3A  
Ibid  
Encl.3B

Kiel was estimated by the C.-in-C. Bomber Command to be beyond the range of Blenheims and the C.-in-C. also thought that Wilhelmshaven was the most suitable land target from the legal point of view. The Bomber Command Appreciation of 26th September, 1938 therefore recommended that the attack should be confined initially to Wilhelmshaven.

A.M. file  
S.43296  
Encl.7A  
Min.2.

A minute of 12th October, 1938 by Air Target Intelligence, had suggested it would be best "to concentrate on Wilhelmsburg (Sic) and possibly Cuxhaven". It was on this note of decisive condemnation that attention was focussed on the more detailed plans to bomb less dispersed targets.

The Three Naval Plans: Summary and Conclusions

Of the three plans the Admiralty regarded the attempt to destroy actual warships as the most important. When the details were worked out in W.A.7a neither the Naval nor the Air Staff showed any great confidence in the ability of Bomber Command to achieve this, and therefore the older idea, that as a general principle a warship can only be destroyed by a warship, was revived. The scattered nature of the targets and the bombing restrictions seemed to offer little prospect of the success of any general plan to strike at German Naval bases. In other words an air counter offensive was hardly likely to have much effect in reducing the intensity of a naval offensive.

On the other hand the independent offensive idea of attacking the Kiel Canal offered much better prospects, but nothing could be done till the striking power of Bomber Command had been increased.

None of these plans then, really offered a solution to the problem of how to employ the striking force effectively in the restricted period. Indeed their limitations were in themselves a challenge to a policy of restricted bombing. There was however another alternative way in which Bomber Command could be employed which will now be considered.

#### The Plan to Drop Propaganda from the Air (W.A.14)

This was a plan for dropping propaganda from the air (W.A.14). It sheds a good deal more light upon the question whether the 'legal' plans were seriously intended to achieve real military results, or merely to employ bomber command at the outset, for this was the least "military" of all bombing plans, and it is therefore significant to note that it absorbed probably more attention than any other plan. (1)

This plan, apart from the fact that it was carried out at the outset of the war, and indeed throughout the whole course of the war, and so has an intrinsic interest, was a clearer pointer to the situation in 1938 and 1939 than any other plan. It will therefore be dealt with in considerable detail. (2)

A.M. file  
S.46650/1  
Encl. 1A

On 14th September, 1938 when the C.-in-C. wrote to the D.C.A.S. asking what steps were being taken to drop leaflets on the enemy in war, he expressed it as his opinion that "it may well prove that skilfully dropped propaganda, distributed by aircraft, may prove a more potent weapon than bombs". (3) He was not suggesting that bombing should be abandoned, but he drew the attention of the D.C.A.S. to the Bomber Command Appreciation of W.A.1. "in which" he said "I have been unable to express any great confidence in the results of our bombing offensive under that Plan".

Ibid  
Encl. 1A  
Encl. 4A

The D.C.A.S. was not immediately impressed. He confessed ignorance of the subject. He was doubtful about what result was hoped for. Was it to bring about the cessation of enemy bombing or was it merely to gain the good opinion of neutral countries? If it was the latter he thought the same result could be achieved by broadcasting. He also suggested some practical objections. There would be the risk of losing fighting aircraft without counterbalancing advantages. The psychological moment might be lost owing to bad weather, and he thought propaganda would be more effective after the enemy had felt the "lash". He also did not think that Bomber Command could afford to drop leaflets instead of bombs while the Germans bombed England.

Ibid  
Encl. 3A

The D.D. Plans however accorded a much more favourable reception to the C.-in-C. Bomber Command's suggestion, and in a minute addressed to the C.A.S. and D.C.A.S. dated 17th September, 1938, he drew a clear picture of the

- (1) It should be noted that W.A.14 raised so many questions relating to Bombing Policy that it will often be necessary to revert to this topic in the interests of clarity and continuity.
- (2) See also Vol. II Bomber Narrative.
- (3) Underlinings by Narrator.

position. He was in agreement with the A.O.C.-in-C. Bomber Command that the Ruhr was "in a class by itself as an air objective", and that to "cripple the Ruhr is incomparably the most effective way of exerting pressure on Germany". But he pointed out that Bomber Command could not attack the Ruhr till the Germans attacked London or other centres of population. He thought moreover that even after a German attack on London "some small additional sacrifice" would be valuable in gaining the good opinion of the U.S.A. He went on to suggest that bombing warning notices might be dropped on the lines of those used in Frontier Warfare, (1) before actually bombing the Ruhr. He thought that the two or three days of actual bombing of the Ruhr which would be lost while the warnings were dropped and had time to take effect would be justified.

Ibid.  
Encl.6A

On 25th September, 1938 an Air Staff note summarised the position. The Air Staff were fully in agreement with the proposal to use aircraft to drop leaflets, but this use must be "strictly limited", and it might be "necessary to resist pressure from some quarters to overdo this form of activity". Thus the enthusiasm of the C.-in-C. Bomber Command was placed in the perspective of the cool attitude of the D.C.A.S.

The Air Staff note drew a distinction between the two courses of action open:-

- (i) General propaganda to be dropped before actual bombing began.
- (ii) Bombing warning notices as suggested by the D.D. Plans.

A third course was that of dropping leaflets throughout the war in conjunction with the normal bombing. (2) This could be done by special aircraft (referred to as 'special dropping') or by aircraft carrying leaflets in addition to their normal war load, (referred to as 'incidental dropping').

The Air Staff regarded propaganda as a "weapon" which would justify some casualties, though they pointed out that the risk would not be comparable to that of normal bombing, as leaflets could be dropped from a great height in darkness.

They further pointed out, as regards the Bombing Notices, that if London was really heavily bombed they would oppose retaliation "merely by dropping paper". On the other hand if the German Air Force inflicted civilian casualties, so to speak by mistake, or incidentally as they might well if they bombed, for instance, Woolwich Arsenal, an aircraft factory or a dockyard, then there would be a case for the Bombing Notices. Further they pointed out that though it was of the utmost importance that an attack, for instance on the Ruhr and the fuel reserves at Hamburg should be made "as soon as possible", such attacks would undoubtedly result in heavy civilian casualties. In these circumstances it might be well to drop warning notices first, with the object of securing the good opinion of the U.S.A. and of Germans in opposition to the Nazi regime.

Finally it was pointed out that warning notices might cause "great panic" and "seriously disorganise the industrial life" of the Ruhr. This would not however reduce the initial scale of air attack on England.

(1) See Appendix 5 for the suggested Notices.

(2) As had been done in the 1914 - 1918 War.

Ibid  
Encl.5A

Meanwhile on 23rd September this plan had been launched "as a question of the utmost urgency".

(b) Summary of the Plan

Thus it appears that at the initiation of this plan there were various considerations to be weighed.

It was realised that three methods could be employed:-

- (i) Bombing Warning Notices.
- (ii) General propaganda before bombing began.
- (iii) Propaganda throughout the war as an adjunct to bombing.

As regards the first of these courses it was thought that the result might be to cause actual interference with industrial production. It was also thought that this course might provide an 'excuse' for starting a campaign of unrestricted bombing, and still keep Britain so so to speak in the right, particularly in American eyes.

The plan therefore in its early stages had 'military' possibilities both from the point of view of what it might portend (i.e. an attack on, for instance, the Ruhr) and from that of what it might achieve itself (i.e. a "panic" in the Ruhr).

It was not however thought that any reduction in the scale of air attack on England could be achieved by this plan.

(c) The emergency preparations to carry out the Plan

Ibid  
Encl.7A

Ibid  
Encl.8A

Ibid  
Encl.9A  
Encl.10A

Ibid  
Encl.11B

Ibid  
Encl.11C

On 25th September, 1938 experiments in leaflet dropping were carried out at Mildenhall, and the next day Bomber Command was able to report to the Air Ministry on the type of package which would be required. The Air Ministry promptly got in touch with the stationery office and gave the necessary information on the type of rubber bands required to secure the leaflets and on 27th September rough drafts of Bombing Warnings were sent to the Air Ministry. At this stage however the Air Ministry decided to postpone making a decision about the Bombing Warning Notices. Drafts of general propaganda leaflets were composed and considered by the Foreign Office at this time, and on 27th September the Foreign Office indicated some of the targets which might be treated. These included the Ruhr, manufacturing districts in Saxony, and it was noted that Saxony had been "very red", Hamburg ("formerly the reddest part of Germany") Bavaria, Berlin and the Rhineland towns. On the same day Sir Hughe Knatchbull Hugesson in a minute addressed to Sir Alexander Cadogan summarised the decisions which had been taken, and those which remained to be considered. He said it was decided in principle to drop leaflets immediately after the outbreak of war<sup>(1)</sup> and that the Air Ministry did not foresee any difficulty in carrying out the plan. The production, packing and delivery of the leaflets would be quick and simple. Decisions were awaited on the selection of the actual leaflets to be dropped. The whole question of bombing notices was open, and a decision was called for with regard to a suggestion that a joint Anglo-French

Ibid

- (1) The consequences of pre-war dropping ruled out any earlier activities.

declaration on bombing should be dropped.<sup>(1)</sup> Lastly a firm decision still had to be reached on the question of targets which might be 'treated'.<sup>(2)</sup>

Ibid

Sir Alexander Cadogan made his choice from among the drafts and authorised the beginning of translations. He thought that his decision about bombing notices would not meet the case. As to the proposed Anglo-French leaflet Sir Alexander thought this was a matter for the C.I.D. and Cabinet. He agreed with the provisional list of targets.

Ibid  
Encl.12A

(c) The C.-in-C. Bomber Command's Challenge to the Plan

The plan seemed to be well advanced when on 28th September its originator suddenly challenged the whole scheme. In a letter for the attention of the D.C.A.S. the C.-in-C. Bomber Command said that "investigations" had shown that the Whitley was the only available aircraft capable of reaching Berlin. The Harrow would be capable of reaching the Ruhr, but this would involve refuelling in France on the return journey. Those difficulties had apparently inspired the C.-in-C. to think of other methods, and looking back to the 1914-1918 war he was reminded of the free-balloon method of dropping leaflets. The Germans had announced in that war that they would shoot any pilot found dropping leaflets. The Air Ministry had accordingly decided to use balloons and according to the C.-in-C., the results had been very good. "Wide distribution throughout Germany" had, he claimed, been achieved. Many of the leaflets dropped by this method would, he admitted, fall in open country, but this the C.-in-C. thought would be an advantage rather than the reverse, as he considered that in towns the authorities would be able to sweep up the leaflets, and have other methods of preventing people reading them.

Ibid

He therefore concluded by putting the question whether in these circumstances it was worth "risking aircraft in this task". The C.-in-C. Bomber Command seemed to have come round almost to the point of view of the D.C.A.S. who now stated that he did not think it "permissible" to send Whitleys to Berlin for the sole business of dropping leaflets, whilst our bomber resources are so limited".

Ibid  
Encl.15A

The legal adviser to the Foreign Office confirmed that dropping leaflets would give the enemy "grounds for protest". He thought that the type of propaganda would have a bearing on the penalty inflicted on the pilot, but considered that the German attitude would be the same as in the 1914-1918 war. This added weight to the C.-in-C. Bomber Command's challenge.

Ibid

On 28th September it was agreed to investigate the possibility of dropping leaflets from free balloons. The whole plan, in so far as Bomber Command was concerned seemed to be in danger of extinction.

(d) Survival of the Plan

The plan was by now, however too much of a vested interest to too many, for it to pass so prematurely into oblivion.

(1) This arose in a conversation between the C.A.S. and General Gamelin on 26th September.

(2) Estimated that R.A.F. could drop 10 million leaflets per night.



Ibid  
Encl.17c

The Archbishop of Canterbury wrote to the Secretary of State for Air on 28th September saying that the leaflet idea had the backing of "several influential people". Apart from this the Air Staff was more or less committed to it, and the Board of Education, the Stationery Office, the prospective Ministry of Information, and the Foreign Office were all involved. Meanwhile the lack of alternative plans for the outset of the war hung over (as always) the heads of the Planning Staff at the Air Ministry.

(e) Progress of the Plan after the Munich Crisis

Ibid  
Encl.18A

A new phase in the history of the plan opened with a Plans 5 memorandum dated 10th October, 1938. It had been realised that the hurried decisions made during the Munich crisis might not have produced satisfactory results. An effort was now to be made to get the whole matter arranged "before another crisis". Plans 5 had accordingly been instructed to start a "propaganda file". This was to be the first of many.

Ibid  
Encl.16A

The object of the Plans 5 memorandum mentioned above was to examine the means by which 1,000,000 pamphlets a day (sic) could be dropped as soon as possible after the outbreak of war.

Ibid  
Encl.18A

Propaganda was defined as the presentation of a case in such a way as to influence others, and it was claimed to be a "proved" and "valuable" weapon of War". It was pointed out that democracies could not make the same use of propaganda in peace time, as the Dictators had already done, but a campaign directed to producing a 'casus belli' should be met by one to show that there was no 'casus belli'. If this failed and war came, then there should be a sustained propaganda drive to justify resistance to aggression, and to undermine the enemy. It was considered expedient that propaganda should be "based upon truth" and that the most fruitful results could be achieved by attacking the enemy Government.

In so far as propaganda dropped from the air was concerned two types were mentioned.

(i) Bombing Warnings. These however should not be concentrated in case they gave away a target. They would minimise enemy civilian casualties, and might reduce industrial production.

(ii) Leaflets threatening retaliation. These would be more effective than diplomacy through neutral channels.

Ibid

As regards the legal aspect, the memorandum stated that this was undoubtedly a legal plan, and mentioned article 21 of the Hague Rules, which sanctioned this form of warfare. Between 1914 and 1917 British aircraft had "constantly" dropped propaganda. After the German threat to shoot the pilots concerned the British had given this up, but the French and Italians had ignored the German threat. The memorandum therefore suggested that the action of the British Government had been weak(1) and

Ibid  
Encl.18A

(1) At the instigation of Lord Northcliffe, Britain was about to resume using aircraft when the armistice intervened.

stated "there is no legal reason why aircraft should not be used for dropping propaganda in a future war". (1)

Having thus dismissed the objections to the plan, without however answering the C.-in-C. Bomber Command's question was it worth using aircraft the memorandum turned to practical details.

The leaflets could be dropped by specially provided aircraft, by bomber or reconnaissance aircraft specially detailed and by bombers and other aircraft in the course of their normal duties. (2) It was however assumed that there should be no diversion of aircraft from their normal duties, unless the Government required this to meet special circumstances. Where possible aircraft carrying out their normal duties were to drop leaflets 'incidentally'. The use of balloons was to be developed with the object of confusing and misleading the enemy.

The memorandum then suggested a specification for the 'ideal' leaflet bomber, and suggested that the Long Range Development Flight might become the 'Propaganda Flight' in wartime.

For aircraft engaged in 'incidental dropping' it was estimated that, in addition to normal war load, the Battle, Blenheim and Wellesley could carry 6,000 pamphlets; and the Whitley and Harrow 30,000.

Finally it was suggested that balloons should be capable of carrying 6,000 pamphlets each, and travelling at 10,000 feet. They would probably be launched from Nancy and would form part of Balloon Barrage Organisation. It was estimated that two hundred suitable balloons could be produced per day.

Despite the optimism about the balloon, they do not any longer appear to have been a threat to the aircraft.

On 27th October the C.A.S. expressed general agreement with the terms of the Plans 5 memorandum, though he was not in favour of starting a special propaganda flight. He agreed however that the Long Distance Flight could be earmarked for this purpose.

(f) Increased interest in Propaganda

If Germany had a long lead in the race for air parity, she also had a longer experience of, and much greater proficiency in, methods of propaganda than the British. It is then hardly surprising to find that the British began to study the methods of Goebels.

In the first instance there was an increased demand for the immediate establishment of a Ministry of Information. The Air Ministry in general, and even the D.C.A.S. in particular were parties to this demand. The D.C.A.S. feared that unless some central authority was established to deal with the whole question of propaganda, the near chaotic conditions of the Munich crisis might return.

(1) It was thought that the Germans intended to use aircraft for this purpose and expected their enemies to do so.

(2) It was thought that twelve Whitleys could drop about 10,000 pamphlets provided the "bulk" was not too great. The Stationery Office could print 2,000,000 pamphlets per day at short notice.

Ibid  
Min.26

Ibid  
Encl.27A

Ibid  
Encl.29A

Ibid  
Encl.18A

Ibid  
Encl.18A

During this period of confusion, he said on 28th November, the Air Ministry had been forced to abandon the idea of bombing notices, and had experienced difficulty in getting suitable pamphlets drafted. He thought that "clumsy propaganda" might not only do no good, but might do "definite harm"... To ensure that material was kept up to date, and that proper liaison was established between the Air Ministry, Stationery Office and the B.B.C. he urged the immediate establishment of the Ministry of Information, which under existing arrangements was only to come into being on the outbreak of war.

Ibid  
Encl.30A

The Foreign Office were however in opposition to this widely held opinion, and claimed that existing departments could deal with the problem in peace time.

M.I.C.15

The Minister of Information Designate was rather naturally also pressing for the immediate establishment of a Ministry of Information, and he was concerned that all propaganda preparations were related only to events after the outbreak of war. He thought that attention should be given to the question of combatting enemy propaganda in peace time. This he claimed might make the difference between peace and war.

A.M. file  
S.46650/1  
Encl.31A

At the request of the Prime Minister, the Foreign Office had been asked about this time to prepare a report for the Cabinet on the problem of propagating the British point of view in Germany in peace time.

The Foreign Office won their point about postponing the creation of the Ministry of Information, but the greatly increased interest in propaganda at the Air Ministry and elsewhere continued to grow.

These comments on the proposed Ministry of Information, and propaganda have been included because they indicate the importance which was now attached to the leaflet plan in general.

(g) Difficulties still obstructing the Plan

Ibid  
Encl.32A

Despite the enthusiasm of the Air Staff for the plan the C.I.D. continued to show a "distressing dilatoriness" and the D.D. Plans informed the C.-in-C. Bomber Command on 12th January, 1939 that not as much progress "as we should have liked" had been made. "Constant prodding" by the Air Staff was however beginning to produce results.

Ibid

Some progress was being made with research into the problem of balloons. But at this stage it was thought that the most probable course of action would be for Bomber Command to drop the leaflets 'incidentally' in the course of their normal duties. Further progress was delayed until the major propaganda decisions had been reached.

Ibid  
Encl.33A

These decisions which were awaited were:-

(i) Was the general policy of leaflet dropping approved and if so should it start at the outset of a war?

(ii) What type of propaganda was to be dropped?(1)

(1) This might affect 'penalties' to be imposed on captured pilots - see above.

- (iii) Was it considered that there was a risk of over-saturation?(1)
- (iv) What was the attitude to special missions?(2)
- (v) Was it intended to concentrate on:-
  - (a) Long term propaganda against indiscriminate bombing?
  - (b) Bombing Warnings?
  - (c) A General Anglo-French Declaration?
- (vi) What was the attitude to the currency suggestion? (i.e. to drop forged currency on Germany).
- (vii) What steps were being taken to achieve co-ordination with the French?

Several of these problems raised questions of Bombing Policy, which, as has been seen in Chapter 5, had not yet been officially answered. They also raised the whole question of war planning, for if leaflet dropping was to be primarily "incidental" then clearly the whole case depended upon what other plans were to be operated. If for instance leaflets were to be dropped "incidentally" on the Ruhr then clearly this would mean that the aircraft concerned must have some business over the Ruhr, or in other words that some form of W.A.5 would be operated.

Thus, if there was a great deal of obscurity clouding the issue of W.A.14, at least the major importance of the plan itself, and therefore of clearing up these doubts had been revealed.

#### (h) High Level Decisions

On 21st March, 1939 the Deputy Director of Plans had a meeting with the Chairman of the Propaganda Committee, Sir Campbell Stuart. At this meeting some of the outstanding problems were raised.

Sir Campbell Stuart had a number of experts including a representative of the Foreign Office, actually drafting three leaflets intended to meet three possible situations. It was agreed that a Ministry of Information should be constituted at once but Sir Campbell Stuart was only able to report that Sir Samuel Hoare had been appointed Minister of Information designate in succession to Sir Stephen Tallents, and that Sir Horace Wilson had advised him (Sir Samuel Hoare) "to be ready, but not to take any positive action".

"Positive action" was however just what was so urgently required by the Air Ministry. There was doubt as to whether one squadron would do all the dropping or whether the whole force would do "incidental" dropping. The difficulty of reaching the Ruhr except by a Special Propaganda Squadron was now pointed out, and Sir Campbell Stuart again spoke of the difficulties involved in a makeshift organisation.

- (1) The Bomber Force could drop 40 million leaflets per month without prejudice to normal duties.
- (2) Twelve Whitleys could drop 8-10 million leaflets in one night.

A.M. file  
S.40450/1  
Encl.46A

Ibid  
Encl. 47A

However the next day Sir Campbell Stuart informed Sir Samuel Hoare that the decision of the Government was awaited upon the following points:-

(a) If the Germans made an unrestricted attack on Britain was "immediate retaliation of the same kind" intended?

(b) Would this "retaliation" be restricted to military targets?

(c) Would bombing be postponed till the civilian population had been warned?

Sir Campbell Stuart pointed out that the amount of time which this organisation would have for the preparation of leaflets for immediate use would be governed by a decision in these matters. He further suggested that if it was decided to drop leaflets at the outset it would be necessary to earmark squadrons for this duty, and that the Air Ministry would have to include this in their plans.

A.M. file  
S.46650/1  
Encl. 50A

Sir Samuel Hoare's reply to these questions was not as clear as had been hoped, and the Air Staff pointed out that unless all preparations were made in advance there would be an interval of 48 hours between the arrival of the first German bombs and the delivery of the first British leaflets, which in their opinion was too long. In any case it seems to have been agreed that the leaflets should be dropped "immediately" war broke out. The Air Staff therefore again pressed the point that leaflets should be prepared in advance to cover all eventualities. They were still hesitant about the Bombing Warning.

Ibid  
Encl. 51A

Some progress was made on 6th April, 1939 at the 4th meeting of the Strategical Appreciation Sub Committee, (S.A.C.) when it was agreed that a Ministerial Committee should consider the whole question of propaganda in war time. It was further agreed that "all necessary preparations" should be completed in peace time to enable leaflets to be dropped immediately on the outbreak of war. This was to be the responsibility of Sir Campbell Stuart and his "Nucleus Organisation". The actual decision to drop the leaflets was to be left to the Cabinet.

Thus at last, though little or nothing had been done to improve the efficiency of the "Nucleus Organisation", the Air Staff had authority to proceed with the plan. The inability of the S.A.C. to give any wider ruling on bombing policy, however, still made it difficult to know what other W.A. Plans would be operated, and therefore how much 'incidental' dropping would be possible.

Ibid

A fortnight later the Secretary to the Cabinet was able to inform the D.C.A.S. that the Ministerial Committee on Propaganda had already met twice under the chairmanship of the Foreign Secretary. As a result he was instructed to inform the D.C.A.S. that it had been decided that leaflets should be "disseminated as widely as possible over areas of dense population" without "undue risk of loss" to the aircraft engaged. The Air Staff were asked to give their views on the possibility of extending the campaign to Northern Italy, report progress made with balloons and the progress generally made with preparations for the plan.

Ibid

To this the D.C.A.S. replied on the same day (20th April, 1939) that the Air Staff could not produce much in the way of plans, but that the R.A.F. could drop the

leaflets without difficulty as no special training was necessary. He said that the C.-in-C. Bomber Command would be instructed to prepare to drop leaflets "incidentally" and by special Squadrons. He pointed out that the areas covered by incidental dropping would depend on other plans. He dismissed the possibility of dropping leaflets on Northern Italy, but suggested that this might be undertaken by the French. He said that the Air Ministry had been authorised to spend £10,000 on balloon trials, and concluded that the Air Ministry now considered that they had the necessary authority<sup>(1)</sup> to proceed with the plans with the exception of that part concerning the balloons.

(i) The Completion of the Plan

Having at last secured the necessary high level decisions for which they had so long struggled the Air Staff now pushed the plan to a fairly rapid conclusion.

Ibid. On 24th April the D.D. Plans asked the C.-in-C. Bomber Command to prepare all necessary plans for the dropping of leaflets 'incidentally' and by a special squadron, which would be necessary if normal duties did not take aircraft over suitable or wide enough areas. He ended with this prophetic sentence. "It seems probable that the dissemination of leaflets by bomber aircraft in the normal course of their duties will become a permanent feature in any future war".

Ibid. On 12th May the C.-in-C. Bomber Command was informed that 8,000,000 leaflets, intended for the first day of war, would be delivered to Group H.Q.'s in about a week's time and on 18th May a provisional list of targets was sent to the Air Ministry.

A.M. file S.46650/1 Encl.65B On 10th August Sir Campbell Stuart was of the opinion that "the principle of the continuous dissemination of propaganda in enemy countries in war is now fully understood, together with the need for essential preparations for this purpose in peace time".

Ibid. Thus on 1st September Bomber Command could be asked to prepare to drop leaflets that night on the Hamburg-Bremen and Ruhr areas.<sup>(2)</sup>

(j) Conclusions

The most striking aspect of this plan was the amount of attention which it absorbed. Indeed this alone would entitle it to a significant place in any survey of plans for Bomber Command in war. There is however a clear explanation of why this plan did attract so much attention.

The leaflet plan had certain salient advantages from the point of view of the Bomber force, which was in a relatively weaker position than its potential rival, was governed by a policy of restricted bombing and had to yield to the overriding necessity to conserve its strength in the initial phases of the war. Large quantities of leaflets could be produced rapidly, without undue expense in money or effort, and they could be dropped from a great height at night in comparative safety. This meant that the bombers engaged would have the opportunity of acquiring war experience with the minimum risk, and that on their observations the Air Ministry Planning Staff would have some

(1) The conclusions of the 4th meeting of the S.A.C. see above.

(2) A revised 'target' list was sent to Bomber Command on 1st September.

concrete evidence upon which to form their later plans. From this point of view the enthusiasm with which the plan came to be regarded may be fully justified.

It was on the question of expected results that there was a tendency for a sense of proportion to be lost. The Commander-in-Chief's original suggestion that leaflets might prove to be a more powerful weapon than bombs was a dangerous idea, and required qualification. It seems doubtful that the Commander-in-Chief would have suggested that, from a German point of view, leaflets could be more effective than bombs. It is therefore permissible to assume that the plan owed something to the difficulties of finding any other practicable plan for the limited force, which would at the same time conform to the policy of restricted bombing and to the need to conserve the force. In these circumstances there was a tendency to exaggerate the effects of the plan upon the course of the war. This danger was seen by the Air Staff from the outset, but nevertheless it was allowed to develop to some extent.

The possibility of the plan achieving any really substantial results would of course depend upon the quality and the type of propaganda dropped, (a subject beyond the scope of the present narrative)(1) but in any case there remained the danger of the primary role of the Air Striking Force, which must always be the infliction of material damage of one sort or another, becoming obscured.

Upon the balance between these two aspects must depend the wisdom of the whole plan.

#### The 'Illegal' or Unrestricted W.A. Plans

##### Significance of the Unrestricted Plans

The plans(2) to be considered in this section are those which could not be operated at all, or even in part, until there was a revision of Bombing Policy to allow attacks to be made upon a wider range of targets than those permitted in the instructions of 22nd August, 1939.(3) In this sense they were long range plans, and were unlikely to be employed at the outset of a war. Yet right at the beginning of the period now under review (i.e. on 30th November, 1938) the D.D. Plans had agreed with the C.-in-C. Bomber Command that plans made in peace could only apply to the opening phase of a war, since their practicability could only be tested in war. Did this therefore mean that all these 'unrestricted' plans had no real significance?

A.M. file  
S.47375  
Encl.6B  
Para.5

- (1) See Appendix 5 for specimens of leaflets drafted during the Munich crisis.
- (2) W.A.1 Attack on G.A.F. and its maintenance.  
W.A.4 Attack on Communications.  
W.A.5 Attack on Manufacturing Resources.  
W.A.5a) German War Industry  
" b) The Ruhr  
" c) Oil  
(W.A.6 Italian Manufacturing Resources)  
(W.A.8 Specially important war like stores etc.)  
W.A.11 Forests  
W.A.13 Enemy H.Q. Berlin etc. See (A.M. file S.41432 Encl.79B)  
All these would involve civilian casualties.
- (3) See above Chapter 6.



There are two answers to this question. In the first place it was an opinion that the Germans would launch an immediate unrestricted air attack against Britain or her allies, and that this would free allied hands, and make an immediate abandonment of the restricted bombing policy possible. More than this it would make it urgently important for Bomber Command to fulfil to the best of its ability its primary role; to reduce by vigorous counter attack, the scale of air attack upon the country or in other words to avert the "knock out" blow from the air. In these circumstances the unrestricted plans would cease to be long range and would become immediate. Upon them might depend the continued existence of the country.

In the second place, even if the Germans did not launch an unrestricted air attack, they were still the most formidable military power in Europe. France was reluctant to launch a land offensive against her potential enemy, and no other power could muster an army comparable with the German. How then was Germany to be defeated? Some held the opinion that this could be done from the air. In these circumstances Britain might be compelled by considerations of expediency to relax her restrictions upon bombing. The crux of this matter was whether a target, or group of targets, could be found whose destruction would have a really vital effect upon Germany's power to continue a war and, if so, whether the 1939 Force was capable of destroying them?

Thus the significance of the unrestricted plans is revealed. An attempt will therefore be made in this section to assess the various plans, (1) in this light.

The following problems will therefore be solved:-

- (1) Was the 1939 Force capable of doing anything to avert the knock out blow?
- (2) Was the 1939 Force capable of doing any thing offensively to win the war?
- (3) Were the 'legal' plans defeatist or merely experimental? (With reference to the 1941 force),
- (4) And so, was there an immediate alternative to the policy of restricted bombing?

The Counter Offensive: Plan for Attack on the German Air Force (W.A.1)(2)

This was inherently a defensive plan, and it may be well to refresh the memory of the reader about the expected attack it was intended to avert.

In October, 1936 the Joint Planning Committee had been of the opinion that the German Air Force would be capable of delivering a "knock out blow" against Great Britain in the event of war in 1939. The scale of attack expected was about four hundred tons of bombs every twenty four hours sustained for about forty days, and aimed at ports and communications.

It was estimated that in the first twenty four hours the handling of cargoes by the Port of London might be

(1) See footnote (1) page 299.

(2) For the early history of W.A.1 See Part I of this volume.

reduced to 25 or 30% of normal, and that nearly all the warehouses would be destroyed by fire. In another three days the same results might be achieved against all the ports from the Tyne to Southampton.

If the Germans attacked centres of population 20,000 casualties might be expected in London during the first twenty four hours and within a week the half dozen big centres of population would have been partially evacuated. In these circumstances it was thought that the civilian population would insist that surrender was preferable to continued resistance.<sup>(1)</sup> It is hardly surprising to find that the attack on the German Air Force found pride of place among all the Western Air Plans.

B.N. Vol. I

The early pessimism with which this plan had been regarded by the Air Staff, and especially by the C.-in-C. Bomber Command was unrelieved down to the outbreak of war. This was of course one of the reasons why the Expansion Scheme 'M' of November, 1938 had given immediate priority to Fighter Command. The most urgent need seemed to be to avert the "knock out blow" and the study of the possibilities of doing this by attempting to launch a counter offensive against the German Air Force had not encouraged the Air Staff.

A.H.B.  
II.1/1

A.M. file  
S.42728  
Passim.

The main purpose of the plan was accordingly abandoned, and it came to be regarded merely as a possible means of assisting the fighters to reduce the German attack on Britain. In this sense the plan was kept up to date in the face of one objection after another from the C.-in-C. Bomber Command.

As an 'immediate' plan of primary importance the attack on the Air Force was assigned very little significance.

The Independent Offensive: Plans for attack on German War Industry and Oil. (W.A.5a and W.A.5c)

If the counter offensive plan was virtually abandoned, there remained the possibility of launching an independent air offensive against Germany which would have a vital effect upon her ability to continue a war. Such was the plan for the attack on German industry (W.A.5a) and that for the attack on resources of oil (W.A.5c).<sup>(2)</sup>

A.M. file  
S.43303  
Encl.3A

In sharp comparison to his attitude to the plan for the attack on the German Air Force, the C.-in-C. Bomber Command was exceedingly enthusiastic about the industrial plan.

(a) The Attack on War Industry

A.M. file  
S.41432  
Encl.32c

An Air Targets Intelligence Report of the 8th September, 1938 had focussed attention on the Ruhr, as a relatively small and highly concentrated industrial area situated near the Western Frontier of Germany. The Report pointed out that this area, which was the "greatest and most centralised" industrial district in the world, could not be

(1) The possibility of "angry or frightened mobs of civilians" attempting to sabotage R.A.F. aerodromes had been considered in connection with Security measures - see §24, Part VI Bomber Command War Orders (unclassified in A.H.B.).

(2) Re-numbered W.A.6 in January, 1940.

supplemented as the nerve centre of Germany. They pointed out that more than half the industrial population of Germany was in this area, and that the Ruhr produced an enormous proportion of Germany's industrial requirements. (1)

Here in the Ruhr, so often called the "Achilles Heel" of Germany, it might be supposed that the 'vital' target had been found, whose destruction from the air might decide the issue of a war.

A.M. file  
S.43303  
Encl.3A

Certainly the C.-in-C. Bomber Command seemed to think so, and on 28th July, 1938 he had said that if a sustained attack by 300 aircraft for a month could be maintained, this object could be achieved.

Ibid  
Encl.3B

The Bomber Command Appreciation of the Plan of May, 1938 had gone so far as to suggest that this sustained attack on the power plants and coke ovens of the Ruhr would prevent Germany waging war on a large scale in less than three weeks.

Ibid  
Min.5.

The Air Ministry was not however so optimistic, and it was pointed out that coking plants would not be so easily visible by night as Bomber Command had suggested, and the report was generally regarded as too optimistic. The tendency at the Air Ministry was to give a higher priority to communications and dams.

Ibid  
Min.7

The Air Tactics Branch suggested that the destruction of the Mohne dam would do more damage than could be effected by the whole of the C.-in-C. Bomber Command's plans. The C.-in-C. Bomber Command had however pointed out that dams could not be attacked until the 1,000 lb. S.A.P. bomb was available.

Ibid  
Encl.3A

Ibid  
Min.9

Plans Ops. also expressed the opinion in October, 1938 that the Bomber Command plan was too limited geographically, and on the basis of the C.-in-C's ruling on maximum penetrations, (2) a wider range of targets was being considered.

The C.-in-C's belief that the 'vital' target had been found was therefore not acceptable to the Air Ministry. This is not to say however that the plan was abandoned. It was to be extended. The difference of opinion between the C.-in-C. Bomber Command and the Air Ministry was not a matter of principle but of detail.

AHB IIA1/2-3  
and A.M. file  
S.43303  
Encl.12A

(b) The Air Ministry Appreciation on the Attack on German War Industry January, 1939

The object of the plan was to cause the maximum possible reduction of German War industry. Since no 'key' industrial group had been discovered, whose destruction would dislocate the whole German industry, this could best be achieved by an attack on a 'key service' - Power. A successful attack on this 'key service', it was thought, would cause an important

A.M. file  
S.41432  
32c

(1) For instance, Coal and Coke 70-80% } of total German  
Pig Iron 67% } production  
Steel 75% }

(2) Battles 100 miles  
Blenheims 150 miles  
Harrows and Whitley (at night) 200 miles.

reduction in all German War Industry. This attack could be delivered in two ways:-

(1) The destruction in the first six weeks of war of sixty four Electricity generating Stations and ten gas coking plants. These seventy four targets were however scattered all over Germany and most of them would require low level attack.

(2) The dislocation of industry in the Ruhr. If this could be achieved, the effect on the remainder of German War industry would be 'very considerable'.

Course 1 was considered too ambitious. On the other hand Course 2 would only involve forty eight targets, thirty three of which were large enough for high level attack. Even if the Low Countries remained neutral, the attack on the Ruhr would not call for deep penetration. Course 2 was therefore recommended as the more suitable, with the proviso that Course 1 could be adopted later, and that some of its targets might be bombed as alternatives while Course 2 was being carried out.

The Air Ministry appreciation was not therefore nearly so optimistic as had been the Bomber Command appreciation, already mentioned. Nevertheless it was quite clear that substantial results were expected.

The appreciation was sent to Bomber Command for comment on 31st January, 1939 and was subsequently approved by the C.A.S. on 5th February, 1939.

A.M. file  
S.43303  
Encl. 11A,  
12A

Ibid  
Encl. 3A

Ibid  
Encl. 14A

Bomber Command now began to see difficulties. The C.-in-C. had already said that he was not confident of maintaining a sustained attack on the Ruhr from the United Kingdom, unless he had the use of the air over the Low Countries. Bomber Command said that Blenheims could not reach the Ruhr from the U.K. unless they could refuel in France. It was also said that Battles, with their poor defence, would be no match for the M.E. 109s, and that Bomber Command did not intend to use them in early attacks on the Ruhr as was expected in the Air Ministry Appreciation. The need for better target recognition intelligence was also emphasised.

Ibid  
Encl. 15A

27th March, 1939 D.D. Plans replied to these comments, saying that an effort would be made to get more intelligence about the targets, and that it was thought that the restriction on flying over the Low Countries would not last long so that Blenheims could be used in the attack. The D.D. Plans however thought that Battles would have to be used as they composed 50% of Bomber Command's medium bomber strength.(1)

Thus practical limitations concerning the range of the Blenheims, and the defensive power and speed of the Battles, together with the doubt about bombing accuracy at night, had tended to diminish the popularity of the plan in the eyes of the C.-in-C. Bomber Command. It was not till after the outbreak of war that these problems of Low Country neutrality and night bombing could be solved. The plan for the attack on war industry was reasonably advanced, and was backed with reasonable confidence. An alternative to the policy of restricted bombing had been produced, and therefore, in so far

(1) C/P letter 1st Feb., 1939 C.A.S. to C.-in-C. Bomber Command.

as this plan was concerned, Bomber Command was considered to be something more than an expensive luxury. The acid test of this confidence in the industrial plan is of course the result in war, but this is a question beyond the scope of the present narrative.

(c) The Attack on Oil W.A. 5c

Another justification for the principle of the independent air offensive was sought, surprisingly late, in the plan for an attack on oil.

It was not till 1st July, 1939 that the first draft of the Air Ministry Appreciation of this plan was sent to Bomber Command. A new draft, seen by the C.A.S. on 24th. July, was sent to Bomber Command on the following day.

The appreciation assumed that one of Germany's "greatest problems" would be the "maintenance" of adequate supplies of oil". A "conservative estimate" allowed Germany only six or seven months of full scale effort, and then if all her foreign sources of oil had been cut off, she could only meet 20% of her requirements from domestic sources.(1) If air action could destroy a proportion of her oil stocks the position would be even more desperate. The aim of the plan was therefore to "reduce Germany's war resources of oil as rapidly and as completely as possible". The sources of German oil were stated to be threefold:-

- (1) Imports of crude oil.
- (2) Domestic oil fields.
- (3) Coal mines (lignite).

An attack on domestic oil fields was not recommended as vulnerability would depend upon whether the derricks, the stocking and delivery reservoir, the pumping station, and the power plant were concentrated in a relatively small area. This was not the case in Germany. For the reason that they were too small targets or that their production was not significant Tetra Ethyl lead plants, substitute fuels e.g. Propane and Butane, and coal carbonisation plants, were also not recommended for attack. This left imported oils, and domestic oils in refineries.

There were fourteen major oil refineries of "particular importance".(2) Normally tank farms were associated with refineries, but there were independent tank farms at Stettin and Frankfurt.

Frankfurt was the main oil depot in Western Germany, and it was thought Stettin would have to be attacked from Poland as it was 550 miles from Norwich or Rheims.

Lastly there were the Synthetic oil plants, hydrogenation (Bergius) Plants producing oil from coal and Fischer Tropsch Plants producing diesel oil.(3)

- 
- (1) See Appendix 6.
  - (2) Eight dealt mainly with imported oil and six with domestic oil.
  - (3) Low Temperature Carbonisation Plants were not considered worth attacking.

Ibid  
Encl. 24A

A.H.B.  
IIA1/6

From these considerations a summary of the targets recommended for attack was drawn up, (1) and their vulnerability considered.

Refineries were thought to be vulnerable to 500 lb. G.P. bombs, but the operative part of the target was only about eighty yards square, though the whole refinery would cover about two hundred acres. The extent of the damage would depend on fires. Imported oil plants were generally more vulnerable than domestic oil plants (lubricants), especially at the outset when imported oil plants might be expected to be full of petrol. However it was admitted that precautions had been taken to prevent fires spreading. Hydrogenation plants were thought to be extremely vulnerable and it was expected that one bomb might cause a "series of explosions". Fischer Tropsch plants were less vulnerable and also smaller in size.

All the targets with the exception of that at Stettin were within range of home based heavy bombers and Elbeheim IV's, and all the major imported oil refineries (except Regensburg) were in the neighbourhood of Hamburg or the Ruhr, which would call for a penetration of less than 120 miles of enemy territory. These seven plants were also all near rivers or canals and might therefore be indentified at night. The six domestic oil refineries were around Hanover, in Bremen or near Hamburg.

Four of the nine Hydrogenation Plants were in the Ruhr. The other five were in the Eastern half of Germany between 150 and 200 miles from the Western Frontier. Six of the

(1) SUMMARY OF OBJECTIVES RECOMMENDED FOR ATTACK

A.N.BILA1/6

Type of objective	Number	Capacity 1939 in thousands of tons.	Remarks
<u>REFINERIES</u>			
Imported Oil	8	2,228	Estimated capacity of tanks 1,100 thousand tons.
Domestic Oil	6	528	Estimated cap. of tanks mainly lubricants. 587 thousand tons.
<u>SYNTHETIC PLANTS</u>			
Hydrogonation	6	1,210	High grade petrol and ISO-octanes.
Bergins	2	600	Starting production 1939/40.
Fischer Tropsch	8	625	Mainly high grade petrol & diesel oil.
TANK FARMS	2		Holding Refined oils, capacity unknown.
TOTAL	30 + 2		

eight Fischer Tropsch plants were in the Ruhr. The other two, in central Germany would be hard to locate.

Thus of the thirty-two targets twenty-three were within reach of the Western Frontier. The remaining nine might be reached from Poland.

This wide dispersal of the targets would make it impossible for the Germans to concentrate their defences, and good weather in any part of Germany could be taken advantage of. Finally the "great majority" of the major oil refineries were at least 500 yards from centres of population.

The recommendation was that if there were no political restrictions and the attack was begun within the first four weeks of the war, the above-ground stocks of imported oil should be attacked first, to be followed by the hydrogenation plants, the domestic refineries and the Fischer Tropsch plants in that order.

The Air Staff seemed to have found an even more promising justification for the independent offensive than the industrial plan.

#### The Independent Offensive: Conclusions

Two plans had thus been devised, either of which, at least appeared to offer a method of enabling Bomber Command to make a significant contribution to the defeat of Germany. But the proper operation of these plans would involve at least a relaxation of the bombing policy which had been adopted for the initial phase of the war.

The Air Staff therefore had in the independent offensive plan a real alternative to the policy of restricted bombing. This meant that the frequent discussion of the possibility of the restricted bombing period being of short duration, or of its being abandoned altogether for one reason or another, was not purely academic. If it became possible at some future date for the cabinet to revise its views about civilian casualties, Bomber Command was considered capable of exploiting the situation.

The fact remained that the German Air Striking Force was much stronger than the British, and that Bomber Command, as has been seen, had no effective answer to the threat of a German "knock out blow". It therefore remained a British interest to secure the maximum immunity from air bombing. In these circumstances it was hardly likely that any of the independent offensive plans would be operated unless the Germans first launched an unrestricted air attack on the United Kingdom.

Finally the accuracy of the forecasts of the success of the independent offensive plans must be mentioned. This can be gauged by subsequent history and will have been dealt with in the succeeding volumes to this narrative. It is fair to point out at this stage however that doubts had been expressed about the practicability of both plans. There was the problem of penetrating the Ruhr, both from the point of view of even that limited range, and from that of the defensive power of the Bombers notably of the Battles. Moreover the accuracy of night bombing was in doubt, and as regards the oil plan, the possible invulnerability of the targets had been suggested. It would be a gross exaggeration to suggest that the Air Staff was entirely confident about either plan.

The main fallacy in the whole argument was that if Germany's oil position had been as desperate as estimated, she

would hardly have gone to war at all and, if she had, the naval blockade should have been sufficient to defeat her. The oil plan as it stood, in this sense was either optimistic or superfluous.

The Auxiliary Offensive: Plans to Delay the Advance of the German Army (W.A.5b, W.A.4a and W.A.4b)

It now remains to discuss a third possible role for Bomber Command, that of devising a plan to delay the advance of the German army through the Low Countries from the air. This was 'ex officio' an army co-operation plan, and has therefore been called the "Auxiliary offensive".

A.M. file  
S.1132  
Encl. 1A

Ibid  
Encl. 2a

Ibid,  
Encl. 1A

When the French came to London for the Staff Conversations of 1939 they seemed convinced that the war would begin with a major German land and air offensive against them, and this, they expected, would be preceded by a German invasion of Belgium and Southern Holland. Indeed the D. of Plans wrote to the C.-in-C. Bomber Command on 17th April, 1939 that the French delegation had shown a "preoccupation amounting almost to an obsession" with this idea. Commandant Bailly had previously told the D. of Plans that, in his opinion, the Germans would be much more likely to concentrate on the defeat of France, the weaker of the two Western Powers, rather than attempt a "knock out blow" against Great Britain. He based this assumption on the major plan which had been agreed between France and Britain to concentrate on the defeat of Italy before that of Germany. The D. of Plans had assured Commandant Bailly that in any event Britain would fulfil her obligations to France.

Ibid

At this meeting on 5th April, 1939 between Commandant Bailly and the D. of Plans the whole question of support by Bomber Command to the French army was raised and the D. of Plans promised to consider the question of bombing the German Air Force with a view to preventing it interfering with the French army, and invited the French to propose a plan for the dislocation of German military communications.

A.M. file  
S.1132  
Encl. 2A

So far as Bomber Command was concerned the prospects were summarised on 17th April by the D. of Plans in a letter to the C.-in-C. Bomber Command. This pointed out the possibility of the Germans invading Belgium and Holland immediately on the outbreak of war, and so getting into a position from which they might outflank the Maginot line. The D. of Plans continued, that it had been agreed that in this event the primary aim of all allied bombers would be to delay the German advance and so allow time for the French army to move up into Belgium and form a defensive line there. In this situation the whole of Bomber Command would be devoted to co-operation with the French army. The problem was how best could Bomber Command achieve this aim? The French thought that the most immediate delay to the German army could be imposed by direct bombing attacks on the columns moving forward, but if the German Air Striking Force began seriously to interfere with the advance of the French army into Belgium, then the French advocated that Bomber Command should switch its attack to the German Air Force, and, in the French view, the best method of doing this would be to bomb aerodrome surfaces. Finally the D. of Plans pointed out that if this plan ever had to be operated it would have to be immediately war broke out.



Broadly speaking then, there appeared to be three methods by which Bombers might contribute to the delay of the German Advance:-

- (1) By an attack on the enemy troops moving on the roads.
- (2) By an attack on the rail and road communications in the operational areas.
- (3) By an attack on the German Air Force to relieve the immediate air offensive against the French army.

A.F.C. Papers  
Passim.

This then was a 'continental' role for an 'island' bomber force, and it is hardly surprising to find that the French were more enthusiastic and, if the wish is ever father to the thought, more optimistic, about what could be done, than the British, to whom this would mean the postponement of the strategic independent offensive, and the abandonment of their conviction that the initial German attack would be in the East.

A.M. file  
S.42731  
Passim.  
A.H.B.IIA1/4

If however the French were so "preoccupied" with these plans, the British had some experience of the problems which were now to be raised. One of the original W.A. Plans (W.A.4.) had been devised to dislocate German Military communications, and an Air Ministry Appreciation of a proposal to modify the plan for the attack on the Ruhr (W.A.5a) in such a way as to dislocate the lines of communication of the German army invading the Low Countries, had seen the light in March, 1939.

(a) Proposed Modifications to the Ruhr Plan

In March the Air Ministry produced an appreciation whose object was to show "how attack on the Ruhr will affect operations" of the "German army" invading the Low Countries, and how the Ruhr Plan (W.A.5a) as it then stood, could be modified "to cause the maximum interference with communications while maintaining the original aim of dislocating industry in the Ruhr". This modification which was to effect a compromise between the ideas of independent and auxiliary offensive, came to be known as W.A.5b.

A.H.B.  
IIA1/4

Ibid

Since the appreciation of W.A.5a had been written two new factors had arisen. Reports had indicated a serious position on the German railways. There was said to be a shortage of rolling stock and locomotives. This and the bad condition of the tracks had apparently caused difficulties at the times of the 'Anschluss' and the Munich crisis. Also during the winter of 1938/9 further trouble had been experienced while the canals were temporarily frozen. It was therefore thought "reasonable" to expect that a "comparatively small weight of attack" on the Ruhr might lead to a dislocation of rail transport. This in addition to other advantages would be likely to further the industrial aspect of the Ruhr plan.

Ibid

The second new factor was the increased "likelihood" of a German initial attack in the West.<sup>(1)</sup> In this event it would obviously be of vital importance to check the advance of the German army into territory on which Britain had kept her eye for more than five hundred years. The appreciation pointed out that it would be less profitable to direct bombing operations "solely" against communications, than to persevere with the industrial attack, as in any case only "temporary interference" with communications could be effected from the air.

- (1) This "likelihood" was based on intelligence reports of early 1939.

A.H.B.IIA1/4

It was however thought that some modification of the existing Ruhr plan would not prejudice its industrial aspect, and might "constitute an interference with German communications into Belgium and Holland." (1)

Ibid

The Air Ministry Appreciation suggested that the tactical aspects of this plan could only be determined during the operations, and therefore confined itself to the Strategic Aspect.

It was assumed that no political restrictions would be placed on bombing "legitimate military targets in populated areas", (2) that France would be allied to Britain and that Belgium would resist invasion. (3)

Ibid

It had been assumed in the appreciation on W.A.5a that an attack on railways would be uneconomical from the point of view of the plan to dislocate industry. (4) Now, however it was decided that railways were vulnerable. They depended upon a rigid system of time tables, which could, it was thought, easily be dislocated, especially at night. (5) A mass attack on a railway centre could, it was estimated, only be justified if a delay of a few hours was vital to the whole course of the war, but a "succession of raids" however small over wide areas of the railway system might cause dislocation out of all relation to the actual damage, and "equal to if not greater than" a "necessarily smaller number of mass attacks."

- (1) The Ruhr lies directly across the main lines of communications between Germany and the West.
- (2) In this connection see Chapter 6 above. Also see A.M. file S.1132 Encls. 5A and 6A.
- (3) The attitude of Holland was not thought important.
- (4) See Appendix B to the Appreciation on W.A.5a (A.H.B.IIA1/3).
- (5) The appreciation of W.A.5b states that it would be upon "dislocation" and not "destruction" that air action against communications should depend for its effect. As to the poor effects to be expected from "destruction" the appreciation recalled a bombing attack on an ammunition train at Thionville on 16th July, 1918 when considerable damage resulted in only 48 hours delay. (For the full details see The War in the Air Vol.VI). The appreciation claimed that a similar attack delivered against coking plants would have put "several plants out of action not for hours but for months."

It should however be noticed that the delay at Thionville was 48 hours, when the French and the British came to work out the details of the attack on Railways (see below p. 310) they anticipated causing a much shorter delay. (The British about 4 hours, and the French 6 to 8 hours). These delays were however to be the result of attacks on the "open line". It is surprising that the French did not press home the lesson of Thionville which though it did not impress the Air Ministry in March when they were thinking more of the industrial offensive, might have done in April.

A War Office Committee had selected the ten main strategic railway lines in Western Germany.(1) Half of these lines were liable to attack under the existing Ruhr plan, and it was therefore assumed that, if no modification to the plan was made, the German advance would be delayed. It was however thought desirable to include strategic rail centres as objectives for night attack.(2) It was therefore recommended that night attacks should now be made on Osnabruck, Hamm, Soest, and Schwerte all of which it will be noted, except Osnabruck, were in the Ruhr. It was suggested that these railway targets should be added to, or substituted for, the steel and munition factories previously recommended for night attack in the Ruhr Plan (W.A.5a). It was thought that railway junctions might be easier to find by night, than factories. The possibility of attacking the Dortmund-Ems Canal, and possibly other inland waterways by day was also suggested.

Thus in March, 1939 the Air Ministry had proposed to make certain concessions to the principle of an auxiliary offensive. Nevertheless the independent offensive (i.e. the industrial plan) still retained priority of place.

(b) The French Plan of Attack on Railways

On 5th April, 1939 the Director of Plans at the Air Ministry had accorded a lukewarm reception to Commandant Bailly's suggestion of an attack on railways with the object of checking the advance of the German army. Nevertheless he had invited the French to lay their plan before the British Air Staff.

Accordingly six days later the French Army Staff produced a note "relating to air attack on concentrated forces". This claimed that massed bombing of railways and roads during a concentration period, either the initial concentration at the beginning of the war, or any subsequent tactical concentration,

(1) i.e.

A. Railways leading to the Ruhr. B. Railways South of Ruhr.

- C1 Lohne-Osnabruck X Rheine  
(Duisberg)
- C2 Lohne-Osnabruck X Munster-  
(Herne)
- C3 Lohne-Hamm X -(Dortmund)-  
( 4 Track)
- C4 Altenbeken-Padderborn-  
Soest X
- C5 Warbourg-Arnsberg-  
Schwerte X

- C6 Kassel-Giessen X  
(Koblents  
(Koln)
- C7. Bebra-Hanau-Frankfurt +  
Mainz.
- C8 Wurzburg - Aschaffenburg
- C9 Wurzburg-Osterburken
- C10 Ansbach-Heilbrunn-  
Struttgart

X Recommended for sustained attack.

+ Recommended for attack by the French and M.A.P. C last enclosure.

See Also Appendix B to W.A.4 and map "C" - the last Encl. in A.H.B.IIA1/4.

- (2) The view of the Air Ministry Committee appointed to investigate transportation targets, that it was impossible with the (then) present weapons to destroy viaducts, was upheld.

A.M. file  
S.1132  
Encl. 1A

A.F.C(J)51 or  
A.M. file  
S.1359  
Encl. 2A

might cause "considerable confusion in the transport system, and seriously compromise the execution of the manoeuvre ordered by the (German) command." It was thought that the attack should be concentrated on railways, and that roads which were more "flexible" and formed smaller targets, should only be secondary objectives.

Ibid

The attack on railways might aim at either the destruction of "permanent sensitive points" such as depots, large stations, technical installations, bridges, viaducts and so on; or the temporary paralysis of traffic in a given area. The French thought that direct attack on "actual traffic" ("temporary paralysis") would have a direct and immediate effect on the course of land operations, but that the attack on "permanent sensitive points" would only produce results "after a fairly long period".(1)

The suggestion therefore was that the attack should be directed against "actual traffic" during a concentration period, to isolate the zone in which the enemy was preparing his offensive. This would require that all railway traffic to the zone in question would have to be cut.

Ibid

The French note suggested that this could best be achieved by "systematically" and "repeatedly" cutting the lines along the open track, preferably away from large centres where means of repair would be available and which would be heavily defended. Attacks on road transport were to be simultaneously carried out.

Ibid

The French went on to outline their conception of an actual plan. The main attack was to be East of the Ruhr, to isolate it from the communications coming from the East and North East.(2) Thus two "barriers" were to be created. For the main barrier eleven main and twelve minor, lines would have to be cut, and for the secondary barrier seven main and five minor lines. As the French thought three cuts in each line would be essential, this would involve a total of approximately 100 cuts which would have to be made, and maintained.

#### (c) British Reactions to the French Plan

It can be seen at once that the French view of this plan was entirely at variance with the British, and that it took little account of the resources available, and the effort needed to achieve and maintain the interruption of more than thirty railway lines. The D.D. Plans had commented that the French plan was "very nice in principle but quite impossible in practice."

Ibid  
Encl. 2A

A.F.C(J)73  
or A.M. file  
S.1359  
Encl. 5A

On the 1st May, when the French Air Delegate met members of the British Air Staff "a wide divergence of opinion" was revealed on the question of the railway attack.

A.M. file  
S.1132  
Encl. 10A

A Plans 2 note of 26th April had accepted the French plan "in principle" but had pointed out that its application depended on a repetition of attacks at frequent intervals all through the day and night, and in all weather, which in practice, would be impossible. It was further pointed out that the targets suggested by the French were mostly beyond

(1) The D.D. Plans was not convinced.

(2) The lines leading to the bridges at Coblenz and Cologne, The Rhine Strategic Railway, and the lines from the middle Rhine to Luxemburg and the Saar were also to be cut.

the range of medium bombers based in the U.K. unless they refuelled at Rheims or Norwich,<sup>(1)</sup> and that heavy bombers were unsuited to this form of attack. It was therefore assumed that in the first seven days of war, which would be the vital period, that the whole available medium bomber force<sup>(2)</sup> would be able to cut and keep cut not more than three railway lines.<sup>(3)</sup> Plans 2, therefore thought the attack on open track was impracticable, and suggested, as an alternative, the idea of attacking traffic centres (W.A.5b) which has been discussed above.

A.F.C(J)73  
or A.M. file  
S.1132/13A

Thus the "divergence of opinion" between the British and French concerned not only the way in which the German concentration would be affected,<sup>(4)</sup> and so the results of the attack on the German army, but also the method by which the railways should be attacked, and the forces required to achieve success. The British Air Staff undertook to make alternative suggestions.

(d) The British Plan of Attack on Railways (W.A.4a)

A.F.C(J)73

As has been seen the British Air Staff felt that the German concentration would be effected before the war, and even if this proved to be wrong in the event, that there were better methods of delaying the German advance than the attack on open tracks. Nevertheless the Air Staff decided to persevere with the plan.

A.M. file  
S.1132  
Encl. 15A

On 13th May the D.D. Plans asked the War Office to re-examine the whole question as they did not wish "to completely rule out (Sic) attack on rail movement in all circumstances." It was however emphasised that the Air Ministry had undergone no conversion, and that the main differences of opinion with the French still stood. It was suggested that W.A.4 and 5b and the French plan (A.F.C(J)51) should provide the basis of the new plan. With this faltering welcome the new plan (W.A.4a) was born.

A.M. file  
S.1359  
Encl. 7A

Meanwhile if the British were obstinate so were the French. On 2nd June the British air attaché in Paris sent the Air Ministry the considered opinion of the French Air Staff on the railway plan in the light of British criticisms.

Ibid  
Encl. 7B

The French substantially maintained their original optimism. They claimed that the permanent way could be "effectively damaged" by a bomb of medium size,<sup>(5)</sup> so that the attack could be delivered from 1,000 metres or less. They thought a triple breach in a line would cause a delay of from six to eight hours, and much more if a derailment was caused. The attack could be delivered in comparative safety at an open

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- (1) Though the Long Nosed Blenheims could make the trip non-stop.
  - (2) The Battles of the A.S.S.F. would not arrive in the Rheims Area till Z + 3. and would then probably attack "Fleeting targets".
  - (3) Even this assumed that one cut (not 3) would be enough for each line.
  - (4) The value of the French plan clearly depended upon the assumption that the German army would not be concentrated before the outbreak of the war. The British thought this assumption false, and therefore considered that the plan would have little effect on the German army.
  - (5) 50 kg.

point, though they admitted that a "deep" penetration of enemy territory<sup>(1)</sup> would be called for. It was pointed out that the French Air Force did not then possess bombers of a high enough performance to do this flight, but the inference was that the British did, and a maximum of 100 breaches was still demanded even if this entailed the employment of the whole available Bomber Force. The French Staff, however, thought the plan so important, that a smaller scale effort would also be worth while. Only if, when the war began, it was revealed that the Germans had completed their concentration would the French abandon the plan.

A.M. file  
S.1359  
Encl. 11A

The War Office, having seen this French view, convened a committee on 12th June, to consider the plan as they had been asked by the Air Ministry.

Ibid  
Encl. 11B

The report of this committee, which was issued on 25th May, assumed that even if the entire bomber force available to Britain and France was employed to attack railways East of the Rhine<sup>(2)</sup> the effect on the German army would be negligible, as far as the advance into Holland and Belgium was concerned, but also that exceptional situations might arise which would make such attacks desirable.

The report therefore recommended that a zone for attack should be agreed upon,<sup>(3)</sup> and that a list of railway targets should be drawn up, in order of importance.<sup>(4)</sup>

On 16th August, the British Air Staff sent a note to the French Air Staff in which they emphasised once again their doubts about the German army concentrating after the outbreak of war, and therefore about the value of attacking railways East of the Ruhr. They also expressed in some detail their estimate of the effort required as compared with the effect to

- 
- (1) 120-150 km
  - (2) See the French Plan - above
  - (3) The Committee suggested a zone boarded roughly on the West by Mons-Brussels-Antwerp - On the East by the Rhine, on the North by Flushing-Wesel, and on the south by Mons-Kaiserlautern.
  - (4) The Air Ministry Transportation Committee's order of precedence was:
    - 1. Viaducts. 2. Railway centres. 3. Embankments.
    - 4. Trains and Tracks.
 was quoted as a guide.

be achieved if the plan was put into operation<sup>(1)</sup> which brought them to the conclusion that it would be much more economical and effective to attack traffic centres.

At any rate until the outbreak of war, the plan then retired to the obscurity from which the British clearly wished it had never emerged. In this plan for the auxiliary offensive the Island power had much less confidence than the continental power.

(e) Plans for Attack on the German Army

The British attitude to the plan to attack rail communications threw into greater prominence other plans to check the

A.M. file  
S.1359  
Encl.12B

(1) Effort required to breach one railway line

Experiments had shown that a 250 lb. bomb bursting in the middle of a double track would cut both lines, but that if it burst to one side only one line would be cut, therefore for the purposes of argument two direct hits would be required to breach a double track.

A formation of six medium or three heavy bombers would therefore be required to make one breach, and these figures might have to be doubled in war time (see A.F.C(J)73 7).

British railway experts thought such a breach could be located and repaired in 4 hours. Therefore 42 raids per week would be necessary to keep one line cut, (or 252 medium or 126 H/B sorties). In the Japanese air attack on the Canton-Kowloon railway 718 sorties were flown during 103 days, 1490 bombs were dropped, but suspension of through traffic aggregated only 10 days.

FORCE AVAILABLE if War Began in early August

288 medium and 216 heavy bombers, at maximum effort (c.54 sorties per squadron per week). Mediums for 1st 3 days of war (A.A.S.F. on way to France) could fly 185 sorties, and in next 4 days 555. Therefore during the first 3 days of war the 8 available medium bomber squadrons could cut and keep out 17 railway lines and the 18 heavy squadrons another 77 lines. In the first week of war the whole of Bomber Command could cut and keep out 9 to 15 lines with an expenditure of 1199 tons of bombs (1 breach in each line) and there would be no chance in practice of sustaining the attacks through the night, or if the weather was bad through the day.

ENEMY DEFENCES

British Bombers would have to run the gauntlet of the enemy fighters covering the Ruhr.

DAMAGE

Only 15% of the bombs would hit the target. Therefore in a week 1,000 tons of bombs would fall in fields. (83% of the Japanese bombs dropped on the Canton-Kowloon railway did no damage).

A.M. file  
S.1359  
Encl. 7B

German advance through the Low Countries for the importance of endeavouring to do this was generally realised. Even the French had admitted that the British might be correct in their assumption that the German army would be concentrated West of the Rhine before the outbreak of war, and had suggested that in this event German army columns should be bombed as they moved up to the front.

A.M. file  
S.1132  
Encl. 2A

On the 17th April the D. of Plans informed the C.-in-C. Bomber Command that the problem of bombing German columns on Belgian roads was due for discussion at the Anglo-French Staff Conversations, and invited the C.-in-C's Comments, on this question (W.A.4b). The C.-in-C. Bomber Command thought that the idea of attacking the German columns was good, provided the Germans moved in daylight. He recalled the experiments which had been made on Salisbury Plain that winter, which indicated that machine gun attacks by fighter aircraft against ground troops were extremely effective. On the other hand he thought that fast modern bombers were not suitable<sup>(1)</sup> as if they flew at high level they would not see the target, if they flew at low level they would overshoot it, and if they flew at medium height they would be vulnerable to A.A. fire and to enemy fighter attack. He concluded that Battles, being manoeuvrable and having open cockpits from which the pilots could command a good view, would be the most suitable aircraft of Bomber Command to attack columns. Hampdens, Wellingtons and Blenheims could be employed against targets further to the rear, such as motor transport parks, railway rolling stock and so on. The C.-in-C. was in favour of the plan, but he doubted if he could employ more than a proportion of his bombers on it, and he still regarded the modified Ruhr Plan (W.A.5b) as the best method of checking the advance of the German army.

Ibid  
Encl. 3A

Ibid

The Bomber Command comments on the plan indicated that fighter cover for the bombers would be essential.<sup>(2)</sup>

A.M. file  
S.1132  
Encl. 11A  
or A.F.C(J)63

(f) "Plan D" Attaque Des Colonnes Motorisees Allemandes Envahissant La Belge Et La Hollande". The French Plan

At a meeting between French and British army and air force delegates to the Staff Conversations held at the War Office on 27th April, 1939, it was agreed that a German attack on the Low Countries would constitute a grave threat not only to France, but to Britain as well. In this event the primary role of Bomber Command was to be the stemming of the German advance. Within this scope it was further agreed that bomber objectives would fall into two classifications:-

- (1) "Permanent objectives," such as depots of fuel, ammunition and so on, whose attack could be planned in advance.
- (2) "Fleeting objectives" upon which attacks could not be planned in advance, as they would depend on reconnaissance at the time.

A.M. file  
S.1338/1  
Encl. 4B

Nearly a month later, on 22nd May, the French plan was sent to the Air Ministry in London. It consisted simply in a long list of "permanent objectives" and explained that the selection had lighted on villages and cross roads where congestion was most probable.

- (1) Blenheims had almost completely failed at the Salisbury Plain trials.
- (2) It was thought the French might contribute to this.



Ibid  
Encl. 8B

The War Office were somewhat sceptical about the French selection of targets. They considered that the French had ignored the possibility of the Germans using alternative roads of which there were many, but their criticism was not purely destructive. They suggested that more advantage should be taken of the Belgian proposed demolitions, and that bombing should aim to prevent the Germans repairing these. Although this suggestion was sent to the Air Ministry on 7th July nothing was done about it till 30th August.

Ibid  
Encl. 9B

Meanwhile, also on 7th July, Bomber Command poured cold water on the French plan. The Bomber Command comments assumed that the methods of delaying the advance would be either material damage to roads, material damage to enemy vehicles, or sustained attacks for moral effect.

Ibid

Roads it was said presented a small target which would call for low, and therefore hazardous attack. It was difficult to damage roads, and obstructions could rapidly be cleared.

Ibid

Enemy forces passing through bottle necks would be difficult to catch, and the problem of getting intelligence and then getting the aircraft over the target in time would be almost "insuperable". In any case the C.-in-C. was not attracted to the idea of employing Battles, Hampdens or Wellingtons against roads.

The moral attack would be impossible unless the whole of Bomber Command was employed as it was estimated that it would require six Squadrons to stop one defile for 12 hours.(1) The Bomber Command comments also examined the question of designating targets.(2)

(g) Delay at the Air Ministry. Target Designation and Belgian Demolitions

Ibid  
Encl. 11A

It was not until the 9th August, 1939 less than a month before the outbreak of War and more than six weeks after the French plan had been sent to the Air Ministry, that the D.D. Plans suddenly had a pang of conscience and suggested to

- (1) The D.D. Plans however was not convinced by these arguments, and pointed out that Wellingtons had been "a great success" against this type of target at the "Suffolk trials". He also thought that the Bomber Command comment had greatly over estimated the effort required to cause panic on the roads, and said that this "purely material and mathematical calculation" did not "consider the human or moral factor" (Pencil comments on Encl. 9B A.M. file S.1338/1).
- (2) It was of great importance that a clear system should be worked out since the whole plan depended upon the French army making calls on British Bomber Command. Despite the urgency of this little progress was made until the eve of the War, when it was agreed that the French should continue with their system and the British with theirs. Despite any assurances to the contrary, there was always the possibility of delay or error in this system, whose arrangement had so long delayed the whole plan.

Ibid  
Min. 13

Ibid  
Encl. 20A

the Senior Air Staff Officer, Bomber Command that "we should look a bit silly if the balloon went up with nothing settled" and asked him on these grounds to accept the French method of target designation as an interim arrangement. Bomber Command agreed, on the telephone, to this the next day, but the C.-in-C. omitted to confirm the arrangement in writing till 17th August.

Even more remarkable was the fate of the War Office suggestion about the Belgian demolitions. (1)

Ibid  
Encl. 21A

As late on 30th August the D. of Plans suggested in a minute to the D. of Intelligence (which was signed in his absence to "save time") that the most promising method of carrying out the plan was to exploit the Belgian and Dutch demolitions by "sustained bombardment," but the Belgian scheme which had been communicated to the British by General Van der Bergen "nearly eighteen months ago" did not describe the exact location or nature of the demolitions. The minute continued that it was of the utmost importance that this information should now be obtained. Thus eighteen months had been allowed to pass before a serious effort to improve on the knowledge given by General Van der Bergen was made, and fifty four days had passed since the War Office had emphasised its importance. In the light of subsequent developments this delay, which does not seem to have produced any censure at the time, was inexcusable, and even allowing for Belgian reserve, must be recorded against the credit of the Air Ministry Planning Staff. (2)

Ibid  
Encl. 40A

When the C.I.G.S. later (3) considered the possibility of the German attack, he was far from satisfied with the plans which had been made for Bomber Command in this event.

#### (h) Plans for the Attack on the German Air Force

It now remains to discuss the last of the plans within the scope of the auxiliary offensive idea. This was the attack on the German air force, which has already been dealt with in its relation to the counter offensive idea. (4)

A.M. file  
S 1132  
Encl. 1A

In the course of the discussion between the D. of Plans and Commandant Bailly on 5th April, 1939, Commandant Bailly had raised the question of planning to neutralize the German Air Force by bombing attacks on aerodrome surfaces and the German aircraft industry. As regards the latter, his proposition was that a specialised attack on production of J.U.88's (of which the French were particularly afraid) should be delivered. The D. of Plans first drew attention to the difficulties and then agreed to consider the matter.

Ibid  
Encl. 2A

The French point of view was that the attack should be delivered if it was found that the action of the German Air Force was impeding the operations of the French Army. The plan which the C.-in-C. Bomber Command was invited to consider on 17th April, 1939, was therefore a revival of W.A.1. with a different aim in view.

- (1) See above.
- (2) The Belgian Plan of Demolition was actually revealed to Britain within 3 weeks of the outbreak of war - see A.M. file S.1338/1 Encl. 1A.
- (3) On 11th Oct., 1939.
- (4) See above p. 308.

Ibid  
Encl. 3A

This change of aim however made little difference to the by now historic dislike of Bomber Command for this plan, and in a comment sent to the Air Ministry on 22nd April Bomber Command condemned it. It was said that the Netheravon trials had demonstrated that the weight of bombs required to put aerodromes out of action<sup>(1)</sup> was beyond all possibility of achievement and that even if this was possible the result would be no more than a "problematical delay of short duration." Also the Air Ministry did not even know the location of many German aerodromes.

(i) Note by Plans 2 on W.A.1 and its Relation to Reducing Air Attack on the French Army. 25th April, 1939

Ibid  
Encl. 8A

On 25th April, 1939 Plans 2 summarised the position by recalling that plans had already been formulated for the attack on the German Air Force by bombing:-

- (1) The eight factories producing completed air frames.
- (2) The six ball bearing factories.
- (3) The seven aluminium plants.
- (4) Approximately fifteen principal component factories.

If this plan succeeded the effect would not be immediate enough to relieve the pressure on the French army at the outset. A plan which would produce immediate results was therefore called for.

Ibid

This meant that an attack would have to be made on either:

- (1) German aircraft in the air.
- (2) German aircraft on the ground.
- (3) Aerodromes.
  - (a) Surfaces
  - (b) Facilities
  - (c) Fuel and bomb stores.

Ibid

It was thought the R.A.F. could not succeed in an attack on aircraft in the air, as, with its limited resources, it would hardly gain the necessary measure of air superiority.<sup>(2)</sup> A report that the French had invented an air mine<sup>(3)</sup> however aroused some interest in this connection. The results of attacking aircraft on the ground, it was thought, would be "doubtful" and the risk to bombers undertaking the raids would be great. It was also thought that there would be too many and too widely dispersed targets to make the attack practicable. Similarly the attack on aerodrome surfaces was considered impossible.

- (1) Four hundred-250 lb. bombs to put one aerodrome out of action. For further details see below, Chapter 8.
- (2) For an excellent definition of "Air Superiority" see an article by Air Vice Marshal R.M. Drummond entitled "Air Superiority" in No.13 Royal Air Force Journal, Middle East Edition.
- (3) The "TESSONIER".

Ibid

The attack on aerodrome equipment and personnel was however thought to offer a better target, and it was considered that this form of attack would "contribute towards the aim".

Ibid  
Encl. 3A

The fact had to be faced that the C.-in-C. Bomber Command and the Air Ministry were in substantial agreement that only a "problematical delay of short duration" could be achieved by an attack on the German Air Force, and that Bomber Command was no more capable of reducing the scale of air attack on the French army, than of averting the "knock out blow" against Britain.

#### The Auxiliary Offensive: Conclusions

French enthusiasm for the three auxiliary offensive plans was damped by British realism. There can be no doubt that the French had not taken sufficient account of the practical limitations of bombing. In so far as this was true the attitude of the British Air Staff was wise and timely. The two countries were about to be engaged in war. In 1940 they were subjected to the full onslaught of a German offensive. It is therefore important to place on record that the French had been warned of the limitations of air support. Like Poland, France was told in so many words that a land attack must be met by land forces, and that an air attack could not be checked by a counter attack from the air force while it was weaker than the enemy's.

The question remains, did the British fully appreciate the urgency of the French requests and if not, would they have altered their plans if they had done? The answer seems to be that it was the real limitations of the force available, coupled with the conservation policy which governed planning, rather than a lack of imagination.

#### The Illegal Or Unrestricted Plans: Summary And Conclusions

It can now be seen that these plans fall into three groups, that of the independent offensive, the counter offensive, and the auxiliary offensive. Of these the counter offensive and the auxiliary offensive ideas were essentially of short term, or immediate, significance, whereas the independent offensive plan was in its effect at least long range. Further the counter and auxiliary offensives were defeat averting plans, and the independent offensive was a war-winning plan. Since, in the last resort, it is more important to avert defeat than to secure victory<sup>(1)</sup> the defeat averting plan was at any rate initially the more important of the two conceptions. If defeat could be averted, it would be possible later to work out war-winning plans in the light of contemporary fighting experience. This implies that since the initial task of the relatively weak Western powers was to avert defeat, the independent offensive plan tended to be academic and tentative, while the defeat averting plans were realistic. This is some explanation of the confidence shown by the Air Staff in the Ruhr Plan, as compared with the absence of it in the communications plans.

The expectation in September, 1939 then, was that Bomber Command could not avert initial defeat, either in Poland, France, or from the air, in Britain. As far as the Air Force was concerned this latter must be a task for

(1) At any rate from the point of view of the power which has the weaker forces, and does not possess the initiative.

Fighter Command. On the other hand it was thought that eventually Bomber Command might make a significant, and indeed decisive contribution to victory. (1)

This conclusion confirms the wisdom of the bombing policy. It was obviously a British interest to secure the "maximum immunity" from air bombardment until such time as defeat had been averted, and Bomber Command could be launched on a war winning offensive.

Thus the connection between bombing policy, the policy to conserve the 1939 force and the decision to give immediate priority to Fighter Command is demonstrated and justified. Hence the necessity of the legal plans.

#### (8) Note on other Plans

It must be recorded that there were some other plans for Bomber Command in war. These were for an attack on special warlike stores (W.A.8), an attack upon German merchant shipping, especially in the Baltic (W.A.10), an attempt to set Forests and Crops in Germany on fire (W.A.11), and an attack upon Berlin and other administrative centres in Germany. (W.A.13).

A.M. file  
S.41432  
Encl. 79B

Ibid

Of these the first clearly required precise information which was not available in peace time, and it was therefore decided that nothing could be done about this plan until after the outbreak of war. The second and the fourth of these plans could not be carried out on account of the extreme distance of the targets, until aircraft of longer range were available to Bomber Command. An Air Targets Appreciation on the plan to attack merchant shipping was produced before the war, but little more was done, and as far as the attack on Berlin was concerned nothing was done at all.

The attack upon forests and crops was later to attract a great deal of attention, but since most of these developments came after the outbreak of war they need not be further mentioned here.

A.M. file  
S.46344  
Passim

#### Plans For Bomber Command In War: Conclusions

A letter of 23rd August, 1939 from the Chief of Air Staff to the Commander in Chief Bomber Command pointed out the limitations of peace time planning from the point of view of the weaker air power. "A simple solution on the lines of a short directive saying put this or that plan into effect forthwith" might not, the C.A.S. thought, be possible. The initiative would not be with Britain "so that our plans must to some extent be dependent on the initial action of the enemy."

A.H.B.  
11/43/98A  
Encl. 4A

Ibid

If the Germans remained on the defensive in the West Britain would gain the advantage of a "breathing space", but it would also throw upon her the onus of starting offensive action in the West. The C.A.S. continued that "It would be manifestly unwise to expend a high proportion of our best aircraft and crews at the very beginning when there are so many unknown factors in air warfare of which we have to gain experience." "This would be all the more undesirable during a phase when for political reasons, we are confined to a course of action which is neither economical nor fully effective."

(1) Judgement on this expectation is a matter for subsequent volumes of this Narrative.

Ibid  
Encl. 2A

The Air Staff entered the war with the intention of doing practically nothing with Bomber Command beyond dropping leaflets, performing reconnaissance, and possibly dropping a few bombs on aerodromes and ships at sea. The conclusion was that it would not be worth sending out aircraft to bomb on a large scale within the limitations of the Rules of 22nd August, 1939, and that it would be better to await the removal of these restrictions before changing the policy of conservation. It was realised however that something more might have to be done, if only to meet public demands for action.

This was Bomber Command's darkest hour, and it called for courage to persevere with the long range plans for the 1941 force. Fortunately this courage was not lacking.



CHAPTER 8INTELLIGENCE: AN ASPECT OF POLICY AND THE BASIS OF PLANNINGIntroduction

Intelligence is not a self contained subject as it covers the fields of both planning and policy, which have received separate attention in the first two chapters of this narrative. It is, however, of such great importance that it is worthy of special treatment. Good intelligence is often the key to success, and bad intelligence is equally often the explanation of failure. Obviously no study of Bomber Command before the war could be complete without some examination of intelligence, which was an aspect of policy, and the basis of planning.

As has been seen, the major lines of bombing policy were determined by the consideration of the possibility of a "knock out blow" being delivered by the Germans. The policy decided for the initial phase of the war was to secure the maximum immunity from bombing, but this conclusion could not have been reached without the services of intelligence. The capability of the German Air Force to deliver a "knock out blow" was a matter of intelligence, and the counter action open to the R.A.F. was also a matter of intelligence in so far as the results of a bombing offensive were concerned. Thus policy leant on intelligence.

Planning clearly could not have begun without an idea of what to attack. It was just as important to form a clear picture of vital targets as it was to build the aircraft, design the bombs and train the crews to carry out the attacks. A powerful air force which lacked intelligent direction would hardly be a military weapon at all.

The British Air Targets Intelligence organisation was called upon to envisage Germany at war, and to advise the Air Staff as to the best methods of directing the bombing offensive of the R.A.F. It was for the planners to decide in what ways this offensive could be executed, or whether it could be executed at all.

It is the object of this chapter to examine the development of the intelligence organisation, the evidence which presented itself, and broadly, the conclusions which were reached.

The validity of the conclusions, or the extent to which they were acted upon cannot be judged in a narrative which closes on the opening day of the war. There is however, an overriding consideration which should be kept constantly in mind, and this is the ratio between the importance of intelligence and the strength of the bomber force available. In 1939, when Bomber Command was weak, relative to the German air striking force, there were many considerations apart from target intelligence which governed the selection of targets. There was, for instance, the fear of retaliation, and the need to conserve the force. At a later stage of the war, when Bomber Command had been expanded almost out of recognition, and when it was allied to the United States Air forces, these considerations became substantially inoperative, and the selection of targets could be based more upon pure target intelligence. Thus the conclusions which were reached by the intelligence organisation before the outbreak of war, though they have an



intrinsic interest, are of much greater importance as the embryo of bombing strategy when Bomber Command was able to develop full power. The critics of target intelligence are more likely to concentrate on the second rather than the first half of the war.

#### The Machinery of Intelligence

D.C.O.S.4

On New Years Day 1936 the Deputy Chiefs of Staff issued a report at the request of the Chiefs of Staff in reply to a suggestion that the time had come to create central machinery for the co-ordination of intelligence.

The report stated that the field which had to be covered by intelligence had been "almost immeasurably extended and complicated" because modern war involved the whole resources of nations, and the battle zones had been greatly extended by the introduction of the air arm as a military weapon. The Deputy Chiefs of Staff thought that the intelligence organisation of that date required "some modification to cope with modern conditions".

1st January, 1936 therefore provides a convenient date at which to start a study of the organisation of the intelligence service which was to guide Bomber Command at the outbreak of war rather more than three years later.

#### Review of the Position in 1936, and the Recommendations made by the Deputy Chiefs Of Staff

Ibid

In 1929 the Sub Committee on Industrial Intelligence in Foreign Countries (F.C.I.) had been set up. It was composed of representatives of the Treasury, Foreign Office, Board of Trade and the Service Ministries, and its terms of reference were:

- (1) To establish direct liaison for the interchange of information and reports in regard to industrial intelligence in foreign countries between the Board of Trade and the Service Departments.
- (2) To deal with all matters arising out of this interchange which might require joint discussion, and
- (3) To discuss the significance of the more important information.

In addition to this committee, it has been found that a permanent whole time staff was necessary to work on this "vast and complex problem", and to meet this requirement the Intelligence Centre had, in 1931, been established.

Since 1934 there had been "considerable inter departmental discussion on the arrangements necessary for the central collection, collation and interpretation of intelligence relating to air targets in foreign countries". The Deputy Chiefs of Staff now thought that the aim of such an organisation should be to ensure that the Defence departments were in possession of such information as would enable them to direct the airforces in such a way as to "obtain the maximum effect on an enemy nation, by means of air attack against those objectives the destruction or dislocation of which the government consider would contribute towards the attainment of the national aim". They thought that this task was beyond the scope of the existing intelligence sections of the Service Departments. It was, however, thought that existing machinery could be adapted to meet the requirement, and it was therefore suggested that the task should be entrusted to the F.C.I.

The Deputy Chiefs of Staff therefore recommended that the scope of the F.C.I. should be enlarged to include the question of air targets intelligence, and that it should set up sub-committees to consider the various groups of targets, and in addition that an inter-service intelligence committee should be established.<sup>(1)</sup>

C.I.D.  
273rd mtg.  
Min.4

The report of the deputy chiefs of staff was approved by the Committee of Imperial Defence on the 30th January, 1936, when Lord Swinton made the further point that the Defence Departments should have more money made available for the development of their intelligence sections. Thus, if the way was not yet clear for the formation of a Ministry of Economic Warfare, the adoption of this report did mark a stage in the development of the machinery of intelligence. The question of air targets intelligence was now to receive individual attention.

#### Development of an Air Targets Intelligence Organisation

F.C.I.84

The Air Ministry responded to the suggestions of the Deputy Chiefs of Staff on 18th March, 1936. The idea of setting up a number of sub-committees to study the various groups of targets did not recommend itself to the Air Ministry who thought that this might result in an "unwieldy organisation". It was thought that this idea should be limited to the establishment of a sub-committee on oil, and that from this experiment experience could be gained before any more such committees were established.

The Air Ministry stated that the type of information they required was that concerning industry generally, its general location, strength, and dependence on other industry and imports, and so on. Further, they wanted precise information regarding the exact location of factories, the type of the buildings, and the defences. The Air Ministry was anxious to maintain a close liaison with the proposed sub-committee on air targets.

F.C.I.  
(Sub)2

A few days later in a second memorandum dated 31st March 1936 the Air Ministry made further recommendations. It was suggested that the F.C.I. should be concerned only with the selection of targets for registration by the Air Ministry, and that it should delegate to a sub-committee the question of the priority of the targets. For registration purposes, it was thought that targets should be divided into two categories: civil and military. Military targets would be dealt with primarily by the service departments. It was suggested that the study of targets should proceed in three stages. First the information should be collected, secondly it should be interpreted, and thirdly that an appreciation on a group of targets should be presented to the Air Ministry to assist in the preparation of plans. It was pointed out that existing reports of the Industrial Intelligence Centre would provide much useful data from which more detailed work might proceed. The note ended with a

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(1) On 30th June 1936, the Chiefs of Staff at their 178th meeting approved proposals which had been put forward to enlarge the functions of the Joint Intelligence Committee (J.I.C.). In future the J.I.C. was to work in close co-operation with the J.P.C., and the J.P.C. would be in a position to ask the J.I.C. for specific intelligence in connection with the particular plan they had under consideration. (See J.I.C.I.).

demand for more detailed information. "Much more detailed information is required before any decisions by the defence services could be taken regarding the right targets to attack in any given set of circumstances.... it is this detailed information which is so vital and without which it will be impossible for right decisions to be taken".

F.C.I.  
(Sub) 1

Meanwhile the F.C.I. had on 26th March, 1936 considered the report of the Deputy Chiefs of Staff, and had decided to set up a special sub-committee to consider how best these recommendations could be put into effect. Two representatives of the Air Ministry were appointed to this committee.

F.C.I.  
(Sub) 3

The report of the special committee, issued on 22nd April, 1936, reiterated the points made by the Air Ministry memoranda, and formally suggested that a sub-committee of the F.C.I. should be established to consider the question of air targets. The suggested sources of information were:

The Industrial Intelligence Centre,  
Government departments,  
Individual business men,  
Industrial research departments,  
Specialists with a knowledge of the country concerned,  
British and foreign trade journals,  
The Secret service.<sup>(1)</sup>

(a) Creation of the Air Targets Sub-Committee

F.C.I.89  
Encl.

On 9th June 1936, the F.C.I. reported that they proposed to appoint a sub-committee on air targets (F.C.I.(A.T.)) and that its terms of reference should be "To supervise the co-ordinated interchange of information and reports between the Defence Departments and other departments concerned in regard to air targets intelligence in foreign countries". The Chairman of this sub-committee was to be the Comptroller General, the Department of Overseas Trade,<sup>(2)</sup> and the members were to be, The Deputy Director of Naval Intelligence, Admiralty, The Deputy Director Military Operations and Intelligence, War Office, The Deputy Director Intelligence, Air Ministry, and the Head of the I.I.C. The Joint secretaries were to be an Air Ministry official and one of the assistant secretaries of the C.I.D.

The collection and collation of the information was to be done by the Air Ministry official, and in the initial stages work was to be confined to Germany so that experience might be gained before extending the field of studies to other countries. No priority was to be laid down as to any particular group of targets.

Ibid

This report was approved by the Minister for the Co-ordination of Defence, and on 26th June the F.C.I. (A.T.) came into being.

(b) The abolition of the Air Targets Sub-Committee

It will have been noticed that the Air Ministry had shown great interest in the establishment of the machinery for the co-ordination of intelligence regarding air targets.

(1) This list should be borne in mind when the reports are considered as they seldom divulged the sources of their information.

(2) Sir Edward Crowe.

D.C.O.S.4.

It is also apparent that the Air Ministry exercised a great deal of influence over the decisions which were taken.<sup>(1)</sup> The Air Ministry clearly regarded the whole matter as their own preserve over which they had no intention of relinquishing control. They had however to face the fact that in the opinion of the Deputy Chiefs of Staff the Service Intelligence sections were not in themselves adequate to deal with the problem.

This did not, in fact, commit the Air Ministry to adhere to the experiment of the Air Targets Sub-Committee which had been set up as a result of the report of the Deputy Chiefs of Staff.

J.P. 265

A dispute about the functions of the Air Targets Sub-Committee arose on 3rd February, 1938, when the Joint Planning Sub-Committee (J.P.C.) criticised the Air Targets Sub-Committee for anticipating the views of the three service departments. The J.P.C. pointed out that the Admiralty, War Office and the Air Ministry were not prepared to commit themselves, before the event, to the conclusions which had been reached in a report on Air Targets in Germany compiled by the Air Targets Sub-Committee.

F.C.I. (A.T.)  
16

As a result of a further point arising out of the comments of the J.P.C. the head of the Industrial Intelligence Centre, who also served on the Air Targets Sub-Committee, suggested that it was reasonable that the Air Ministry should have full power to determine the weight of bombs required and the other technical matters concerned with the attack on specific targets, but he thought that the question of the assessment of the probable effect of the bombing was a matter beyond the scope of the Air Ministry and should be dealt with by the Ministry of Economic Warfare when it came into existence, and by its nucleus in peace time.<sup>(2)</sup>

A.M. file  
S.45752  
Encl.1a

At their fourth meeting held on 28th July, 1938, the Air Targets Sub-Committee resolved that their reports should consist purely of "actual information arranged in the most convenient form", that the report should then be sent to the Air Ministry who would examine it and determine the practicability of the recommendations and the "physical" effects likely to be achieved. Finally the report was to be submitted to the J.P.C. who would put it into final form.

Ibid  
Encl.7a

The Air Ministry were not agreeable to this suggestion, and, having waited until the Munich Crisis was over, then replied in November, 1938 that in their view the proper procedure, which they claimed was already in force, was that the A.T.B., or when it came into existence the Ministry of "Economic Pressure" (sic) guided by the advice of the Industrial Intelligence Centre should lay down the "general class of objectives" which were to be attacked. Within these groups the actual targets were to be prepared by an

(1) For instance two notes by the Air Ministry dated 18th and 30th March respectively commenting on the proposals of the Deputy Chiefs of Staff had been largely incorporated in the report of the Special Sub Committee set up to make recommendations on the question of air targets intelligence.

See above page. 325.

(2) Or in other words by the Sub-Committee on Economic Pressure. See below p. 330.

Air Ministry Official<sup>(1)</sup> acting on the advice of the Industrial Intelligence Centre and the Service departments. His report would then be submitted to the Air Targets Sub-Committee which would do no more than amend it and pass it on to the J.P.C. who would issue it in final form. At this stage "the Air Ministry Official" in his capacity as Head of the Air Ministry Target Intelligence Section would examine "in great detail" the targets within the groups, and arrange them in order of priority. In this task he would consult the Air Staff, and if necessary could call an ad hoc sub-committee, as he had in fact done to deal with the question of transportation targets. After this the planning stage could be begun.

Thus the Air Ministry somewhat curtly informed the Air Targets Sub-Committee that, in their opinion, there was no useful function which they could fulfil, and indeed that they had already virtually ceased to exist.

Ibid  
Mins. by  
A.I.I.(b)

Meanwhile the Air Ministry having decided that the Air Targets Sub-Committee had "overstepped the mark" decided to "let sleeping dogs lie" and take no further action unless the C.I.D. took up the matter. De facto the Air Targets Sub-Committee had therefore ceased to exist in November, 1938 or earlier.

Ibid  
Encls. not  
numbered

The matter was regularised by a further exchange of letters in June 1939. On 1st June the Secretary of the Air Targets Sub-Committee asked the Air Ministry to say whether his committee was of any further use. Four days later the Air Ministry replied that it was not, and that it should be disbanded forthwith. The letter went on to say that experience had now shown that the Air Ministry Intelligence Section was capable of drawing up reports on industrial intelligence, and that they had already done so, and consequently that the recommendations of the D.C.O.S. in 1936 no longer applied. In future, as in the past, the work of compiling these reports would devolve upon the Air Targets Intelligence Section of the Air Ministry, working in co-operation with the Industrial Intelligence Centre.

(c) The Increased importance of the Air Ministry Intelligence Section

Thus, even before the formal dissolution of the Air Targets Sub-Committee, the Air Intelligence Section of the Air Ministry was in a powerful position, which was a remarkable development in view of the Deputy Chiefs of Staff recommendation in 1936 that the organisation was inadequate to cope with the problem.

Ibid  
unnumbered

The working of this intelligence section of the Air Ministry was overhauled at the end of 1938, and on 10th January, 1939 in a minute addressed to the Deputy Director of Intelligence the head of the section emphasised the need to increase his staff, and complained about the attitude of the Treasury to this matter. He said that it was difficult for anyone who had not experienced the "specialised intelligence work" which was being done to appreciate the "very extensive and constant enquiries and study demanded by it". It was, he said, "a scientific investigation and study in every sense of the word and the basis of war planning".<sup>(2)</sup>

(1) See Conclusion (e) F.C.I. 81

(2) Underlinings by the Narrator.

As will be seen subsequently the final reports on the question of air targets in Germany were issued from the Air Ministry Intelligence Section, though it should not be forgotten that a considerable number of conclusions had been reached by the Air Targets Sub-Committee.

(d) Conclusions

The important point about this episode in the story of the organisation of intelligence is that it demonstrates the progress which had been made since 1936. The creation of the Air Targets Sub-Committee was really an admission that the existing machinery was inadequate, but the need for some really drastic reform was not then recognised. Only when this was seen did the Air Targets Sub-Committee appear in its true aspect as an inadequate makeshift. The way was now clear for the creation of the Ministry of Economic Warfare and for the establishment of direct contact between it and the Service departments.

The Origins of the Ministry of Economic Warfare

It might appear that the action of the Air Ministry in disbanding the Air Targets Sub-Committee was a reactionary step, and that in assuming responsibility for the preparation of target intelligence reports themselves, they were undertaking something which, according to the Deputy Chiefs of Staff, had been found to be impossible in 1936.

Things were not, in fact, as bad as this. The Air Ministry did not challenge the principle of an overriding decision as to the selection of the group or class of target that it would be most desirable to attack. They did not even claim that it was within their province to determine the priority of the various groups. They merely claimed that they, and Bomber Command, should be allowed to determine the technical details, and that they should be empowered to select the detailed targets within the groups.

The fear that the Air Ministry regarded it as within their province to determine the effect of attacks upon the German economy therefore proved to be a false alarm. The Air Ministry claimed they could assess the probable material damage but they did not suggest that the decision as to the general effect upon the enemy economy as a whole was within their scope. This they tacitly agreed should be a matter for some overriding body for example the Ministry of Economic Warfare, when it came into existence.

The fact therefore emerges that in 1938 there was dissatisfaction with the arrangements which had been made in 1936, but that the principle of co-ordinating machinery had not been abandoned. Expert supervision was needed to direct general policy, and the Air Ministry would work out the details in its intelligence section, and then make the plans in conjunction with Bomber Command.

(a) The Industrial Intelligence Centre

Already in 1936 it had been reported that the Industrial Intelligence Centre (I.I.C.) had been working "very satisfactorily" since 1931. This was a central organisation intended to give advice to the numerous bodies which were working on the various aspects of industrial intelligence.

A.M. file  
S.45752  
Encl. 7a

F.C.I.(A.T.)  
16  
Ibid 17

D.C.O.S.4

C.I.D.  
1442-B

In 1938 it was reported that the scope of the I.I.C. was expanding. By that time it had concerned itself with the collection of information on economic matters, drawing up plans for the Ministry of Economic Warfare, preparing the work of that Ministry by considering actual plans of economic warfare, and acting as a general adviser and instructor on economic and defence matters to the Imperial Defence College, and the three staff colleges. The head of the I.I.C. served on most of the committees which were set up to study problems connected with industrial intelligence, and he therefore had a good knowledge of the relationship between planning and intelligence, as well as a grasp of the views of the Air Ministry on the problem as a whole.

In its comprehensive activities the I.I.C. was an example of the central organisation which was needed. It was, however, under the auspices of the Sub-Committee on Advice on Trade Matters in War (A.T.B.) that the nucleus of the Ministry of Economic Warfare was to come into being.

(b) The Reconstitution of the Sub-Committee on Economic Pressure

C.I.D.  
1338-B

The Defence Plans (Policy) Sub-Committee of the C.I.D. had recognised the need for an overriding body, and had accordingly instructed the F.C.I. to review the arrangements which had been made for the preparation of intelligence in a war with Germany.

A.T.B. (E.P.G.)  
1

On 2nd July, 1937, The Sub-Committee, which had in consequence been set up, issued its first paper. The terms of reference of the Sub-Committee on Economic Pressure on Germany (A.T.B. E.P.G.) were "To consider the problem of exerting economic pressure on Germany in the event of war with that country in 1939 and to draw up definite plans. Initially the investigations should be based on war between Germany and Great Britain, France and Belgium, consideration afterwards being given to any modifications that would arise in the event of Holland, Czechoslovakia, Poland and Russia becoming allies of Great Britain, or of Italy becoming an ally of Germany".

F.C.I.  
121

On 30th June 1938 it was reported that this committee had started drafting plans for economic warfare. The nucleus of the Ministry of Economic Warfare had come into being, but the problem of organising the Ministry itself remained.

(c) Plans for the Ministry of Economic Warfare

A.T.B.166

In February, 1938, the A.T.B. suggested that, contrary to the view of the Board of Trade, an independent Ministry of Economic Warfare would be necessary in war time. They recommended that it should be under the control of a Cabinet Minister, and that it should be responsible for the "initiation of plans and the direction of policy in regard to economic warfare as a whole". The duties of the Ministry, it was suggested, would include the collection and collation of information regarding the enemy's industrial and economic position and the estimated effect on it of the various forms of economic pressure. The Committee of Imperial Defence adopted this report on the 4th March, 1938.

A.T.B.167

M.E.W. (O.C.)  
13

On 20th June, 1938, more specific proposals were made by the Ministry of Economic Warfare organising Committee as to the staff requirements and detailed working of the proposed Ministry. The total staff of the Intelligence department was to be seventy-eight, excluding executive and clerical officers,

and it was intended to absorb as a nucleus the entire intelligence staff of the I.I.C. which numbered seventeen.

It might be expected that the formation of a Ministry of Economic Warfare would have been a matter of close concern to the Air Ministry, and that the plans for the Ministry would have taken account of the possibilities of bombing. This however does not seem to have been the case, for in the plans for the organisation of the Ministry there was included no direct representative of the Air Ministry, and the whole organisation would appear to have been designed almost exclusively to manage the naval blockade and allied problems. Indeed the term "Ministry of Economic Warfare" had only been substituted for that of "Ministry of Blockade" in deference to the legal complications of the term blockade.<sup>(1)</sup>

(d) The Scope of the Ministry of Economic Warfare.

C.I.D.  
331st. mtg.  
Min.5

This raises the whole question of the scope of the Ministry of Economic Warfare. At a meeting of the C.I.D., held on 27th July, 1938, to discuss the recommendations which had been made by the A.T.B. for the organisation of the Ministry, Mr. Walter Elliot, who was the chairman of the Economic Pressure Sub-Committee, said that "severe economic pressure on Germany could only be exercised through a system of rationing neutral countries". This view was not entirely welcome to all the others attending the meeting, and the Treasury representative, for instance, pointed out the difficulty of dealing with neutrals, when it was considered so important that they should not be driven into the arms of Germany. No one however suggested any other way in which economic pressure might be exerted on Germany. Mr. Elliot's remarks, then, tended not only to circumscribe the activity of the proposed Ministry, but to limit the application of economic warfare to one of its aspects only.

A.T.B.197

If however the air weapon, as an adjunct to economic war, was largely ignored, it was not completely overlooked. There was one short section in the Handbook on Economic Warfare devoted to air action. This, after pointing out that His Majesty's Government could never initiate an air attack on civilians, and that bombing policy would accordingly depend upon the action of the enemy, and would in any case be purely retaliatory, recorded that plans had been made for the attack by Bomber Command on objectives which would have economic significance. It was not thought necessary to describe these plans, but a note of warning was struck when it was said "It must, however, be emphasised that air action against economic objectives, if employed at all,<sup>(2)</sup> can be most effectively employed only if carefully related to the development and effects of other forms of economic warfare. If, for instance, contraband control and agreements with neutrals fail to prevent the enemy from obtaining adequate supplies of, say, oil seeds, the bombing of crushing mills will achieve the same ends by rendering supplies of the imported raw material useless". It was added in conclusion that the Minister of Economic Warfare would keep in close touch with the Air

(1) The A.T.B. had recommended the adoption of the term Ministry of Economic Warfare, saying that it was "advisable" to avoid the use of the word "blockade".

(2) Underlining by Narrator.



Ministry and would make recommendations on the selection of targets.

(e) Conclusions

It thus appears that the policy restricted bombing exercised an adverse effect upon the development of the Ministry of Economic Warfare from the point of view of the air weapon. There was a vague realisation that economic ends might be achieved by bombing, but in the plans for the Ministry of Economic Warfare mention of this was rare, and always in the most general terms.

As had been seen in Chapter 7 of this narrative, the restricted bombing policy did not unduly stunt the development of "illegal" plans, and it is therefore all the more remarkable to find that, in so far as the central body was concerned, this same policy did seem to have a markedly stunting effect on the collecting of intelligence for those "illegal" plans.

The Organisation and Machinery of Intelligence: Summary and Conclusions

In 1936, when the whole question of air targets intelligence came up for review, the real needs were for more attention to be given to the selection of targets for Bomber Command, and for the creation of central machinery to handle the problem. The creation of the Air Targets Sub-Committee did at least indicate that the question of air targets intelligence was in future to receive special attention. The problem of creating a central machine to co-ordinate the bombing attack with other methods of economic warfare was substantially left unsolved. As has been seen the Ministry of Economic Warfare was envisaged primarily as a Ministry of Blockade, and the air weapon received only slight attention in the committees which were the nucleus of the war time Ministry of Economic Warfare.

This meant, especially after the dissolution of the Air Targets Sub-Committee, that the collection of intelligence for Bomber Command became almost exclusively an Air Ministry responsibility. The desire to have an overriding body capable of directing the general selection of target groups which would be co-ordinated with other considerations did not yield significant results.

Intelligence for Bomber Command in War

The Evidence

It is the purpose of this section to examine the evidence put before the Air Staff by the intelligence organisation, which was available to assist in the making of plans for Bomber Command in war.

Broadly speaking this evidence can be reduced to three heads:

- (1) Historical evidence: An examination of the results of bombing in the Spanish Civil War and the Sino-Japanese Hostilities.
- (2) Experimental evidence: An examination of the results of bombing trials which could be carried out in peace time.

- (3) Research evidence: An examination of the German war machine, made up of a study of German industrial, economic, political and military life.

Under the first two heads an idea of the effects of bombing could be achieved, and applied to the third, which concerned the selection of targets in Germany. These three forms of evidence were therefore closely linked, and errors made under the head of historical evidence for example, would have a cumulative effect by the time they were applied to the third head.

Historical Evidence: The Spanish Civil War and the War in China

D.C.O.S.  
100- (J.I.C.)  
App. XVI

The evidence of the wars in Spain and China had the recommendation that they were contemporary, and in the case of Spain, of showing the German and Italian airforces in action, albeit on a small scale. Some useful evidence from these contemporary theatres of war might be expected, but its limitations had to be repeatedly borne in mind. This was indicated by a British observer in Spain<sup>(1)</sup> who thought that the results of bombing by "a competent enemy possessed of adequate means to keep up a sustained attack" would hardly bear comparison with what he described as the "hopeless ineffectiveness" of attacks he had witnessed upon Barcelona and Valencia.

A careful study of the two wars was made by the Joint Intelligence Sub-Committee, and the Deputy Chiefs of Staff issued a series of reports on 10th June, 1939, incorporating the conclusions which were reached.

(a) Air attack on industry in Spain and China<sup>(2)</sup>

D.C.O.S.  
102 (J.I.C.)

Originally the Joint Intelligence Sub-Committee had intended to compile a report on the effects of air attack on agriculture, industry and labour. This however proved to be impossible as no concerted attack upon industry had been made in either country. The main object of bombing in Spain and China had been to attempt to dislocate the enemy ports of entry, through which supplies of foreign arms, essential to both sides in Spain, and to China, might be brought. General Franco did not aim to do widespread damage to the capital equipment of the country which he intended to rule. In both countries the main use of the air forces had been to further the aim of the land forces. Neither Spain nor China was a highly developed industrial country,<sup>(3)</sup> and in Spain most of the original armaments works had fallen into Franco's hands at an early date, since when the Government air force had made little or no attempt to bomb them, thus depriving the Joint Intelligence Sub-Committee "of much useful war evidence regarding the degree of dislocation to be effected by air attack on such objectives".

(1) The British Consul in Valencia.

(2) The period covered was July 1936 - December 1938 in Spain and July 1937 - December 1938 in China.

(3) For instance Chinese Steel production in 1934 was 50,000 tons compared with the United Kingdom figure of nearly 9,000,000 tons in the same period.

Ibid

In China the Japanese attack upon industry had been limited to a few raids on factories from which "no useful conclusions" could be drawn. The Nationalist Air Force had however made a number of attacks upon fuel reserves and factories in Spain. Twenty five known attacks had been made on ten different centres of oil reserves, but it was impossible to gather any evidence of the effect of these upon the fuel position of the Government. In any case the attacks appear to have ceased after July 1938.

Approximately one hundred small attacks had been made on factories in Spain. The pilots appear to have been given a certain amount of latitude in the selection of the targets, and the attacks were usually "spasmodic". The only sustained attack was on the steel works at Sagunto<sup>(1)</sup> but, in the opinion of an R.A.F. officer who visited the place in February 1938, "the repeated attacks had apparently not appreciably reduced the output of steel, which at the time was averaging three hundred and sixty tons a day. The attacks were not sufficiently heavy to cause major destruction, and not sufficiently maintained to prevent repair". Information regarding specific raids was said to be "meagre" and "conflicting". The Nationalist airforce had made no attempt to destroy any of the approximately two hundred and twenty power stations, which, at the end of the first year of the war, still remained in Government hands, and similarly no attempt had been made to interfere with agriculture. Workers had been forced to evacuate their homes in some places but it was thought that there was no evidence that this had any effect upon industrial production.

The conclusion was accordingly drawn that there was very little analogy between the wars in Spain and China and any future war between Great Powers in so far as attack upon industry was concerned.

(b) Air Attack on Sea Communications in Spain and China

D.C.O.S.  
100 (J.I.C.)

The air efforts against sea communications by the Republicans in Spain, and by both sides in China was small and no useful conclusions could be drawn from them. The evidence was therefore confined to the Nationalist attacks in Spain.

At the beginning of the Civil War the Nationalists did not possess a sufficiently large air force to undertake an air blockade of all the ports in Government hands. They therefore concentrated on the attack on merchant ships at sea.<sup>(2)</sup> By October, 1937 General Franco's land forces had occupied all the Government's ports on the North coast, thus narrowing the limits by which Government shipping could enter Spain to the Mediterranean ports. In November, 1937

- (1) Fifteen attacks were made upon the Steel works at Sagunto between 11th April, 1937, and 27th October, 1938. Usually these raids were carried out by groups of from one to five bombers, most of which seem to have been Italian Savoia S.79 and S.81. On one occasion (13th January, 1938,) three S.79s dropped forty-eight 100 kg. and twenty-four 20 kg. bombs. (100 kg=approx. 220 lb.)
- (2) This policy resulted in international difficulties and the enforcement of the Nyon agreement in September, 1937.

the Nationalists appear to have decided on the policy of attempting to blockade from the air those ports remaining under government control. (1)

The J.I.C. report considered the results of this bombing offensive under two headings: direct, and indirect. They considered that they had a certain amount of firm evidence about direct results, but the evidence about indirect results, which they considered the more important of the two, was meagre.

(i) Direct Results

It was considered that the Nationalists had achieved "considerable" direct results. During the period under review the Republican fleet had been "virtually immobilised" and had refused after September, 1937 to sail within range of the Nationalist bombers. (2) Thirty-two merchant ships had been sunk, and one hundred and twenty-eight damaged. (3) At least two hundred and ninety raids had been made on ports, and serious damage had been done. The failure of the Nationalist airforce to sustain the attacks had however lessened the effect.

Ibid  
App. VIII

Cartagena, the only naval repair base available to the Government, had been "very seriously damaged", and a report on the results of the attacks on La Sociedad Española de Construcción Naval in Cartagena up to August, 1938 said

- (1) In the period 1st July, 1936 - 1st November, 1938, two hundred and ninety raids were made. In the first year of war approximately 5% and in the second approximately 20% of the Nationalist airforce was employed. Probably 90% and certainly 60% of these raids were carried out by German and Italian aircraft (He.59, S.79 and S.81) based on the Balearics.
- (2) This result was achieved by eighty attacks. No warships were sunk, but nineteen were damaged.
- (3) As an example of the results of the attack on merchant ships the following figures were quoted:

<u>From the outset to the</u> <u>1st September, 1937</u>	<u>In Harbour</u>	<u>At Sea</u>	<u>Total</u>
No. of reported attacks	44	37	81
No. of ships sunk	5	1	6
No. of ships damaged	19	10	29
Unsuccessful attacks	18	24	42
Results unknown	2	2	4
 <u>From 1st October, 1937</u> <u>to 1st October, 1938</u>			
	<u>Sunk</u>	<u>Damaged</u>	<u>Missed</u>
Recorded attacks at sea	7	6	18
Recorded attacks in port	19	93	17
Total	<u>26</u>	<u>99</u>	<u>35</u>

The percentage of successful attacks at sea was therefore 41.9 as against 86.6 in port.

"the works as a whole have been very seriously damaged, and parts of them completely destroyed. Such machinery as may still be serviceable is being removed to a foundry on the outskirts of the town. The pattern shops and the offices are burnt to the ground. Turbine rotors which were intended for the Alcala Galiana were thrown across the shops by the force of the explosions, and a full set of turbines was ruined".<sup>(1)</sup>

D.C.O.S.  
100 (J.I.C.)

As to the results obtained on the ports, details of the effects were not forthcoming, but it was considered that the working of Barcelona, Valencia and Alicante was "seriously interrupted", during April and May, 1938, H.M.S. Achates reported that Malaga had been "completely demoralised" and that "work in the port had been disorganised by air raids, and by the continual sounding of alarms". In August, 1938, the British Consul at Valencia described the situation at Gandia as follows: "The recent air raids have wrought chaos in the harbour. Only about one hundred and twenty-five yards of quay space remain available to shipping. Warehouses, the weigh bridge and sidings are smashed by bombs. The wrecks of two ships, the harbour dredger, and two sailing vessels obstruct the approach to the wharves. One small crane, useless in its present position, alone remains of the lifting appliances".

(ii) Method of attack

The types of bombs used against these targets varied from 20 kg. to 250 kg. (550 lb.) Against warships the use of the 250 kg. bomb seems to have been most common, but it was noted that the German battleship Deutschland had been severely damaged by 220 lb. bombs. Against merchant ships 250 kg. bombs were also used, but it was supposed that the more normal bomb was the 100 kg., which, it appeared, was sufficient to sink an unarmoured ship. The bombs used against ports varied from 20 kg. to 250 kg., but if ships were in the port being attacked a mixture of high explosive and incendiary bombs was often dropped.

Generally, it was noted that the German bombing was more effective than the Italian. Most of the damage at Alicante was attributed to individual German aircraft operating at low level and achieving a high degree of surprise. A.A. fire had a more marked effect on the height of Italian bombing, than on the Germans, who often pressed home their attacks regardless of the opposition.

(iii) Indirect Results

Ibid

The indirect results of this offensive, as has been mentioned, were thought to be more important, and at the same time more difficult to assess, than the direct results.

There was no evidence to show the effect of the attacks upon imports into Government Spain. These declined in the first half of 1937, but this may not have been entirely, or even mainly due to the bombing offensive. There was however an average increase in the freight charges from the north east coast of Britain to Spain of three hundred and ninety per cent in 1938 over the figures which had been levied in 1936.

- (1) In the period July, 1936, - November, 1937 Cartagena was bombed three times by day and once by night. From November, 1937 - October, 1938 ten times by day and twice by night.

D.C.O.S.  
100 (J.I.C.)  
App. XVI

An attempt to assess the moral effect of the bombing was made by the British Consul at Valencia in a report for the Foreign Office written in December, 1938. After enlarging upon the difficulty of obtaining any accurate information in a country which was in the grips of a spy mania, the Consul stated that he considered the indirect results of the bombing had been "negligible". He did not know whether this could be attributed to the failure to sustain the attacks, to the inaccuracy of the bombing or to the small number of aircraft employed in the attacks. He thought that the whole method was an "excellent example of how not to utilise a complete mastery of the air". He had heard the suggestion that "half a dozen planes intelligently used to keep the ports and towns in an almost continuous state of alarm would have far more of the indirect effects referred to than the present system whereby spasmodic raids are carried out by three, five or ten planes playing tip and run up and down the coast, loosing their cargo of bombs from anything up to 20,000 feet up, generally missing anything resembling a worthwhile objective, followed by periods of days and even weeks when no raid is carried out".

Ibid

In the opinion of the Consul, the Spanish people were standing up to the effects of the raids with nerveless courage, and he believed that the discharge of cargoes remained as high as ever in Barcelona and Valencia. He added that the effect on the dock workers was not likely to be considerable as they had been militarised and could, if necessary, be compelled to return to work.<sup>(1)</sup> On the other hand he pointed out that when sustained attacks had been made, as for instance on Barcelona in March, 1938, and later on Badalona, a "general exodus was already beginning after three days in the first, and a nightly migration up to Tiana was the order of the day in the second".

The general conclusion therefore was that the Spanish people were tougher than most, but that even against them, moral effects could have been obtained if the bombing attacks had been on a larger scale and had been more sustained.

(c) Air Attack on Internal Communications in Spain and China

D.C.O.S.  
103 (J.I.C.)

There was some firm evidence from both Spain and China as regards air attacks upon the transportation systems, but the J.I.C. report pointed out the danger of drawing conclusions which might "have little or no application in the event of a major war between first-class powers". In the first place, the communications of Spain and China were not developed to the same degree as those in the major European countries, and they did not make the same contribution to the economic, industrial and national life of the people. Secondly, in Spain a relatively small air effort had been launched against communications. Thirdly in both Spain and China the volume of traffic over strategic lines of communication had not been sufficiently heavy to lead to any cumulative effects as a result of the minor delays and stoppages which had been caused. Having sounded this note of warning, it was possible to proceed to an analysis of the effects which had been achieved.

(1) This appears to be a non-sequitur. If the port workers had been militarised, this alone is evidence that morale was not satisfactory. There is evidence to support this theory. See paragraph 56 of D.C.O.S. 100 (J.I.C.).

(i) Method of attack and type of bombs used

Ibid

In the early stages of the war in China the Japanese made their attacks in small ragged formations, and the aircraft bombed individually. As the Chinese A.A. improved, and notably at Nanking, they began to use more modern aircraft, and flew in larger formations. These were often accompanied by fighter escorts, and normally approached the target at a height between ten and twelve thousand feet. The main formation split up into groups of three or four aircraft for the attack, and each dropped its bombs on a signal from the leader. Night attacks were rare and were only made in moonlight.

In Spain nearly all the attacks were made by German and Italian aircraft based on Majorca.<sup>(1)</sup> The Italians bombed in ragged formations from heights between twelve and eighteen thousand feet, and often approached the target in a glide from as much as twenty two thousand feet. It appeared that they bombed on a signal from a leader, making a "pattern" often as long as two thousand yards. There were usually five or six aircraft in each formation, though on one occasion there were nineteen, and in the raid on Tortosa railway bridge fifty-four aircraft were employed. The aircraft were Savoia S.79 and S.81.

The Germans used He.59 Seaplanes and usually attacked at low level. The crews were said to be "expert and determined", and the normal procedure seems to have been to carry an expert in the local topography. These aircraft were sent out in twos and threes and operated individually at dusk or on moonlight nights, flying low and achieving a high degree of surprise.

Aircraft based on the mainland were only used to attack communications in direct support of the land forces and in these cases the Italians usually bombed from above twelve thousand feet and the Germans from six to eight thousand feet.

In China there was definite evidence to show that the Japanese had used 60 kg. (130 lb.) 250 kg. (551 lb.), 300 kg. (661 lb.) and 500 kg. (1,102 lb.) bombs, though the 60 kg. had predominated. They had also dropped small splinter and incendiary bombs. In Spain the details of the bombs used by the Germans were not available, but the Italians had used bombs up to a maximum weight of 250 kg. and the normal bomb was the 100 kg.

In the majority of cases the Savoia machines carried a bomb load of 1,000 kg.

Ibid

(ii) The Results of the Bombing

In China there was very little concrete evidence as to the effect of the bombing of transportation. Undoubtedly a considerable amount of damage to stations, track, rolling stock, and bridges had been done, and mainly on account of the bombing the Chinese had been compelled to leave large quantities of rolling stock behind when they retreated.<sup>(2)</sup>

(1) Nationalist air forces on the main land were used for army co-operation.

(2) The Vice President of the South Manchurian Railway after a tour of Japanese occupied China was reported to have said that it would take two years to repair the damage which he estimated at 15,000,000 yen. (£875,000 at 1939 exchange). Much of this damage was however, caused by the retreating Chinese and it was impossible to estimate the contribution of air bombing.

There was a singular operation which is worthy of comment. This was the Japanese attack on the Kowloon-Canton-Hankow Railway. The aim of this operation was to cut the railway, and thus to deny the Chinese their main channel for the distribution of war material from external sources. The operation lasted for about a year, and the air effort expended was "considerable". The Japanese failed to achieve their aim. This failure was attributed to inaccurate bombing; the dispersal of the attack along great stretches of the line, the lack of sustained attacks on vital sections of the system, the failure to harass repair gangs, the small effort expended against rolling stock, and the efficiency of the Chinese repair organisation. Observers commenting on this operation agreed that the attack had had singularly little influence on the course of the war, but that, had the attack been better planned, success could have been achieved.

In Spain the Nationalist air offensive against the Republican communications on the Mediterranean coast had two main aims. Firstly to interfere with supplies entering Republican Spain from France, and secondly, to interfere with the distribution of supplies entering the Republican ports on the Levant Coast, despite the air blockade which was being maintained on that coast.

To attain the first aim attacks were directed against road and rail communications in the Port Bou area. On the evidence it was impossible to determine whether the aim was to sever completely, or merely to impose delays, on this line of communication. In view of the relatively small air effort, and the sporadic nature of the attacks it would appear that complete severance was not the aim. The line of communication across the French border was subjected to delays, which did not however have a serious effect, as alternative methods of transport were available.

The attack on the East Coast communications was not apparently inspired by a clear cut policy and was in any case subsidiary to the air blockade of the ports themselves. Attacks on communications were often combined with attacks on the ports. Minor delays were caused, but as the system was carrying considerably less than its maximum capacity, these were not serious.

In Spain the conclusion was that the attack on communications had very little effect on the course of the war, and this was attributed to:

- (i) The relatively small demands made on the railways.
- (ii) The existence of alternative routes.
- (iii) The fact that the attacks were not sufficiently heavy to cause major damage, and not sufficiently sustained to prevent repair.

These conclusions, it was felt, would not have much value for application to the case of a major war in Europe.

(d) The evidence from Spain and China: Conclusions

The main impression to be gathered from a study of the wars in Spain and China was the relatively unimportant role played by the airforces in both theatres. This was not taken to indicate that there was any inherent weakness in the potentialities of bombing, for if this had been the conclusion the estimate of the German capability to deliver a



"knock out blow" against England would have been revised. It was taken to indicate that the airforces in Spain and China had been inadequate to exploit the situation, that in many cases the type of war which was being waged was not suited to the independent use of bomber aircraft, and that where opportunity did present itself of vindicating the power of the bomber, it had been lost by bad management. Regarded in this light, the main lessons to be learnt from these wars were negative. They were taken to indicate the lines of policy which ought not to be adopted, rather than to present a picture of what the results of a bombing offensive in a major war might be.

Apart from this the most important detailed conclusion was that if substantial results were to be achieved by almost any form of bombing it would be essential not only to sustain the attacks to a much higher degree than had been done in Spain and China, but that it would also be necessary to make very much heavier attacks, and to make them in much greater concentration.

On the evidence the theory of the feasibility of the "knock out blow" might have suffered some loss of probability, but this does not appear to have been the case. (1)

#### Experimental Evidence: Bombing Trials

##### (a) The Value of experimental evidence

The object of bombing trials was to discover the best tactics, and to ascertain the effect of the various bombs on their targets. As such they formed a valuable adjunct to the other services of intelligence. This was fully realised at the time, and the C.-in-C., Bomber Command was, in September, 1938, of the opinion that bombing trials were neither frequent nor exhaustive enough. Referring to the trials which had been carried out at Netheravon he said "The extremely valuable information obtained from these practical trials only touch on one small branch of the vast subject of air bombardment, but they serve to illustrate clearly enough the fact that we cannot hope to devise our bombing tactics on sound and practical lines unless we have the facilities to explore every branch of the subject by means of practical trials such as these".

In 1938 it was however already too late to conduct trials on the scale which the C.-in-C., Bomber Command would have liked. For instance the trials conducted to reveal the best methods of attacking railway permanent ways, which were carried out in the summer of 1938, were by no means exhaustive, and the results had not been fully analysed when the war broke out. The further trials which were wanted could not therefore be completed in peace time.

A certain amount was achieved in the last eighteen months before September, 1939 and three of the trials have been selected for examination here. These were the Netheravon trials, which were intended to show the results of an attack upon aircraft dispersed round an aerodrome, and the effect on the aerodrome surface, the Longmoor trials which were an attempt to assess the damage which could be

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- (1). Some attention was given to the historical evidence of bombing results in the Great War. Notably in connection with the assessment of damage which could be inflicted on railways, when reference was made to the War in the Air Vol. VI. It has not however been thought desirable to embark upon this aspect here.

A.M. file  
S.36637/II  
Encl. 1a

A.M. file  
S.44673  
Encl. 46a

inflicted upon railway permanent ways, and the Portland trials which consisted of a simulated attack on units of the Home Fleet and some of the shore establishments. The prime object of the trials was the determination of the best tactical methods of attacking, but the assessment of the damage which could be inflicted in war was an important aspect, from the pure intelligence standpoint the most important, of the experiments. Most of the limitations of these forms of acquiring intelligence were appreciated and will be revealed in the course of the narrative on the trials themselves.

(b) Railway Permanent Way Trials at Longmoor

Ibid  
Encl. 1a

On 2nd May, 1938, the C.-in-C. Bomber Command proposed to the Air Ministry that trials should be carried out at the Railway Training Centre at Longmoor to determine the penetration and ricochet effect of 250 lb. bombs dropped on railway permanent way, from various heights up to 1500 feet. This information was wanted in connection with the appreciation on plan W.A.4., which was at the time being prepared by the War Office. This then was an example of the direct dependence of planning upon intelligence.

Ibid  
Encl. 26b

The trial was conducted in three phases. During the first stage Battles and Blenheims practised shallow dive and low level bombing at Porton to determine the accuracy of bombing. Secondly 250 lb., inert filled, bombs were dropped at Longmoor to determine penetration, and finally live 250 lb. bombs were buried and detonated at Longmoor to determine damage. The actual bombing trials at Longmoor were carried out on the 7th, 11th and 12th July, 1938.

During the first stage at Porton, Battles got sixteen per cent hits at low level and thirteen per cent in shallow dive. The Blenheims got twelve per cent hits at low level and forty per cent from shallow dive.<sup>(1)</sup> Notwithstanding these figures it was concluded that greater accuracy was to be expected from low level than from shallow dive attacks, and it was further concluded that the best angle of approach was between twenty and thirty degrees to the fore and aft line of the target. It was also decided that stick bombing was more effective than salvoes, and the early issue of the mechanical distributor was urged.

During the second stage of the trials at Longmoor three types of targets were attacked. These were a double track two hundred and fifty yards long in a thirty foot deep cutting; a single track of the same length in open country on a sand embankment varying in height from one to seven feet, and a single track on an embankment twelve feet high. Eighty bombs were dropped, and six direct hits were obtained. Twenty-eight of the bombs dropped within ten yards of the centre of the track. Some of the bombs ricocheted from five to ninety yards and only three of the nineteen bombs dropped in the cutting retained their initial point of strike. On the other hand only six of the bombs aimed at the embankment ricocheted. Penetration in the cutting varied from six inches to two feet nine inches, and in the embankment from two feet three inches, to five feet nine. From this evidence it was concluded that cuttings offered an unfavourable target and that it would be more profitable to attack embankments.

(1) The bombs were released by "judgment" as sights were not available.

The third stage of the trials was carried out on 27th September, 1938. Four live 250 lb. G.P. bombs were buried and detonated in positions similar to those in which the bombs had fallen during the second stage of the trials. The first of these on the embankment caused damage which it was estimated could have been repaired in five hours. The second, which was buried under the sleepers of the double track, caused damage which was repaired by one N.C.O. and eight men in three-quarters of an hour. The third and fourth bombs were buried near the sleepers of the double track and caused similar damage.<sup>(1)</sup>

The Bomber Command report on the trials concluded, on the evidence of the third stage, that all the bombs would have caused derailments, that the damage caused by the detonation of the first bomb might have taken twenty-four hours to repair under war time conditions, and that it was necessary to get within one yard of the target, and to penetrate up to five feet. Finally it was suggested that "constant and accurate bombing of open lines of railways will seriously delay railway operations and will harass railway personnel, but it is unlikely that rail communications can be severed and be kept out of action for any length of time without very heavy expenditure of bombs."<sup>(2)</sup> The Bomber Command report called for further trials, and suggested that an experimental attack should be made on an embankment of at least thirty feet in height which was composed of settled soil. It was hoped that one of the Railway companies would make a disused line available for this. The Director of Staff Duties informed Bomber Command on 21st August, 1939 that the railway companies were being approached about this. Thus the matter stood at the outbreak of war.

(c). The Netheravon Trial. Bombing an Aerodrome

The object of these trials, which were carried out in July, 1938, was to test the effect of various forms of attack against aircraft equivalent to two fighter squadrons dispersed on an aerodrome one thousand yards in diameter. Two protected positions were also dug, and in each two Bulldog fighters were placed to represent the presence of one bomber. The Bulldogs had their petrol tanks filled and were armed with incendiary ammunition. In addition the army placed two tanks, one armoured car and four lorries near three Bulldogs. These vehicles were arranged about twenty yards apart.

During five days of bombing about twenty-two tons of high explosive bombs were dropped in addition to more than one thousand incendiaries<sup>(3)</sup> and about seven thousand rounds of incendiary S.A.A. ammunition. This was achieved in seventeen raids by formations of aircraft varying from three to nine in number and from heights between one hundred and fifteen thousand feet.

The accuracy of the bombing was considered to have been very good, especially by Harrows bombing from thirteen and eight thousand feet. Both the incendiary raids straddled

- (1) The bombs were detonated externally, and the opinion was expressed that on this account the results were "very unreliable". See pencil comment on A.M. file S.44673 Encl. 23 B., and Encl. 27a.
- (2) See Chapter 7 p.314 for the development of this conclusion with reference to the formation of plans and the discussions on the subject with the French.
- (3) Composed of forty-eight 25 lb. and one thousand and eighty 4 lb. incendiaries.

A.M. file  
S.36637/II  
Encl. 1a

the targets, and 40 lb. G.P. bombs fell all round the protected pits. All the 250 lb. bombs fell on the aerodrome site, and nearly all the 500 lb. bombs fell "really close" to the Bulldogs or the vehicles. It was thought that the accuracy would not have been so good in war time.

About three hundred and fifty holes of various depths, about fifty of which would have needed levelling, were made in the aerodrome surface. Four of the delay fused 500 lb. bombs made craters from four to five and a half feet deep, but it was estimated that the holes could have been about half filled with the earth thrown up near the craters in half an hour by four men. A mechanical navy took only five minutes to "soft fill" one of these craters completely, and it was estimated that the total damage to the aerodrome surface could have been rectified in a few hours by the men who would normally be available on a station.

The damage to the protected pits was found to be "negligible". No bomb fell right into a pit, but one Bulldog was slightly holed and another set on fire.

The damage to all the aircraft, including those already mentioned in the pits, was three Bulldogs burnt out and one damaged beyond repair. Of the remainder two were put out of action for two days, three for one day, six for a few hours, and four for less than one hour. Eleven were not hit at all. All the army vehicles could, it was stated, have been driven away. The blast effect of the 250 and 500 lb. bombs against the aircraft even when they fell within seven yards of the target was found to have effected little damage. The ammunition and the incendiary bombs did little or no damage.

On this evidence the C.-in-C., Bomber Command was able to agree with the C.-in-C., Fighter Command that any systematic attempt to render aerodrome "services" (sic)<sup>(1)</sup> unserviceable by bombing would "normally not be worth the effort expended".<sup>(2)</sup>

(d) The Attack Exercise on the Home Fleet at Portland

This experiment was conducted on 25th May, 1939. It differed from the two experiments already discussed in that for obvious reasons no live bombs were dropped.<sup>(3)</sup> This then was primarily a tactical exercise which had an obvious reference to the plan to attack the German fleet at Wilhelmshaven. (W.A.7A).

Deposit the limitations of this exercise from the point of view of intelligence, some interesting conclusions were drawn in the report by the C.-in-C., Bomber Command, which was dated 21st July, 1939. The object of the exercise was to investigate the problem of concentrating a large bomber force in quick succession over the target, after a long sea

A.M. file  
S.1680  
Encl. 1B.

- (1) Probably a mis-print for surfaces.
- (2) For the link with the planning of attacks on this type of target. See Chapter 7 p.318.
- (3) It is considered that the "Centurion" trials and the exhaustive examinations which were conducted into the vulnerability of capital ships are beyond the scope of the present narrative, and are primarily a matter for Naval historians.

flight and without a preliminary land fall having been made, and to indicate to the Royal Navy the type of attack with which they might be confronted in war.

Out of the total of one hundred and seventeen aircraft briefed for the attack, ninety-two actually reached the target and "bombed". Weather conditions on the route, and in some cases at the bases, were unfavourable, and the navigation proved to be difficult. Track keeping was however said to have been good, despite the fact that some of the bombers made unauthorised departures from the track and in a few cases made landfalls before reaching the target. This would have compromised the secrecy of the attack in war. Various tactics were employed. No.3 Group employed pattern bombing, the plan being for each squadron to cover five hundred yards. The "bombs" were dropped on a signal from the leader of each formation, which attacked in line astern. No.2 Group was briefed to make individual attacks and each aircraft was to select a battleship as its target, No.5 Group was to attack in formations of squadrons. Each squadron was to act independently.

It was estimated that H.M.S. Rodney and Royal Sovereign received direct hits, and that hits were also obtained on the three land targets. Apart from this it was possible to assess what would have been the extent of the damage, which was, from the intelligence point of view the crucial question. Further use of this exercise might well have been made had not the war intervened.

(e) The Bombing Trials: Summary and Conclusions

On the whole the striking impression to be gained from these three trials was the relative impotence rather than the power of bombing. Tactical difficulties, and the relatively small bombs available showed, particularly at the Netheravon trials, some of the limitations of the pre-war bomber force.

On the other hand the limitations of the trials themselves had to be born in mind. The difference between the destructive power of a bomb exploded internally and externally and the greater vulnerability of a railway embankment made freshly, are two instances of this type of limitation.

Perhaps the most important point, however, is that the trials were conducted too late to allow of time to draw all the useful conclusions which might have been possible before the outbreak of war, and the consequent necessity to take decisions on the evidence already available. Nevertheless these, and other, trials ought not to be ignored in appreciating the various sources of intelligence which were available to the Air Staff on 3rd September, 1939.

Research Evidence: The Study of Germany

(a) The selection of Industrial targets in Germany

The support and maintenance of modern fighting forces is a serious problem which enlists the whole resources of a nation. This involved the organisation of production, supply, and transport to meet great strain. Such organisations have nerve centres, main arteries, heart and brain. Attack upon these is the most effective contribution which can be made by air power to the destruction of a nation at war.

A.H.B.  
II/70/41(A)  
Encl. 1  
A.T.1./1G

Working on these lines a report by the Air Intelligence section of the Air Ministry dated 24th July, 1939 applied these considerations to the case of Germany. The most desirable way of achieving the industrial aim would clearly have been to find one industry whose destruction would make it impossible for the enemy to continue a war. This attractive theory was however disposed of by a consideration of the ways in which vital materials can be produced in alternative ways and places. If however there was no "key" group of industries which it would be possible to destroy and so win the war, there might be vital spots in industry whose destruction would at least reduce the power of the enemy to resist. In Germany such industries were considered to be those producing ball bearings, non-ferrous metals, optical glass and chemicals.

It was however thought that an attack on a "key" service might have a more important effect than an attack upon industry itself. The destruction of the electricity and gas supplies would have a disastrous effect upon industry as a whole.

In addition to these considerations there was a third, that of a "key" area. In Germany there was one area which obviously fitted into this classification: the Ruhr. This was the 'Achilles heel' of Germany and it was at such a spot that a "knock out blow" from the air could be envisaged.

It was within the framework of these three aspects of the problem of selecting air targets in Germany that the research of British intelligence was conducted.

#### (b) Vital Industries

It will be remembered that in 1936, when the Air Targets Sub-Committee was set up, it was specifically instructed to proceed with a general study of potential targets in Germany, and not to attempt to work out any list of priority groups.

In the course of time, however, study tended to concentrate on the following industries.

- (i) Chemical and Explosives.
- (ii) Metallurgical
- (iii) Armaments.
- (iv) General Engineering.
- (v) Foodstuffs.

These then, were considered as the vital German industries.

#### (i) Chemicals and Explosives

A report of the Air Intelligence Section of the Air Ministry dated 25th July, 1939, stated that the German chemical industry was one of the strongest in the world, and that it was of special importance to Germany in view of her need to manufacture large quantities of synthetic materials. Its products were needed in practically all other industries.

A.H.B.  
II/70/41(a)  
Encl. 2  
A.1.1.(b)  
Air Targets/  
Germany

It proved impossible to find any relatively small number of targets whose destruction would have a vital effect upon the production of explosives. Furthermore it was not thought that the destruction of any of the various types of chemical works or explosive filling stations would have an immediate effect upon the course of the war.

Chemical fertiliser factories which produced materials for explosives and for synthetic rubber, were considered to be vulnerable to air attack, but it was also realised that alternative methods of production were available and that the destruction of any existing factories would not prove "rapidly decisive".

The same argument was applied to filling factories, which could be constructed in a matter of six to eight weeks. On the other hand the explosive factories themselves took from nine months to a year to build, and the number of them in existence was limited. This meant that when stocks, which would be in bomb proof shelters, had been exhausted, the destruction of the explosive factories might have an important effect upon the supply position.

As a target for the outset of the war the filling factories were considered to be the more important, but the effect of destroying these, it was thought, would be doubtful in view of the expected stocks of filled ammunition.

It was thought that Germany would have stocks of natural rubber, but when these had been exhausted she would come to depend upon synthetic production. The factories engaged upon this were few in number and took a long time to construct. They were also thought to be "very vulnerable". Their destruction would however only be of value in a long war.

In a short war it was not, then, thought that decisive results could be achieved by the bombing of this group of industry. On the other hand the results, in a long war, were viewed with greater optimism.

#### (ii) The Metallurgical Industry

Ibid

The report stated that Germany was the largest producer of steel in Europe and the second largest producer in the world. Domestic deposits of ore were insufficient to meet requirements, and they were of low grade, with the results that it was estimated that in war Germany would require a minimum of nine million tons of ore from Sweden per annum, and that this would have to be supplemented by further imports from Luxemburg. The possibility of Germany reducing this need by seizing Lorraine was not overlooked.

Blast furnaces and steel foundries it was thought, would be easily visible from the air and would be vulnerable to bombing. Other important considerations were that attention should be given to attempting to interrupt supplies of ore from Sweden, and if this proved impossible, of interrupting the transport of the ore from the Baltic to the Ruhr, which contained seventy per cent of the steel industry. This journey would involve a passage through the Mittelland and Dortmund-Ems Canals. It was also noted that coking ovens played an important part in steel production.

Germany had, on the other hand, relatively few factories making non-ferrous metals, and it was thought that in war this would be one of her main deficiencies. The smelting plants were mostly well inland but it was thought that they would present good targets, and their destruction would have a vital effect after the peace time stocks had been consumed.

F.C.I.(A.T.)

4

In view of these conclusions, it is interesting to note that in 1936 the Air Targets Sub-Committee had recommended that none of the targets in this group should be registered by the Air Ministry, as, in their view, the best way of reducing the productivity of the metallurgical industry was by attacks on coking plants, and power.

(iii) The Engineering Industry

A.H.B.  
II/70/41(a)  
Encl. 2  
A.1.1.(b)  
Air Targets  
Germany

It was expected that most of the engineering industry would, in war time, turn over to the production of armaments. It was therefore impossible to distinguish the armaments industry from engineering as a whole. The German engineering industry was one of the strongest in the world, and was capable of producing all essential engineering requirements provided the flow of raw materials was not interrupted, and a supply of skilled labour continued to be forthcoming. This industry was spread over the whole of Germany, but the Air Intelligence Section of the Air Ministry selected the following parts of the industry for special attention:

Armament stores

War ships and special naval stores

Aircraft and special aircraft stores

General engineering goods.

It was, however recognised that many factories produced armaments for all three services and also products for civilian purposes.

It was thought that there were too many factories producing armaments to make it possible to work out any plan to bomb them all. It was therefore decided that good results might be obtained by an attack on certain "key" parts in the armament industry as a whole. Optical glass, gun sights, and gun barrels were particularly mentioned. The destruction of these, it was expected, might eventually have a "decisive" effect.

Naval construction yards were expected to be well defended, but, together with the factories associated with them, they would be vulnerable to bombing. It was thought, for instance, that an attack upon submarine production might become imperative.

The results of an attack upon the aircraft industry were viewed with rather more optimism. In particular the factories making aero-engines were thought to be specially vulnerable, and were highly specialised which would mean that it would be hard to get new factories into production if the existing ones had been destroyed. Successful attack on these objectives, it was said, would reduce the scale of the attack of the German airforce "rapidly".

For the rest it was thought that the factories producing ball bearings, ignition generators, gears, carburettors, telephones and optical glass were especially vital, and their destruction, it was said, would have "far reaching" effects.



(iv) Food

Ibid  
F.C.I.  
(A.T.) 4

The Air Ministry report did not mention the possibility of making an attack upon agriculture, but the earlier report of the Air Targets Sub-Committee had suggested that an air attack on this industry was impracticable, and that none of the targets in this group were worthy of registration by the Air Ministry.

(v) General Considerations

A.M. file  
S.45752

One of the shortcomings of this system of compiling a dossier of target intelligence was that the information would constantly tend to become obsolete. This had been pointed out by the intelligence section of the Air Ministry when the scheme was brought into operation.

I.C.F./548

There was another and possibly more serious shortcoming of the system, which was pointed out as early as 1936. This was the questionable validity of the division of industry into groups. This was thought, by the Industrial Intelligence Centre, to be particularly dangerous as non-experts were going to be asked to take decisions on the information presented.

(c) Key Services: Fuel and Power

A.H.B.  
II/70/41(a)

As the theory of a "key" industry lost its validity it was succeeded by that of a "key" service which seemed to be a more hopeful idea. It was eventually decided that an attack on electricity, gas or transportation might well prove more effective than a direct attack upon industry itself.

F.C.I.(A.T.)  
Papers  
Passim.

Indeed the way to this conclusion had been pointed by the reports of the Air Targets Sub-Committee in 1936 and 1937, which had, for instance, indicated that in their opinion the production of steel could best be reduced by an indirect attack, upon power. Fuel and power was clearly the source of all industry, and transportation was an ancillary service not only to industry, but to the whole of national life, and to military manoeuvres. In addition to this it was thought that "Germany's greatest weakness, by general admission, (was) in the domain of her oil supplies".

A.H.B.  
II/70/41(a)  
App. A ATI/2G

For the purposes of examination these key services were divided into the following groups:

(i) Fuel and Power

- (a) Liquid Fuels
- (b) Solid Fuels
- (c) Electric power
- (d) Water Works.

(ii) Transportation

- (a) Railways
- (b) Roads
- (c) Inland waterways.

(i) Liquid Fuels (1)

A.H.B.  
II/70/41(a)  
Encl.2  
A.1.1.(b)  
Air Targets  
Germany

The main components of this group were oil fields, refineries, synthetic plants, commercial stocks and state reserves.

German consumption of petroleum in 1938 was estimated to be about five and a half million tons but this consumption was thought to be increasing by about twenty per cent per annum. It was also estimated that the minimum war time requirement would be about forty per cent above that of peace time.

The main German sources of supply were from stocks, crude oil from domestic wells, synthetic oil from lignite and coal, and imports. Of these, there were two kinds of stocks. The capacity of the commercial storage tanks, which it was thought would be unprotected, was estimated to be about two and a half million tons. A further two million tons would be stored in underground state reserves. Production of crude oil from domestic wells was estimated to be in the region of four hundred and fifteen thousand tons per annum, and it was not thought that any substantial increase could be made to this figure. The maximum figure for the production of the synthetic plants, when all the existing plans for the expansion of the industry had been completed, was estimated to be about two million tons per annum. It was thought that this figure could not be exceeded within eighteen months of the date of the report. (July 39.) Roughly two thirds of the imported supplies came from north and south America. Rumania supplied just over one fifth. Almost all these supplies were seaborne, and the main receiving ports were Hamburg, Rotterdam, Wilhelmshaven and Stettin. Imports by way of the Danube were small, and in any case were not thought likely to exceed one million tons per annum. In the event of German seaborne supplies being cut off she would become dependent upon Poland and Rumania for her imports. Supplies from Poland were unlikely ever to exceed one hundred and fifty thousand tons per annum, but Rumania would be capable of meeting all German imports requirements if the transport facilities could bear the load.

It was estimated that Germany would, under the best conditions from her point of view, be self sufficient in oil for the first six months of a war, but that in the first year she would need to import two and a half million tons, and that if the sea routes were closed she could only do this with the maximum co-operation of Poland and Rumania. The situation for Germany, it was recognised, would improve when the large tankers on the Rhine could pass by canal to the Danube, but at the time this was not in sight.

It was recommended that oil fields would be hard to damage, as there was no centralisation of machinery, but that the refineries and synthetic plants would be very vulnerable to bombing, and it was concluded that if substantial stocks could be destroyed Rumanian imports could not compensate for this. In addition it was pointed out that more than half of the commercial stocks were concentrated in a relatively few unprotected areas.

(ii) Solid Fuels

Ibid

This group included coal and lignite mines, coking ovens, coal tar distillation plants and town gas works.

(1) See Appendix 6. The Oil Supply Problem in Germany.

Germany was more than self supporting in coal and coke, and it was expected that she would be able to continue to export these even in war time. Domestic production of coke was the largest in Europe, and was still being extended. (Coke supplies, and the distillates, depended, however, upon the activity of the coking ovens and the coal tar distillation plants.

The mines themselves were considered an impossible air target, but the coking ovens, most of which were in the Ruhr, the coal tar distillation plants and the town gas works were considered to offer excellent targets for bombing. The destruction of the coking ovens would in addition have serious effects upon many other branches of industry.

(iii) Electrical Power

Ibid

The Air Intelligence report estimated that the destruction of electric generating stations would have an important effect, and might have "decisive results".

Rather under twenty per cent of German electricity was generated by water power, but these generating stations were largely confined to Bavaria, Baden and Austria, though some were imported from Switzerland. The long distance cables connecting these areas with the Ruhr were considered to be the most vulnerable link in the system.

One hundred and thirty six high power electric generators, seventy-seven of which were of major importance, were mentioned as being favourable targets which could be easily recognised from the air. There had indeed been a tendency in Germany to centralise the sources of electric power, but there were elaborate systems of switching over from one source to another. It was therefore suggested that the transmission system should be considered for attack.

F.C.I.(A.T.)4

The Air targets sub-committee had, in 1936, suggested that the bombing of electricity should be combined with the attack on gas, and had thought that the joint attack would result in an "appreciable loss in the productive capacity of industry".

A.H.B.  
II/70/41(a)  
Encl.2

(iv) Reservoirs and Water Works

In July 1939, the Air Ministry Intelligence section had not reached any firm conclusion about the vulnerability of this type of target, nor had they formed any conclusions as to the effects to be expected from successful bombing.

In view of the attitude to this type of target which was revealed when the question of attempting to deliver a "knock out blow" against the Ruhr was being discussed<sup>(1)</sup> and the subsequent attacks which were actually delivered, it is of interest to record that this group of targets was under consideration at the time of the report. It was stated that the destruction of some dams would not only paralyse some industries, but would cause flooding in the areas.

(v) General Considerations

In general it may be said that the idea of delivering an attack on a "key" service rather than a "key" industry enjoyed the greater popularity with the Air Staff. This conclusion should not however be further considered until

(1) See below p. 354.

some examination has been made of the possibilities of an attack upon another form of "key" service: transportation.

(d) Key Services: Transportation

The question of an attack upon the transportation system in Germany attracted a great deal of attention. The French were particularly impressed with the possibility of achieving military results by such an attack, but the British were less optimistic about this.<sup>(1)</sup>

The possible attack was considered in two aspects; the military and the industry or civil.

(i) The Military Aspect

F.C.I.(A.T.)  
2.

It was at first felt that it would be impossible to achieve any industrial results by an attack on transportation, but the Air Targets Sub-Committee which had reached this conclusion thought that the military aspect was worth examination, and it accordingly recommended that a War Office Committee should be set up to consider this matter.

A.M. file  
S.42731  
Encl.1c.

On 10th November, 1937 this War Office Committee sent a report to the Air Targets Sub-Committee, which stressed that the period of military concentration would be the most favourable moment to deliver an air attack. It was however pointed out that it would never be possible to achieve a complete dislocation of the German system of transport, which was highly developed, and which afforded so many alternative routes. The War Office Committee suggested that an Air Ministry Committee should be set up to consider the relationship between air effort needed and effect to be achieved.

A.M. file  
S.4238  
Passim.  
Ibid  
Encl.31a

The Air Ministry Committee, which was accordingly appointed considered an immense amount of material, and also studied reports from Poland and France. The advice of British civil experts was also sought, but in the end it was decided that the decision as to the relation between effort and effect was a matter for the Commander-in-Chief Bomber Command, and, as such, the problem became one of planning rather than intelligence.<sup>(1)</sup>

(ii) The Civil or Industrial aspect

During these investigations there was evidently a change of opinion as to the results to be expected from this form of attack in so far as industry was concerned.

A.H.B.  
II/70/41(a)  
Encl.2.

The Air Ministry Intelligence Section reached a very different conclusion on this matter in July 1939 from that which had been reached three years before by the Air Targets Sub-Committee. Roads, it is true, were not recommended for attack as they were considered to be invulnerable, and were the least important method of industrial transport. On the other hand it was thought that the dislocation of the railways would mean that "German industrial output must practically cease". It was further suggested that even temporary dislocation would be likely to have "far reaching effects upon industrial output". It was however recognised that considerable and sustained effort would be required to achieve this aim.

(1) This and the whole question of the attack from the planning aspect has already been discussed in some detail in Chapter 7.  
See above.

There were, however, other important methods of transport available to Germany.

The inland water ways' main value was thought to be for the transport of bulk cargoes of raw material over long distances. The system was divided into two main parts. The first connected the Ruhr and South West area with the North Sea ports, and the second connected North and Central Germany with the Baltic ports.<sup>(1)</sup> Intercommunication between these two parts of the system was not good, but the widening and deepening of the Mittelland Canal which was at the time in progress was designed to improve this state of affairs particularly from the point of view of making the transport of imported Swedish ore more rapid. Even so this traffic would have to pass the bottleneck of the Dortmund-Ems Canal.

There was at the time no canal connecting the Rhine and the Danube of sufficient size to carry the large tankers which were used on the Rhine, and this meant that the Rumanian oil imports would have to be handled at the inland ports of Vienna, Regensburg and Passau.

The Kiel Canal, apart from its naval importance, might in the event of German North Sea traffic being brought to a standstill, have considerable industrial significance, when it might be used by merchant ships wishing to unload cargoes brought from the Baltic at North Sea ports.

The conclusion was that certain canals should be attacked with the object of imposing an increased strain on the railways, and with the special aim of interfering with the import of ore and oil from Sweden and Rumania.

It was also felt that it might be valuable to attack some of the ocean ports which, even if North Sea trade came to a standstill, would still be used for coastal trade, and which, it was expected, would prove to be highly vulnerable, especially if the attacks were delivered at an early stage of the war when these ports might be expected to be full of merchandise, some of which would be inflammable.

(e) Key Areas: The Ruhr

Since 1933 when the threat from Germany had become apparent, the British Air Staff had been preoccupied with the possibility of the Germans delivering some form of "knock out blow" from the Air. London in particular was regarded as especially vulnerable, and the results of widespread damage to the capital had been fully appreciated. Indeed it was this fear which was the underlying explanation of the policy which was adopted by the Air Staff before the outbreak of war.<sup>(2)</sup> The theory of a "knock out blow" was developed from the supposition of a powerful air striking force, and a suitably vulnerable and vital objective, such as London or the East Coast ports. If however Germany possessed the powerful bomber force and Britain provided the vulnerable objectives, some similarly vulnerable spot in the German armour might be found. An attack on such a spot might in time be developed into an independent "knock out blow", and might be the means of winning a war against Germany. On the other hand, though it might prove impossible to deliver a "knock out blow" against it, it might still be possible to avert the German "knock out

(1) The importance of the Baltic ports has already been stressed in connection with the import of Swedish ore.

(2) See Chapter 6.

blow" by the threat of counter action. As has been seen this was one of the most important aspects of the planning which was done for Bomber Command.<sup>(1)</sup>

The problem was to find some target or group of targets in Germany which were susceptible to this form of attack, and as the search for a "key" industry had not been successful, it was felt that success might be achieved by an attack on "key" services. This clearly would be an immense task, which would require an enormous bomber force. It was in these circumstances that the idea of a "key" area seemed to acquire greater validity. Certainly, as is witnessed by the enthusiasm of the Commander-in-Chief Bomber Command for the plan of attack on the Ruhr, the operational aspects of the "key area" plan were more promising than any other.

C.O.S.843

The Chiefs of Staff, in their European Appreciation for 1939/40, which they issued on 20th February, 1939, wrote that there was in Germany "One vitally important and especially vulnerable objective in the industrial area of the Ruhr, which in its own sphere (had) no counterpart in England or France".

In fact the Ruhr was the German key area or "Achilles heel" as it came to be called.

(i) The Importance of the Ruhr to the German Economic Structure

A.H.B.  
II/70/41(a)  
Encl.3  
WA 5a  
4th Revise

The Intelligence Section of the Air Ministry reported in July 1939 that the Ruhr was "the great part of the German economic structure", and that if it could be paralysed Germany would become incapable of waging war on a large scale "in less than three months".

These were strong words, and it is necessary to make some further examination of the basis of this conclusion.

Ibid  
Economic and  
War importance  
of the Ruhr.

An Air Ministry report of January, 1939 had explained that the Ruhr was responsible for over seventy per cent of the total German production of bituminous coal, coke, coal tar and its by-products, raw steel, over sixty five per cent of pig iron, by far the greater part of chemicals, and that it constituted over seventy per cent of the engineering industry of the country. Fifty one per cent of the entire industrial population of Germany lived in the Ruhr, and the eight principal towns in the area had a population of six millions. These facts required no elaboration.

(ii) Courses of Action to Achieve the Paralysis of the Ruhr

Ibid  
WA.5a  
4th Revise.

The Air Targets Intelligence Section recommended in July, 1939 that the best way of putting the Ruhr out of action would be to attack the dams, canals and the fuel and power supplies. In addition to this it was suggested, that in the event of it being found desirable to sustain the attack throughout the night as well as the day, the principal iron and steel works and the inland waterway ports might also be attacked. It was expected that the night attacks would have a "severe psychological effect" and it was thought certain that a considerable loss of productive power would result from this alone. The main attack, in so far as material damage was concerned, was however to be made by day.

(1) See Chapter 6.

The Ruhr water and sanitation system was thought to be vulnerable to bombing, and the destruction of certain dams was expected, not only to cut off the water supply to the valley, but also to cause serious flooding. If in addition a few pumping stations could be put out of action, then the collection of flood water and of sewage would be likely to affect "seriously" many industrial activities and to lead to the "evacuation of whole districts".

The river Emscher, which was used for drainage, had a comparatively high level and several important industrial concerns were below it. The Emscher was however below the level of the Rhine and could only deliver into that river by means of pumping stations, two of which were "keys". The Emscher Sewage Company were said to have realised the danger to the whole system should the banks of the Emscher be burst, but it was thought that there was nothing they could do about this threat.

There had already been two disasters in the Ruhr valley. The course of the Emscher is in an area of marshes, and it has an almost imperceptible flow. In 1866 there was an outbreak of cholera, and there were also frequent occurrences of typhoid. On another occasion there was a calamity at Oberhausen where a lake of stagnant water twenty five acres in size collected following a fall of earth due to mining. In 1877 a pumping station was constructed at Concordia mine to carry off the water through one hundred and ten metres of piping. Subsequently the whole of the Emscher was regulated. There was therefore an elaborate system to deal with the problem of sewage and surplus water. The destruction of this would, it was thought, have disastrous results in the Ruhr.

It was further suggested that the destruction of the important dams (The Mohne and the Scorpe dams were mentioned as two of the most important) would result in a serious curtailment of the water supply, and especially if the bombing was done soon after heavy rain, would cause extensive flooding of the valley.

Here then, in the water works, was a weak spot within the "key area" of Germany. Further there were other methods by which it was thought that significant results might be achieved. The principal supply of electricity to the area came from twenty-eight generating stations, and it was stated that the grid supply, which came from the south, could be cut off by the destruction of a few transformer stations. Gas for the Ruhr was made at only six works of prime importance, and though there were over one hundred coking ovens, only thirty of these were of major importance. It therefore appeared that a successful attack upon this aspect of the industrial Ruhr was by no means out of the question.

Finally it was thought that an attack upon the waterways, particularly the Dortmund-Ems Canal would have a serious effect upon the import of ores and other raw materials into the district.

Up to this point it is strikingly apparent that the report was most optimistic about the vulnerability of the Ruhr. It is therefore important to record that the attack on marshalling yards was not recommended, and it was stated that an enormous weight of attack would be needed to put them out of action.

### (iii) Conclusions

It thus appears that, of all the intelligence produced

about the selection of targets in Germany, the most optimistic, from the British point of view, was that concerning the "vital area". The impression to be gained is that it was thought that it would not only be easier to put the Ruhr out of action than to tackle any of the other targets which had been suggested, but that success in this field would have much more significant results, than in others. There was a distinctly confident note about the reports on the estimated effects of the Ruhr attack. In this, intelligence was in almost complete sympathy with planning. At the time it appeared that the only limiting factor was the limitation of strength and policy which hung over Bomber Command.

#### Photographic Policy

In view of the subsequent importance of photography in war-time intelligence, and the early realisation of its potentialities, some attention must be given to the photographic policy of the Air Staff before the war.

A.M. file  
S.42910  
Encl.1a

On 22nd September 1937, the Air Ministry sent out a draft memorandum on this subject to the A.O.C.-in-Cs Bomber Command, Fighter Command, Coastal Command and Training Command, and also to the A.O.Cs Middle East, Iraq, India, Mediterranean, Far East and Aden, and to other Air Officers.

Ibid  
Encls. 11a  
and 20a

The C.-in-C., Bomber Command sent a general reply on 23rd November, 1937 and more detailed comments on 7th January, 1938.

He expressed the opinion, based upon experience during the operational exercise which had been carried out at that time in his command, that it was "most evident" that photography would be "exceedingly valuable" in war to get "the required information of the results of raids, and of enemy activities, so as to enable Bomber Command to direct operations". He thought that visual observation would be a relatively unimportant factor in view of the speed and height at which modern aircraft flew.

He suggested that it would probably prove necessary to provide special bomber aircraft for this "important work", in the absence of long range reconnaissance machines, and he emphasised the importance of training a sufficient number of photographic officers to ensure that the best use of the photographs would be made. In his earlier letter he had suggested that the peace time training at the squadrons should be directed by station intelligence officers, which he hoped would be provided.

Ibid  
Encl.23a

After considering these remarks and the views of the other Commands, the Air Ministry issued an Air Staff Memorandum entitled "Photographic tasks for which the Squadrons of the Royal Air Force are to be trained". As far as securing intelligence for the use of the R.A.F. was concerned, the functions of photography mentioned were, the identification and accurate location of bombing objectives, the production of target photographs for examination by the pilots briefed for bombing, the recording of bombing results, and the provisions of pictures of the bombed targets to help in the assessment of the damage done. In addition it was mentioned that photography would assist to build up general intelligence regarding the plans of the enemy.

The memorandum included an outline of the plans made to prepare to meet these requirements in war.



Clearly operational photography is a matter for the war time volumes of this narrative, but it is important to mention that these pre-war plans had been made.

### Summary and Conclusions

It is one thing to have knowledge and another to act upon it. Plans and policy are obviously liable to fundamental alterations in the course of a major war. Ideally, intelligence should not be liable to this fluctuation. For instance industrial intelligence if initially accurate should change only to the extent that is inevitable in keeping it up to date. Clearly it would in practice be impossible to arrive at such an ideal state of affairs, but it is a good principle to keep in mind. How far then did British air targets intelligence before the war approximate to this idea?

The main failure was in the field of organisation. Here the scope of intelligence was limited by the restrictions imposed by a temporary bombing policy. The main example of this was the failure to establish a really satisfactory co-ordinating and over-riding authority, such as might have been expected from the nucleus of the Ministry of Economic Warfare.

It would clearly be unwise, and indeed impossible, to draw significant conclusions about the real value of the intelligence provided without relating it to the conduct of the bombing offensive in the war, and examining the basis of the strategy adopted and the advice on which those plans were framed.<sup>(1)</sup>

This chapter has, however, tended to demonstrate that there was a distinct note of caution in most of the intelligence reports. It was the difficulties rather than the ease of achieving strategic results which seemed to be apparent.

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(1) This would be beyond the scope of the present narrative, but is dealt with in a subsequent narrative "Intelligence and the British Strategic Bombing Offensive against Germany" which is now in the course of preparation in this Branch.

SECRET

ANNEX

THE IDEAL BOMBER

## THE IDEAL BOMBER

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THE IDEAL OR STANDARD BOMBERIntroduction

The story of the Ideal Bomber is a remarkable episode in the history of Bomber design. The object was to produce a bomber suitable as a replacement for the whole striking force of the R.A.F. both at home and abroad, but the conception was even more ambitious than this. The machine would have to show an improvement on the designs already in hand. It would have to be a better machine than the Stirling, Manchester and Halifax, and this improvement would have to be achieved before those bombers had been tested. In other words it was hoped to design the successor to these three bombers before they themselves had come into use. This implied, not only the belief that these bombers could at the time be improved upon, but that the tactical and strategic conditions, which would prevail when they became obsolete, could be forecast with reasonable accuracy.

The main problems raised by the inception of the Ideal Bomber were therefore technical, strategical and tactical. Above all foresight, beyond that ever demanded before, was needed. The whole future of Bomber Command, not to mention the overseas commands, could have been made or marred by decisions taken about the Ideal Bomber. (1)

It is the purpose of this annex to examine these problems as they arose between March, 1938, when the Air Staff produced their "considerations affecting the design of the Ideal Bomber", and May, 1940, when in view of the crisis then prevailing, and, it may be suspected, the disappointments which had been experienced, the decision was taken to suspend activities in connection with the design and construction of the Ideal Bomber.

The problem as a whole can best be dealt with in three sections. The first will deal with the hypothetical ideal, when the type of bomber required was considered without too much encumbrance in technical details. The second will show the attempt to translate this ideal into a practical plan. Here technical details had to be squarely faced, and important tactical decisions had to be taken. Finally the third section will show how, when these problems had been imperfectly overcome and after many of the original ideals had been involuntarily abandoned, the firms failed to convince the Air Ministry experts that the Air Staff requirements could be met, and how ultimately the whole scheme was postponed, virtually for the duration of the war.

The term "ideal" was perhaps unfortunate and confusing. At the end of the hypothetical stage it was largely dropped in favour of the more comprehensible, but none the less ambitious, name of "Standard Bomber".

The Hypothetical Ideal

B.C.18

In March, 1938 the Air Staff produced a paper entitled "Considerations affecting the design of the Ideal Bomber for the Royal Air Force." This paper "is one of the most

(1) The development of post war civil aviation too might have been profoundly influenced by the construction of an Ideal Bomber.

comprehensive and most interesting of all the pre-war papers upon bomber design."<sup>(1)</sup>

The most immediate need was to produce a bomber which would be effective in war with Germany, but at the same time it had to be borne in mind that in five years time the political situation might have changed, and Britain might be confronted with Italy, Russia or Japan as enemies. The Ideal Bomber had therefore to be suited to strategical moves and to be capable of operating from less highly organised bases than those in the United Kingdom. The ideal was that the bomber should be capable of reinforcing any part of the R.A.F. by air from any other part. Experience during the Middle East Crisis of 1935 had shown that multiplicity of types of aircraft and engines when large reinforcement schemes had to be put into operation was a "very serious administrative disadvantage."

A second aim was ease, rapidity and economy in production and in the training of personnel. This again could best be achieved by a reduction of the numbers of types in use.

The aim of the paper was therefore to suggest one type of bomber with which all bomber squadrons, both at home and overseas, could be equipped.

(a) The Optimum Size

The optimum size of such a bomber had to be considered from the points of view of operations and administration. This postulated the question of what the minimum bomb load and radius of action might be. It was considered that, 1,000 lbs. was the minimum economical bomb load, and that the bomber should have an operational range to enable it to reach targets in Eastern Germany. This, it was stated, would be 750 miles, which would require a range of 2,000 miles in still air. An aeroplane which could carry 1,000 lbs. of bombs for 2,000 miles would also be capable of flying 2,700 miles without a bomb load, which would allow it to fly non-stop across France to Egypt, or non-stop to Malta via Gibraltar. In other words it would have the necessary degree of "strategic mobility".

This consideration gave the minimum possible size for the Ideal Bomber, and this was called Type "A". For the upper limit, the largest type of bomber which it seemed probable could be constructed within the next six or seven years was assumed to be a machine with six engines and a span of 180 feet. This was called Type "E".<sup>(2)</sup> Thus, with the three intermediate types, five possible sizes of Ideal Bomber had to be considered.

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(1) These words are quoted from Part I of this Volume. In the interests of continuity and clarity it has been found necessary to repeat some of the work done in that part which discusses the Ideal Bomber up to the Munich Crisis.

(2) Types "B", "C" and "D", which were of intermediate size, came between these two extremes. See Appendix 'A' to this Annex for the main characteristics of the five types in tabular form.

(b) The Characteristics of the Ideal Bomber

The characteristics of the Ideal Bomber were then considered in relation to these five possible types, under the two headings of operational requirement and administrative requirement.

(c) Operational Requirement(i) Minimum Size

It has already been demonstrated that the bomber must have a minimum range to enable it to reach targets in Eastern Germany. It would also have to be capable of adequate speed to take advantage of that range. With a minimum of 1,000 lbs. bomb load it was found that a machine capable of a satisfactory performance would have an all up weight of 18,000 lbs. The smallest Ideal Bomber would therefore be considerably larger than the Blenheim.

(ii) Bombing and Navigational Facilities

The Ideal Bomber would have to be equipped with the best possible facilities to enable it to reach and hit the target under all weather conditions. This would mean that it must have good facilities for the pilot, navigator and bomb aimer, that it must be capable of rapid bombing up, and that it must have a steady bombing platform. None of these factors would be adversely affected by an increase in size from the minimum, and some of them would be facilitated by this.

(iii) Bomb Loads

It was considered that the most difficult target which a bomber would be called upon to destroy would be a ship, because this would be small, well defended and manoeuvrable, as well as robust under air attack. It was estimated that the type of bomb required to destroy the most heavily armoured ship would be, if the ship was under way, the B bomb which weighed 250 lbs., and if it was stationary, the 2,000 lb. A.P. bomb. The minimum bomb load required if all bombers were to be capable of aiming at ships was therefore 2,000 lbs. This could be carried either as one 2,000 lb. bomb, or as eight 250 lb. B. bombs as occasion demanded.<sup>(1)</sup>

Turning to the consideration of attacking targets other than capital ships it was decided that the Ideal Bomber would have to carry a "reasonable" load of 500 lb. bombs and alternatively as many as possible 250 lbs. bombs.

In war it was expected that ten per cent of the bombs dropped might hit the target, and this meant that, if every aircraft was to have the chance of securing one direct hit per flight, the minimum bomb load would be either 2,500 lb. (composed of ten 250 lb. bombs) or 5,000 lbs. (composed of ten 500 lb. bombs), in so far as land targets were concerned, and if each aircraft was to be capable of sinking a capital ship a bomb load of 20,000 lbs. would be required.

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(1) Capital ships were not regarded as the most likely, or the most frequent targets for Bombers, though the possibility of attacking them was not overlooked. They were merely used as an example of what was regarded as the most difficult target.

From this point of view the larger types of bomber seemed to be called for. Type "A", for instance, could carry 1,000 lbs. of bombs, but if the same type could carry 2,000 lbs. of bombs then twice the load could be delivered with the same effort on the part of the aircrew and groundcrew, with the same amount of time spent over enemy territory, and the same consumption of fuel. In point of fact, as the aircraft got bigger and the ranges increased so the fuel consumption, crew and size and number of engines increased, but not in proportion to the bomb lift. Operational economy increased with size. In addition to this it was found that the bomb lift to be obtained for an expenditure of £20,000,000 increased with the size of the individual bomber.

From this point of view therefore it was decided that there was no point in considering a bomb load of under 2,000 lb. and that there would be advantages in obtaining one of anything up to 20,000 lbs. There seemed to be a premium on size here, and type "A" was ruled out.

#### (iv) Protection

The Ideal Bomber would have to be capable of evading or dealing with opposition on its way to and from the target. It had been suggested that the bomber might rely entirely on evasion for its protection. In any case it would have no protection against A.A. fire except evasion, and the argument was that by the elimination of all armament its speed might be so much increased that it would be able to evade fighter attacks as well. It was pointed out, however, that the bomber could never rely upon attaining a greater speed than the contemporary fighter, and that, if it did manage to do so, the advantage would be temporary. It was also mentioned that the morale of the fighter pilot would be greatly increased if he knew that the bomber had no armament. Possibly, however, the unarmed bomber could survive in conditions of cloudy weather or at night, but in the interests of producing a standard bomber, this possibility was not further examined. Thus the Ideal Bomber would have to be provided with armaments and possibly armour, and it would have to be capable of evading A.A. fire.

The armament should be capable of developing a volume of fire sufficient to engage the maximum number of fighters which could attack simultaneously.

Experience in Spain and the conduct of experiments by the R.A.F. had shown that the only practical way for a fixed gun fighter to attack a bomber was from astern. All the countries were at the time relying primarily upon the fixed gun fighter. This meant that the ideal bomber would have to be provided with a power operated tail turret. Type "A" could not carry such a turret, and could, in fact, only carry a turret amidships which was considered wholly inadequate. Type "B" and the larger types could, on the other hand, carry power operated four gun turrets in the tail without difficulty. The same argument applied to, the two gun power operated nose turrets. "Dustbin" turrets could be fitted to the Type "B" and the larger types to give them protection against turret fighters, but again this would not be possible in the case of Type "A". It was further mentioned, rather optimistically as it turned out, that larger calibre guns could be mounted in the Type "B" should this prove necessary, but not in Type "A". From the point of view of armament the minimum size was therefore type "B".

It also appeared that it would be possible to provide Type "B" and the larger bombers with armour protection against .303 fire. This would not be possible in Type "A".

(v) Speed

Though not relying upon speed entirely as the bombers protection, it had obvious advantages from the point of view of defence. In this connection it was noted that speed increased with weight up to 80,000 lbs. and that, for instance, Type "E" was considerably faster than Type "A".

(vi) General Defence considerations and the effect of losses

"An aeroplane of whatever size is still a fragile thing." It was not considered sound to put too many eggs into one basket. If individual aircraft became too valuable, there might be a tendency to avoid risking them in the way that this had become apparent with capital ships in the 1914 War.

The problem was considered as one of the ratio between vulnerability and ease of replacement.

On the basis of cost and industrial effort it would be rather easier to produce one Type "E" (total bomb lift 44,000 lbs.) than eight Type "A" (total bomb lift 8,000 lbs.) Assuming a flat rate of wastage in war 8.4 Type "A" machines would be lost for every one Type "E". On the same assumption two type "A" would be lost for every one Type "B", but the inadequate armament of the Type "A" would probably result in considerably greater losses than this would suggest.

In many ways the larger types showed an advantage. The loss of one machine would always mean the loss of one automatic pilot one bomb sight and so on, regardless of the size of the machine. The loss of one type "E" would mean the loss of two pilots and six crew while the loss of eight Type "A" would mean the loss of sixteen pilots and sixteen crew.

On the other hand if the size were increased above Type "B" it was thought that the bomber would become so valuable that it might, for instance, be worth the enemy's while to ram it.

Type "B" or possibly Type "C" was therefore regarded as the best compromise.

(vii) Ground requirements

The Ideal Bomber would have to be capable of operating with full bomb load, from the normal aerodromes in the United Kingdom, as well as from the maximum number overseas. This would permit a take off run of 1,400 yards. The Type "A" could not take advantage of any run in excess of 700.<sup>(1)</sup>

Over a certain weight, it would be necessary to have concrete runways, and this was considered a disadvantage as

(1) And in order to achieve the speed called for the fuselage would have to be kept so small that it would not be possible to increase the bomb load above 1,000 lbs.



it would, it was thought, increase the vulnerability of aerodromes, and reduce the mobility of airforces. Type "C" was the heaviest bomber which could operate from the normal grass surface.<sup>(1)</sup>

(d) Administrative Requirements

(i) Flying Crews and Maintenance crews

It was found that the progressive increase in the size of the bomber would produce an economy in the numbers of men required to man the bomber force. It was also pointed out that the larger machines need not necessarily be any more difficult to fly than the smaller ones. The most remarkable increase in economy of flying and maintenance crews was between Types "A" and "B". Production of the larger bombers would also be easier.

(e) Conclusions

The advantage from almost every point of view of Type "B" over "A" was remarkable. A further increase to Type "C" it was thought, did not however show a corresponding increase of advantage. The conclusion was therefore that "at the present time, with the engines which are available" and with the present "knowledge of design and construction the Type "B" bomber offers the best compromise." It was accordingly recommended that this type should be selected for mass production as the standard equipment for the Bomber Force at home and abroad.

THE STANDARD BOMBER

The Translation of Hypothesis into Practice

This paper, which came to be known as the "Ideal Bomber Paper" was discussed in detail at the seventeenth meeting of the Bombing Committee held at the Air Ministry on 4th May, 1938.

The Chairman (Air Vice Marshal Douglas) explained that the object of the discussion was to produce a specification out of the recommendations which had been made in the paper on the Ideal Bomber, by which, he said, was meant a standard bomber.

The meeting substantially endorsed the opinions and conclusions which had been arrived at in the Paper. Some rather startling suggestions were, however, made which indicated the dangers of the whole plan to produce a standard bomber. For instance the representative of the Directorate of Armament Development suggested that it would be desirable to limit the carrying capacity of the standard bomber to 250 and 500 lb. bombs which, in his opinion, were the most destructive. The C.-in-C., Bomber Command to a certain extent, qualified this dangerous suggestion by pointing out the advantages of the 1,000 lb. bomb. Another suggestion, which followed the C.-in-C.'s insistence on the importance of armour protection, was that the use of cannon firing in the air was extremely unlikely. The Chairman pointed out that foreign aircraft were already equipped with cannon firing guns and that this form of attack would therefore have to be kept in mind.

The desire to produce a standard bomber obviously had certain inherent dangers, apart from the obvious difficulty

(1) This conclusion was based on "recent" experiments.

of foreseeing how the tactical situation would develop. As the C.-in-C., for instance, mentioned it was not possible to say whether bombers would operate in formation or singly. These pitfalls were of course, a trap to the designers of every bomber, but this particular one was intended as the standard equipment for the whole of the R.A.F.

(a) The Problem of formulating requirements

The difficult task of formulating requirements for the standard bomber on which a specification could be based was now undertaken.

Ibid  
Min. 1.

On 14th July, 1938 Operational Requirements was drafting the Air Staff requirements for a bomber on the lines of that recommended in the Ideal Bomber Paper and endorsed at the subsequent meeting of the Bombing Committee. The essential features of this bomber were said to be "high speed", "formidable all round defensive armament" and "substantial bomb load". The crew was to be seven or eight, and there was to be a forward turret capable of mounting two 20 m.m. shell firing guns, a central turret or turrets to cover the upper and the lower hemispheres, and the tail turret to mount two 20 m.m. shell firing guns. In the first instance it was expected that machine guns would be mounted, and in this case there were to be six forward, eight amidships and six astern.

Ibid  
Min. 3

By 25th July this armament had become eight 20 m.m. shell firing guns mounted in two turrets amidships giving protection above and below and to the rear. Two possible bomb loads were to be considered, one of eight thousand pounds and the other of twelve thousand. The bomber was to be able to land within six hundred yards from fifty feet with two thousand pounds of bombs and petrol for two thousand miles, and it was to take off with twelve thousand pounds of bombs, and petrol for two thousand miles in nine hundred yards. The minimum operational requirement was twelve thousand pounds of bombs to be carried for two thousand miles. Armour protection was to be provided for the crew against .303 fire. The specification was to be numbered B19/38.

Ibid  
Min. 6

Two days earlier however the D.D.O.R. had pointed out the difficulty of designing the bomber round its turrets, as had been suggested by the Bombing Committee, when there were in existence no turrets of adequate size. He foresaw difficulties in asking for turrets to mount Hispano guns, but he agreed that this would be necessary. Further discussions were held, and on 13th August, 1938 the A.C.A.S. was able to circulate the amended draft of the Air Staff Requirements.

(b) Air Staff Requirements for the B 19/38

Ibid  
Encl. 10A

The Air Staff required a bomber land plane for world wide use as a replacement for all heavy and medium bomber types. The essential features were high cruising speed, powerful gun defence, long range and substantial bomb load. The bomber should be equipped with four engines for reliability. The crew should be protected against stern attacks by .303 guns by the provision of armour plating.

It would, the paper continued, be essential to provide the bomber with guns of the same calibre as those which were likely to be employed by fighters. This would make it

impossible to fit any standard form of turret, since there was not one in existence which could carry the required size of guns.

The design of the bomber was to be arranged to conform with the shape of the turrets.

The speed, at fifteen thousand feet, was to be not less than three hundred miles per hour at maximum economic cruising power, and the range, at fifteen thousand feet, was to be not less than two thousand miles when twelve thousand pounds of bombs were being carried.

The bomber was to be capable of taking off from a grass surface, with full service load, for a range of 2,000 miles, with a load of 12,000 lbs. of bombs, and to be capable of crossing a fifty foot obstacle after a run of nine hundred yards. Similarly it was to be able to land after crossing a fifty foot obstacle and come to rest within six hundred yards with petrol for fifteen hundred miles, but no bombs. The take off and landing capacity was assumed to be in still air conditions. The bomber was also to be able to maintain height when carrying its full war load with one engine stopped.

The crew, petrol tanks and engines were to be protected by armour plating against .303 fire from astern, and the machine was to be fitted to carry bombs varying in size from 250 lb. to 2,000 lb. The total bomb load was to be 12,000 lb.

The crew was to consist of seven, made up of two pilots, one of whom would act as navigator and, or, bomb aimer. There were to be two wireless operators, two air gunners and an observer. Minimum conditions of comfort and convenience were laid down for the crew's accommodation. Facilities for troop carrying were to be made possible, the bomber was to be well provided with emergency exits, and it was to be easy to maintain.

Obviously the bomber indicated by these requirements was going to be a good deal larger than the "Ideal" which had been selected in the Ideal Bomber Paper. On 13th August the A.C.A.S. wrote that he was anxious that the bomber should be "the smallest and cheapest that can fulfil the role of a standard bomber of the future," and he suggested that some weight might be eliminated by a reduction in the amount of equipment to be carried. A great deal clearly depended on the type of armament to be fitted, and as the A.C.A.S. now explained, this had been omitted from the Air Staff Requirements pending discussion of the problem by a special sub-committee.

(c) The Problem of size

It was now possible to see roughly the dimensions of the bomber which it would be necessary to build to fulfil these Air Staff Requirements, and to compare it with the "Ideal" which had been selected in the Ideal Bomber Paper.

On 9th September the D.G.R.D. pointed out that the B19/38 was going to be larger than the B12/36, and substantially larger than the Type "B" or "Ideal". He pointed out that the five types discussed in the Ideal Bomber Paper were purely "hypothetical cases", which had been kept artificially comparable and whose power units were assumed just "to fit the circumstances, without reference to actual engines". For this reason the 19/38 could not be compared exactly with

Ibid  
Min. 11.

Ibid  
Min. 12.

any of the five ideal types, but the closest comparison was with the Type "C". He showed the main characteristics of the three types of bomber comparatively in a table, from which he drew some striking conclusions which threatened the future of the standard bomber. (1)

The increased size of the B 19/38 was chiefly due to the thirty miles per hour increase of speed, the fact that armour was required and the need to mount upper and lower turrets capable of accommodating 20 m.m. guns. The extra speed was, however, considered to be the "dominant reason" for the increase in size and cost.

The assumed power for the Type "C" during take off was 1540 H.P., but there was no engine in existence between the 1250 H.P. (Hercules) and the 2,000 H.P. (100 octane Vulture). The Vulture was therefore the smallest engine which could be used to increase the speed by the amount required, and it was still thought that, even with this power unit, it would be difficult to reach the required cruising speed.

In addition to this, the Directorate of Armament Development had estimated that the weight of armour, to provide the protection required would amount to no less than 5,000 lbs. This would increase the all up weight by a further 8,000 lbs.

The omission of any other items of equipment, it was thought, would not have an appreciable result, and it was therefore, concluded that the choice lay between, on the one hand, higher speed and so increase size and cost, and on the other, sacrificing the increase of speed over the B 12/36 and being content with improved defence and armament.

(1)

Type	Design Weight	Take off Overload	Cruising Speed	Span	Est. Cost per a/c	Number of a/c for £20,000,000
"C"	55,000lb	66,000lb 1,000 yds 12,000lb bombs. 2,000 miles.	270	100	£40,800	490
B12/36	45,000lb	62,000lb 1,000 yds 14,000lb bombs. 2,000 miles	270	100	£32,500	600
B19/38	64,500lb	82,000lb 900 yds 12,000lb bombs. 2,000 miles.	290	120	£49,000	410

This raised the question as to whether it was worth persevering with the B 19/38 at all. In order to get an increase of twenty miles per hour plus armour and armament, the Air Staff were confronted with the need to construct a bomber nearly half as big again as the B 12/36 which would carry two thousand pounds less in bomb load than that machine. It was questionable whether such a machine could operate constantly from grass surfaces, and the wisdom of putting so "many of our financial eggs into so few baskets" was challenged.

The suggestion was that it was too early to produce a specification for the Standard Bomber. Not enough was yet known, and the problem of providing for the increased fire power called for decisions about turrets without adequate experience.

The D.G.R.D. therefore suggested that it would be better to ask the firms to face a broader problem, and design an improved version of the B 12/36. If this was not acceptable, he thought that it would be essential to reconsider the speed requirement for the B 19/38.

Ibid  
Min. 13.

In a minute addressed to the Chief of Air Staff A.M.D.P. supported those suggestions. He said that when the "outcome of a hypothetical investigation (like that made into the Ideal Bomber) is translated into the practical (the 19/38) the very arguments which made us select the Ideal Bomber would make us throw out the 19/38."

He compared the requirement to a demand for a destroyer armed with fifteen inch guns and heavy armour plating. He wanted the B 19/38 abandoned and supported the previous suggestion that the firms should be asked to improve on the B 12/36.

Ibid  
Min. 17.

The A.C.A.S. however disagreed "emphatically" with these suggestions, which he thought amounted to a proposal to pass on to the firms problems which the Air Ministry could not solve. This "confession of defeat" did not recommend itself to him. He made two constructive suggestions. The first was that the Hercules engine should be accepted and that the designer should merely be asked to get the best possible speed. Secondly he suggested that five thousand pounds of armour plating was excessive and that the weight of this should be reduced to 1200 pounds and within this limit the designer should be asked to provide the best protection he could devise. This, he thought, would reduce the weight of the bomber to about 50,000 lbs.

Ibid  
Min 18.

The Deputy Chief of the Air Staff was also against the idea of passing the problem on to the firms. He thought that the evils of exceeding the optimum size were probably greater than going smaller. At the same time he pointed out that the essential features of the standard bomber remained improved speed, improved defence, armour protection (probably limited to 1,200 lb. in weight) and adequate range. Without these features he doubted whether the bombs would reach the target. The Standard Bomber which was no longer ideal was apparently in danger of ceasing to be a bomber. He would be prepared to sacrifice up to five thousand pounds of bomb load to increase the prospect of the remaining seven thousand pounds reaching the target. He also wanted the range to be increased from two thousand miles to two thousand five hundred miles, which he thought would be necessary to ensure penetration to targets in eastern Germany.

Ibid  
Min 19.

On 28th November, 1938 the Chief of Air Staff ruled that a specification should be produced on the lines suggested.

(d) The Armament Problem

Meanwhile the armament problem, which had been a stumbling block to the production of a specification for a bomber which it was intended should be designed round its turrets, was being studied by a sub-committee of the Operational Requirements Committee.

Ibid  
Encl. 14A

At the first meeting of the committee, which was held on 22 August, 1938, the D.D.O.R., in the chair emphasised the difficulty of attempting to design an aircraft round its turrets when there was so little knowledge of what these turrets would be like. He therefore suggested that the members of the committee should visit two firms which were then working on new turrets. (1)

The representative of Bomber Command expressed concern at the tendency to increase the size of the bomber, but the chairman pointed out that the chief factor in the size of the bomber was its required speed, and not the size of the required turrets. The armament problem therefore was related to that of design rather than to that of size.

Ibid  
Encl. 15A

The whole question of the armament of the B 19/38 was seriously considered for the first time in a paper produced by Operational Requirements and circulated on 7th September, 1938.

The Operational Requirements Committee had already agreed that the bomber should be equipped with two amidships turrets, and that 20 m.m. cannons, or possibly guns of even larger calibre, should be mounted. The proposal to equip the two turrets exclusively with these cannons had not, however, found "general acceptance", and it had been suggested that it might be advisable to equip the bomber with nose and tail turrets armed with .303 machine guns. These turrets could be of the standard type, and would be carried in addition to the two mid turrets. This plan had been rejected, and it had then been suggested that any .303 guns which were carried should be mounted with the Hispano cannon in the mid turrets. The immediate problem, which this paper sought to solve, was whether it was an advantage to carry any .303 guns in addition to the cannon.

During the Blenheim trials at Orfordness in the summer of 1938 it was considered that practical proof had been given that modern aircraft can absorb .303 fire without serious results. In this trial five hundred bullets had hit the aircraft, having been fired from astern, and they had failed to destroy the structure, the controls or the hydraulics. Similarly it had been demonstrated that .303 fire could not be expected to prevent a fighter aircraft pressing home an attack against a bomber. It was therefore expected that the standard bomber would have to contend with fighters equipped with cannon of 20 m.m. calibre or larger. Indeed it was pointed out that the French and the Germans already had fighters in existence capable of being armed with these

(1) It was agreed that visits to Messrs Bristols or Frazer and Nash should be made on 5 or 6th September.

larger guns. The argument that .303 fire would be effective as a protection against turret fighters was conceded, but was considered to lose its validity in view of the fact that it was expected that the Germans would concentrate on the fixed gun fighter.

The argument that .303 fire would be a valuable deterrent to attacking fighters was disposed of on the grounds that the fighter pilot would not see the fire unless it was tracer, which was inaccurate, that he would not hear it from his enclosed cockpit, and that he would even be unlikely to feel it, should his machine be hit.

It was admitted that the duration of the bomber's fire could be increased by the addition of the .303 guns, but it was suggested that this was only a theoretical advantage as ".303 fire will be almost entirely ineffective against the fighter of the immediate future." To counter the short duration of the fire which would be available to the bomber equipped exclusively with cannon, it was suggested that a proportion of the bombers should carry a load of ammunition equal to the total bomb load and should then act in a purely defensive capacity.

Ibid  
Encl. 16A

Ibid  
Encl. 21B  
Ibid  
Encl. 21A

These recommendations were accepted by the sub-committee at its fourth meeting, held on 23rd September, when it was concluded that .303 fire would be largely useless by the time the B 19/38 took the air, and that the next calibre worth considering was 20 m.m. Further it was pointed out that a turret, then being developed by Nash and Thompson, would be suitable for the B 19/38. Taking the long view, it was recommended that the bomber should be stressed to carry 37 or 40 m.m. guns at a later date. The C.-in-C. Bomber Command soon pointed out that he agreed with this proposal, but that he thought the turrets should be designed to take nothing bigger than the 20 m.m. gun. Unless this was done, he feared that the streamline of the bomber would be destroyed. This consideration of the streamline lead to the abandonment of the predator sight.(1)

#### (e) The Revised Air Staff Requirements

Having disposed of the armament problem, in so far as the problem was capable of solution with the limited knowledge available, and having made the alterations necessary to conform with the desire to increase the range of the bomber, it was now possible to circulate revised air staff requirements.

Ibid  
Encl. 23 A

Ibid  
Min. 26  
Ibid  
Min 24  
Ibid  
Min 27

The speed at maximum economic cruising power was now reduced to "not less than 280 m.p.h." The range was increased to 2,500 miles, but the bomb load was reduced to 9,000 lbs. This time a section on armaments requirements was included. Two large turrets capable of mounting 20 m.m. Hispano cannon (four in each turret) were to be provided amidships. One was to give upper and the other lower protection. They were to be power operated. Otherwise the requirements remained substantially unchanged. On 20th December, 1938 the D.T.D. was able to announce that "the way now seems clear to go ahead with the specification". The Secretary of State for Air, who was apparently sensitive about criticisms of production delays, suggested that the standard bomber should be given a new specification number incorporating the new year. Accordingly on 28th December, 1938, the B 19/38 was renumbered the B1/39.

(1) Which would require a "blister" in the turret.

### The Failure to meet Air Staff Requirements

Any hopes, which may have been entertained at the end of 1938, that the main problems standing in the way of the production of the prototypes of the standard bomber had been overcome, were doomed to early disappointment in the new year.

Ibid  
Min 29.

On 5th January, 1939 it was decided to invite several firms to tender for the B1/39.(1) It was felt that adequate knowledge of the turrets was at the time available to take this step.

#### (a) Re-examination of the B1/39 in the light of the Tenders

Ibid  
Encl. 36A

By 23rd June, 1939, there had been time to examine carefully the nine tenders which had then been received for the B1/39. In a memorandum of that date the D.D./R.D.A. summarised the position and pointed out future courses of action.

The essential features of the B1/39 were to provide a bomber for world wide use, armed with two turrets each carrying four 20 m.m. guns. The Bomber would be flown by a crew of seven, and in addition to them equipment, including the turrets, weighing ten thousand pounds would have to be carried.(2) The aircraft must be capable of an operational radius of two thousand five hundred miles at a cruising speed of 280 m.p.h. with a bomb load of nine thousand pounds.

An examination of the tenders indicated that these requirements could not be met "with the power plants, materials, structural methods and standard of aerodynamic" available at the time, "or likely to be developed in the next two years." The chief reason for this, was thought to be the high cruising speed and the long range required, but the turrets were also a source of difficulty. It was expected that knowledge on these points could not make substantial progress until the Manchester, Halifax and Stirling had been seen in flight. In particular it was not expected that knowledge of the larger turrets, which were to be "the heart" of the standard bomber, could advance much for one and a half to two years. It was therefore feared that the immediate design of the prototype of the B1/39 would only result in "fruitless work" and "wasteful expenditure."

It was however suggested that two of the firms(3) should be asked to undertake, in collaboration with the Air Ministry. "the fullest possible technical investigations of the problem which the B1/39 really represents, to carry out experimental work, involving if necessary the construction of smaller and relatively cheap, experimental aircraft to prove the practicability of the various devices, which will certainly be necessary to achieve the take off, landing and the performance required, and to solve the problems of handling, control and stability which will arise as a result of the considerable departure from conventional form which turrets are likely to demand".

- (1) The firms invited to tender in the first instance were Armstrong-Whitworth, Handley Page, A.V.Roe, Short Bros. Vickers-Supermarine, Blackburn and Gloster.
- (2) This weight included that of the crew themselves.
- (3) Handley Page and Bristols.



Ibid  
Min. 37

The D.T.D. was even more gloomy. He felt that the discussions had been complicated all along by the protracted arguments about the size of bombers, and he suggested that the competing claims had never been fully reconciled. Examination of the nine tenders had convinced him that, with the limited knowledge available about the gun turrets and aerodynamic problems associated with them, the chances of meeting the specification either at the time or within the following two years were "insignificant". He thought it would be very unwise to "grope" for a solution, in view of the "magnitude and the expense of the task." He particularly wished to avoid committing himself to a prototype until he knew that "the plan was within the means." Unless the Air Staff were prepared to limit the load to 25,000 lbs, to be shared between the fuel and bombs, he thought that there was no alternative to the postponement of the whole project.

Ibid  
Min. 38

On 13th July, 1939, A.M.D.P. informed the C.A.S. that the Air Staff requirements, as they stood, could not be met, but that it was proposed to continue discussions with Bristols and Handley Pages. He sounded a further note of warning and said that the development of the prototype "must be a gradual process". He thought that the reduction of the speed from 280 m.p.h. to 250, and the range from 2500 to 1800 miles might bring the B1/39 within practical limits, but the defence would also have to be reduced, and this would mean little advance on the B12/36. He did not therefore feel that he could, at that time, recommend these reductions.

Ibid  
Min. 43

Thus the development of the prototype of the standard bomber was recognised to be only a long term possibility. The bomber was not yet, however, abandoned, and on 31st July, 1939, the D.T.D. gave instructions that Handley Page and Bristols were to be invited to develop proposals and models, and if any satisfactory results were achieved, prototypes of the B1/39. Meanwhile Armstrongs were to build a revised B 18/38 to develop the nose wheel undercarriage, and Vickers were to revise the B1/35 to demonstrate the latest geodetic structure.

Ibid  
Min. 58  
Ibid  
Encl. 61A

At the end of the year the design of the B1/39 was enjoying a "high priority", but on 25th May, 1940 the decision to suspend all construction activities in connection with the B1/39 was reached.<sup>(1)</sup> At the same time it was decided that all design work should also cease, except in so far as designers could not be employed on more urgent work.

A.H.B.  
1D/2/225

Thus if it was not killed outright by the German advance, the Ideal Bomber retired to obscurity. It is however interesting to note that on 2nd August, 1940, the Secretary of State for Air sent a revised copy of the original Ideal Bomber Paper to the Prime Minister, and that on the 21st April, 1944, the project was once more under consideration.

A.M. file  
S.45513  
Encl. 63A

#### The Ideal or Standard Bomber, Summary and Conclusions

The most striking impression to be gained from a study of the Ideal Bomber plan was the extraordinary ambition of the whole project. If the plan had come to fruition, and if the bomber had proved successful in action, this would probably have been among the most outstanding achievements in the history of aircraft design. On the other hand if the

(1) Work was similarly to be suspended on the F.11/37. The development of this specification was connected with that of the Standard Bomber for the F.11/37 was the first Manchester prototype embodying cannon bearing turrets (See A.M. file S.45513 Encl. 36A)

machine had been put into mass production and then proved to be inadequate, or even a total failure, then the results would have been catastrophic.

As it was the machines which were being designed before the conception of the Ideal Bomber took shape, proved in the event, worthy successors to the Wellingtons and Hampdens which formed the spearhead of Bomber Command at the outbreak of war. The failure of the Manchester was transformed into the triumphant success of the Lancaster which in the course of the war, performed for Bomber Command feats which could scarcely have been imagined in 1938 when the Ideal Bomber was under discussion.

In the light of after events the question may well be asked whether the conception of the ideal bomber was wise, or even necessary. It is, however, impossible to answer this question decisively for it is impossible to envisage with certainty the form in which the Ideal Bomber might have taken the air. This is not however to say that certain conclusions cannot be drawn.

The most important consideration was the necessity for the Ideal Bomber to be an improvement upon the Stirling, Manchester and Halifax. It would have been clever indeed if the Lancaster, for instance, could have been designed before the Manchester had been demonstrated, yet it was an achievement of this magnitude which the Ideal Bomber demanded. This raised the question as to whether it was wise to attempt it. Experience can only be acquired from practice, but in this case the practice was not available.

A second consideration is whether it can ever be wise to equip the whole of a bomber force with one type of bomber. The last paragraph of the Air Staff Paper on the Ideal Bomber included these words. "Accordingly it is recommended that the Type "B" bomber should be selected for mass production as the standard equipment for the Bomber Force at home and abroad." Certain shortcomings are likely to reveal themselves when any bomber is put into service. These may be overcome by the use of another type for specific employments. If all the bombers were of one type this would not be possible. In the event of any serious defects coming to light after the bomber had been put into production, or in the event of the general military situation changing in an unexpected way, there would obviously be greater security in having a number of types.

Thirdly there is a general consideration which should be borne in mind. In matters of equipment it may often be a mistake to plan too far ahead. The changing needs of war are so swift and so complete that the force which has built up the greater strength before these changes can be envisaged often tends to stand at a disadvantage after its initial strength has been spent.

On the whole therefore, it is concluded that the conception of the Ideal Bomber had more value as a means of summarising what was known and what was not known about the problems of bomber design, rather than an intrinsic merit. It indicated fields of research rather than plans for prototypes.<sup>(1)</sup>

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- (1) It is considered desirable to point out that these conclusions are the conclusions of the narrator, and are in no way intended to represent those of the experts responsible for Ideal Bomber. They are based upon the evidence, as it appears to-day, but in themselves, unlike the rest of the text, they cannot be documented except by coincidence.

THE IDEAL BOMBERTable of Performances

Col. No.1.	2	3	4	5	6	7	8	9	10	11	12
	Range 2,000 miles				Span  feet	Weights (lb)		Cost per aero- plane including engine	Number obtain- able for £20,000,000	Total bomb lift of number of aircraft shown in column 10	
	Take off 700 yds over 50 ft. screen in still air conditions.		Take off 1,000 yards over 50 ft. screen in still air conditions			Gross with bomb load lb. shown in Col. 2.	Tare			With 700 yd. take off Tons	With 1,000 yd. take off Tons
	Bombs lbs.	Cruising Speed m.p.h.	Bombs lb.	Cruising Speed m.p.h.							
A.	1,000	265	See note below		58' - 60'	18,000	9,000	£ 14,5000	1380	616	616
B.	2,500	270	8,000	266	80' - 84'	35,000	18,950	£ 29,250	683	762	2434
C.	4,000	275	12,000	270	96' -100'	55,000	27,000	£ 40,800	490	875	2620
D.	8,000	280	20,000	275	122' -126'	80,000	44,700	£ 62,000	323	1153	2884
E.	18,000	275	44,000	270	172' -180'	160,000	91,500	£120,500	166	1334	3260

NOTES

1. In order to obtain the performance shown in Col. 3 it will be necessary to keep the body size so small that Type "A" will have bomb cells for 1000 lb. only, but theoretically, for a take-off run of 1000 yds with range 2000 miles it could carry 4,000 lb. bombs at a cruising speed of 262 m.p.h.
2. It is probable that the costs of the larger types will be lower than the figures shown in Col. 9,, which are on the 'safe' side.

THE IDEAL BOMBERFlying Personnel

Table showing numbers required to man  
the number of I.E. aeroplanes which  
could be obtained for a capital expendi-  
ture £20,000,000.

Col. 1	2	3	4	5	6	7	8	9	10	11
CREW PER AEROPLANE						TOTAL FLYING PERSONNEL REQUIRED TO MAN THE NUMBER OF AEROPLANES WHICH COULD BE OBTAINED FOR A CAPITAL EXPENDITURE OF £20,000,000.				
TYPE	Pilots	Air Observers	W/T Operator Air Gunners	Engineers	Total	Pilots	Air Observers	W/T Operator Air Gunners	Engineers	Total
A	2	1	1	-	4	2760	1380	1380	-	5520
B	2	1	2	-	5	1366	683	1366	-	3415
C	2	1	3	-	6	980	490	1470	-	2940
D	2	1	4	-	7	646	323	1292	-	2261
E	2	1	4	1	8	332	166	664	166	1328

THE IDEAL BOMBERReinforcing Data (1)

1	2	3
TYPE	Reinforcing load with a range of 2,750 miles	
	Take off 700 yards over 50 ft. screen Economical cruising speed 178 m.p.h. Disposable load in lbs.	Take off 1,000 yards over 50 ft. screen Economical cruising speed 188 m.p.h. Disposable load in lbs.
A	-	2,250
B	1,650	6,650
C	3,200	10,000
D	6,200	18,000
E	17,000	39,000

NOTE: The fuel required to attain a range of 2,750 miles at most economical air speed would exceed that required for 2,000 miles at maximum speed for economic cruising conditions by amounts varying between 107 gals. for type "A" to 135 gals. for Type "E" but permanent wing tankage for the 2,750 miles range could be provided without detracting from operational performance.

(1) These three tables are reproduced from the Ideal Bomber Paper - B.C.18.

APPENDICES

THE HISTORY OF THE "TEN YEARS RULE" (1)

The first appearance of a "Ten Years Rule" was on 15th August, 1919. On that date Mr. Lloyd George's Cabinet decided that "the Admiralty and the War Office and Air Ministry should work out their estimates on the following basis .... that the British Empire will not be engaged in any great war during the next ten years and that no Expeditionary Force will be required for this purpose". In this form the rule therefore applied only to the estimates of that particular year and referred to a definite period ending in 1930.

Five and a half years later, in February 1925, this ruling was partially re-affirmed, and the time limit extended, by a Cabinet decision that the Admiralty, who were then using the Japanese Navy as a yardstick for measuring their own requirements, might assume that "aggressive action against the British Empire on the part of Japan within the next ten years is not a contingency seriously to be apprehended".

On 3rd December, 1925 the rule was indirectly, and again partially, applied to the R.A.F. by the decision to postpone until the financial year 1935/1936 the completion of the scheme for expanding the Home Defence Air forces to 52 Squadrons which had been announced on 20th June, 1923.

A further extension came on 28th July, 1927 when it was laid down that the Army should assume that no European war would occur for another ten years and that its immediate plans should aim only at readiness for defence operations outside Europe.

So far, then, the rule had not applied to all the commitments of all the Services in all possible theatres. For the Army and the Royal Air Force it applied only to Europe, for the Navy only to Japan. Moreover, it meant that the Services were "working to a ten year date that was not moveable" (2) - to 1930 first of all, to 1935/1936 from 1925 onwards.

In 1928, however, a radical change occurred. On 5th July, 1928 the Committee of Imperial Defence, at the suggestion of the Chancellor of the Exchequer, Mr. Winston Churchill, recommended (C.I.D./236th Meeting Minute 6) to the Cabinet:-

- (1) "That it should be assumed, for the purpose of framing the Estimates of the Fighting Services, that at any given date there will be no major war for ten years".
- (2) That this assumption should be reconsidered by the Committee each year before the Service Estimates were drawn up.
- (3) That any Department, or any Dominion Government, should be at liberty to demand such reconsideration at any other time.

These recommendations were approved by the Cabinet on 18th July, 1928 (Cab.39(28) concl. 10(a)) and the Ten Years Rule assumed its final form. It was now transformed into a standing and general assumption: it applied to all the commitments of all the Services: and instead of a fixed and definite time limit, it established a vague date which could never draw nearer to the present.

In this wider interpretation, the Ten Years Rule was re-affirmed by the Committee of Imperial Defence without serious discussion in 1929 and 1930 and,

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- (1) Based upon a "Note upon the history of the Ten Years Rule" drawn up by Sir Maurice Hankey and circulated to the Committee of Imperial Defence on 23rd June, 1931 - C.I.D. Memoranda, 1055-B.
  - (2) Mr. J. Ramsay Macdonald, at the 243rd Meeting of the Committee of Imperial Defence.

with considerable hesitation, again in 1931.<sup>(1)</sup> During those years, too, the Government in its anxiety to ensure the success of the coming Disarmament Conference, had suspended part of the naval shipbuilding programme, slowed down the rest, and at the same time again postponed, until 1938, the R.A.F. 52 squadron scheme.

On 23rd February, 1932 the Chiefs of Staff Sub-Committee in its Annual Report urged the withdrawal of the Ten Years Rule.<sup>(2)</sup> The Cabinet gave approval to this in principle on March 23rd.<sup>(3)</sup> But it was not until 15th February, 1933<sup>(4)</sup> that they made the withdrawal effective in practice by directing that a start should be made in providing for essential defensive requirements with priority to those of the Far East.

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(1) C.I.D. Memorandum, 1058-B.

(2) C.I.D. 1082-B.

(3) Cabinet 19(32), Conclusion 2.

(4) Cabinet 9(33), Conclusion 3.



ORDER OF BATTLE  
HOME-BASED BOMBER SQUADRONS  
1919-1939

I. THE HOME-BASED R.A.F. 1919-1922

1. Establishment proposed in Trenchard Memorandum, 25th November, 1919  
(Cmd. 467)
  - (a) Home defence (fighter and bomber) - 4 squadrons
  - (b) Army co-operation: - 1 flight to each Army division.
 

" : artillery co-operation - 1 squadron, or more.
  - (c) Fleet co-operation: reconnaissance - 1 squadron
 

" : fighter - 1 squadron

" : torpedo - 1 squadron

" : seaplane - 2 squadron

(Overseas:- Eighteen squadrons plus two small units of seaplanes)..
2. Actual strength, April, 1920 (1)
  - (a) Inland Area: Army Co-operation - 1 squadron (No. 4).  
Communications - 1 " (No. 24).
  - (b) Coastal Area: Naval co-operation - 2 "

In addition, six squadrons were just beginning to form:-

  - (a) Inland Area: Fighter - 1 squadron (No. 25)  
Bomber - 2 " (Nos. 39, 207)
  - (b) Coastal Area: Naval co-operation - 3 "

(Overseas there were eighteen squadrons and two flights formed plus three forming. Of these two (one bomber, one Army co-operation) were in Ireland and one in the Rhineland).
3. Actual strength, March, 1922 (1)
  - (a) Inland Area: Bomber - 3 squadrons (Nos. 39, 100, 207).  
Fighter - 1 " (No. 25)  
Army co-operation - 2 " (Nos. 2, 4.)  
Communications - 1 " (No. 24).
  - (b) Coastal Area: Naval co-operation - 4 "

Nos. 2(A.C) and 100(B) came to Inland Area from Ireland, March, 1922.

(Overseas there were nineteen squadrons and one flight. Of these one was in the Rhineland until it was disbanded in June, 1922).

(1) From Air Force List, under date.

## II. HOME-BASED BOMBER SQUADRONS, 1924-1939<sup>(1)</sup>

### 1. March, 1924

#### INLAND AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
<u>Fully formed:-</u>			
Day bombers (Regular)	100	Spittlegate	DH9a
<u>Began to form 1923/4:-</u>			
Day bomber (Regular) (4)	11	Netheravon	Fawn
	12	Andover	Fawn
	15	Martlesham	DH9a
	22	Martlesham	DH9a
Night bomber (Regular) (4)	7	Bircham Newton	Virginia
	9	Manston	Vimy
	58	Worthy Down	Vimy
	99	Bircham Newton	Vimy

#### Not counted among the 52 Home Defence squadrons:-

'Reserve' day bomber (Regular)	39	Spittlegate	DH9a
" " " "	207	Eastchurch	DH9a

(There were now two Fighter Squadrons formed plus five which had begun to form in 1923/4).

### 2. March, 1925

#### INLAND AREA

#### Formed:-

Day bomber (Regular)	11	Netheravon	Fawn
	12	Andover	Fawn
	100	Spittlegate	Fawn (from DH9a May, 1924).
Night bomber (Regular)	7	Bircham Newton	Virginia
	9	Manston	Virginia (from Vimy Feb. 1925).
	58	Worthy Down	Virginia (from Vimy March, 1925).
	99	Bircham Newton	Aldershot (from Vimy Aug. 1924).

#### Skeleton squadrons attached to Aircraft Armament Experimental Establishment:

Day bomber (Regular)	15	Martlesham	DH9a
	22	Martlesham	DH9a

TOTAL: Three day bomber + four night bomber + two skeleton day bomber = nine squadrons (all Regular).  
 (The two Reserve squadrons, Nos. 39 and 207, as before, not included).  
 (There were now nine Fighter squadrons fully formed).

(1) Based upon lists prepared in this Branch, supplemented by papers in A.M. File S.22846 and other files referred to in text of Narrative.

3. March, 1926INLAND AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
<u>Formed:-</u>			
Day bomber (Regular)  (A.A.F.)	11	Netheravon	Fawn
	12	Andover	Fawn
	100	Spittlegate	Fawn
	600	Northolt	DH9a (formed Oct. 1925).
	601	Northolt	DH9a (formed Oct. 1925).
	602	Renfrew	DH9a (formed Sept. 1925).
	603	Turnhouse	DH9a (formed Oct. 1925).
Night bomber (Regular)	7	Bircham Newton	Virginia
	9	Manston	Virginia
	58	Worthy Down	Virginia
	99	Bircham Newton	Hyderabad (from Aldershot Dec. 1925).
	(S.R.) 502	Aldergrove	Vimy (formed May, 1925).

Skeleton squadrons attached to A & A.E. Establishment:-

Day bomber (Regular)	15	Martlesham	DH9a
	22	Martlesham	DH9a
<u>TOTAL:</u> Day bomber: Regular	3	Night bomber: Regular	4
A.A.F.	4	S.R.	1
Skeleton	2		5
	<u>9</u>		<u>5</u>

= Fourteen Bomber squadrons, of which five formed 1925/6 and two skeleton.  
(There were now eleven Fighter squadrons, of which two formed 1925/6).

4. March, 1927Formed:-WESSEX BOMBING AREA

Day bomber (Regular)	11	Netheravon	Horsley (from Fawn Dec. 1926).
	12	Andover	Fawn
	100	Spittlegate	Horsley (from Fawn Nov. 1926).
Night bomber (Regular)	7	Bircham Newton	Virginia
	9	Manston	Virginia
	58	Worthy Down	Virginia
	99	Bircham Newton	Hyderabad

No. 1 AIR DEFENCE GROUP

Day bomber (A.A.F.)	600	Hendon (Jan. 1927)	DH9a
	601	Hendon " "	DH9a
	602	Renfrew	DH9a
	603	Turnhouse	DH9a
	605	Castle Bromwich	DH9a (formed Oct. 1926).
Night bomber (S.R.)	502	Aldergrove	Vimy
	503	Waddington	Lynx (formed Oct. 1926).

Skeleton squadrons attached to A. & A.E. Establishment:-

INLAND AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
Day bomber (Regular)	15	Martlesham	Horsley (from DH9a Feb. 1927)
	22	Martlesham	Experimental
<u>TOTAL:</u> Day bomber: Regular	3	Night bomber: Regular	4
A.A.F.	5	S.R.	2
Skeleton	2		6
	10		

= Sixteen Bomber squadrons, of which two formed 1926/7 and two skeleton.  
(There were now twelve Fighter squadrons, of which one formed 1926/7).

5. March, 1928

Formed:-

WESSEX BOMBING AREA

Day bomber (Regular)	11	Netheravon	Horsley
	12	Andover	Fawn
	100	Bicester (Jan. 1928)	Horsley
	101	Bircham Newton	Sidestrand (formed March 1928 two flights only).
Night bomber (Regular)	7	Worthy Down (April 1927)	Virginia
	9	Manston	Virginia
	10	Upper Heyford	Hyderabad (formed Jan. 1928).
	58	Worthy Down	Virginia
	99	Upper Heyford (Jan. 1928).	Hyderabad

No. 1 AIR DEFENCE GROUP

Day bomber (S.R.)	504	Hucknall	Horsley (formed March, 1928).
(A.A.F.)	600	Hendon	DH9a
	601	Hendon	DH9a
	602	Renfrew	Fawn (from DH9a Aug. 1927).
	603	Turnhouse	DH9a
	605	Castle Bromwich	DH9a
Night bomber (S.R.)	502	Aldergrove	Vimy
	503	Waddington	Lynx

Skeleton squadrons attached to A. & A.E. Establishment:-

INLAND AREA

Day bomber (Regular)	15	Martlesham	Horsley
	22	Martlesham	-

Note: Of the two 'Reserve' squadrons under Inland Area but not counted in the 52, No. 39 moved from Spittlegate to Bircham Newton in Jan. 1928 and No. 207 was re-equipped from DH9a to Fairey IIIIF in March, 1928.

<u>TOTAL:</u> Day bomber: Regular	4	Night bomber: Regular	5
S.R.	1	S.R.	2
A.A.F.	5		7
Skeleton	2		
	12		

= Nineteen Bomber squadrons, of which three formed 1927/8 and two skeleton.  
(There were now twelve Fighter squadrons, as in March, 1927).

6. March, 1929Formed:-WESSEX BOMBING AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
Day bomber (Regular)	12	Andover	Fox (from Fawn Jan. 1929).
	33	Netheravon	Horsley (formed March 1929).
	100	Bicester	Horsley
	101	Bircham Newton	Sidestrand
			(two flights only).
Night bomber (Regular)	7	Worthy Down	Virginia
	9	Manston	Virginia
	10	Upper Heyford	Hyderabad
	58	Worthy Down	Virginia
	99	Upper Heyford	Hyderabad

No. 1 AIR DEFENCE GROUP

Day Bomber (S.R.) (A.A.F.)	504	Hucknall	Horsley
	600	Hendon	DH9a
	601	Hendon	DH9a
	602	Renfrew	Fawn
	603	Turnhouse	DH9a
	605	Castle Bromwich	DH9a
Night bomber (S.R.)	502	Aldergrove	Vimy
	503	Waddington	Lynx and Fawn.

Skeleton squadrons attached to A. & A.E. Establishment:-INLAND AREA

Day bomber (Regular)	15	Martlesham	Experimental
			Horsleys given up Feb. 1929).
	22	Martlesham	Experimental

Note: No. 33 Squadron was formed to replace No. 11 which went overseas in December, 1928. Another Squadron, No. 35 was also formed to replace the 'Reserve' or 'Emergency' Squadron No. 39 which went overseas in Feb. 1929. No. 35 was equipped with DH9a aircraft, and it and No. 207 (Fairey III F) were classed as 'Emergency' squadrons: they were still not counted in the 52 but were earmarked as the two Bomber squadrons to accompany Contingent A of the Army Expeditionary Force.<sup>(1)</sup>

TOTAL:

Day bombers:	Regular	4	Night bomber:	Regular	5
	S.R.	1		S.R.	2
	A.A.F.	5			7
	Skeleton	2			
		<u>12</u>			

= Nineteen Bomber squadrons, of which one formed 1928/9 and two skeleton.  
(There were still twelve Fighter squadrons).

(1) A.M. File S.30973/2

7. March, 1930Formed:WESSEX BOMBING AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
Day bomber (Regular)	12	Andover	Fox
	33	Eastchurch	Hart (from Horsley March, 1930).
	35	Bircham Newton	Fairey III F (from DH9a Nov. 1929).
	100	Bicester	Horsley
	101	Andover (Oct. 1929)	Sidestrans (two flights only).
Night Bomber (Regular)	207	Bircham Newton	Fairey III F
	7	Worthy Down	Virginia
	9	Manston	Virginia
	10	Upper Heyford	Hyderabad
	58	Worthy Down	Virginia
	99	Upper Heyford	Hinaidi (from Hyderabad Dec. 1929).

Note: Nos. 35 and 207, though still classed as 'Emergency' squadrons were counted in the 52 Squadron Scheme from Jan. 1930. (1)

No. 1 AIR DEFENCE GROUP

Day bomber (S.R.)  (A.A.F.)	501	Filton	(formed June 1929).
	504	Hucknall	Horsley
	600	Hendon	DH9a
	601	Hendon	DH9a
	602	Renfrew	Fawn
	603	Turnhouse	DH9a
	604	Hendon	Wapiti (formed March, 1930).
	605	Castle Bromwich	DH9a
Night bomber (S.R.)	608	Thornaby	Wapiti (formed March, 1930).
	502	Aldergrove	Hyderabad
	503	Waddington	Hinaidi

Note: No. 607 (D.B.) was also formed, on paper, March, 1930 but did not in reality come into existence until October, 1932. (2)

Skeleton squadrons attached to A. & A.E. Establishment:

INLAND AREA

Day bomber (Regular)	15	Martlesham	Experimental
	22	Martlesham	Experimental
<u>TOTAL:</u> Day bomber:	Regular 6	Night bomber:	Regular 5
	S.R. 2		S.R. 2
	A.A.F. 7		<u>7</u>
	Skeleton <u>2</u>		
	17		

= Twenty-four Bomber squadrons, of which three formed 1929/30 and two skeleton.

(There were now thirteen Fighter squadrons, of which one formed 1929/30).

(1) A.M. File S. 22846/I/79; *ibid*, II/1

(2) No. 1 A.D. Group O.R.B., under date.

8. March, 1931Formed:WESSEX BOMBING AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
Day bomber (Regular)	12	Andover	Hart (from Fox Jan. 1931).
	33	Bicester (Nov. 1930)	Hart
	35	Bircham Newton	Fairey III F
	101	Andover	Sidestrans (two flights only)
Night Bomber (Regular)	207	Bircham Newton	Fairey III F
	7	Worthy Down	Virginia
	9	Boscombe Down (Nov. 1930)	Virginia
	10	Upper Heyford	Hinaidi (from Hyderabad Feb. 1931)
	58	Worthy Down	Virginia
	99	Upper Heyford	Hinaidi

Note: No. 100 Squadron had now been converted to torpedo bombing and detached to Coastal Area.

No. 1 AIR DEFENCE GROUP

Day bomber (S.R.) (A.A.F.)	501	Filton	
	504	Hucknall	Horsley
	600	Hendon	Wapiti (from DH9a May, 1930)
	601	Hendon	Wapiti (from DH9a May, 1930)
	602	Renfrew	Wapiti (from Fawn May, 1930)
	603	Turnhouse	Wapiti (from DH9a May, 1930)
	604	Hendon	Wapiti
	605	Castle Bromwich	Wapiti (from DH9a May, 1930)
	608	Thornaby	Wapiti
	500	Manston	Virginia (formed March, 1931).
Night bomber (S.R.)	502	Aldergrove	Hyderabad
	503	Waddington	Hinaidi

Skeleton squadrons attached to A. & A.E. Establishment:-INLAND AREA

Day bomber (Regular)	15	Martlesham	Experimental
	22	Martlesham	Experimental
<u>TOTAL:</u> Day bomber: Regular	5	Night bomber: Regular	5
S.R.	2	S.R.	3
A.A.F.	7		<u>8</u>
Skeleton	<u>2</u>		
	16		

= Twenty-four Bomber squadrons, of which one formed 1930/1 and two skeleton.  
(There were still thirteen Fighter squadrons).

9. March, 1932Formed:-WESSEX BOMBING AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
Day bomber (Regular)	12	Andover	Hart
	18	Upper Heyford	Hart (formed Oct. 1931)
	33	Bicester	Hart
	35	Bircham Newton	Fairey III F
	40	Upper Heyford	Gordon (formed April, 1931)
	57	Netheravon	Hart (formed Oct. 1931).
	101	Andover	Sidestrand (two flights only).
	207	Bircham Newton	Fairey III F
Night bomber (Regular)	7	Worthy Down	Virginia
	9	Boscombe Down	Virginia
	10	Boscombe Down (April, 1931)	Hinaidi
	58	Worthy Down	Virginia
	99	Upper Heyford	Hinaidi

No. 1 AIR DEFENCE GROUP

Day bomber (S.R.)	501	Filton	
(A.A.F.)	504	Hucknall	Horsley
	600	Hendon	Wapiti
	601	Hendon	Wapiti
	602	Renfrew	Wapiti
	603	Turnhouse	Wapiti
	604	Hendon	Wapiti
	605	Castle Bromwich	Wapiti
	608	Thornaby	Wapiti
Night bomber (S.R.)	500	Manston	Virginia
	502	Aldergrove	Virginia (from Hyderabad Dec. 1931).
	503	Waddington	Hinaidi

Skeleton squadrons attached to A. & A.E. Establishment:INLAND AREA

Day bomber (Regular)	15	Martlesham	Experimental
	22	Martlesham	Experimental

<u>TOTAL:</u>	Day bomber:	Regular	8	Night bomber:	Regular	5
		S.R.	2		S.R.	3
		A.A.F.	7			<u>8</u>
		Skeleton	2			
			<u>19</u>			

= Twenty-seven Bomber squadrons, of which three formed 1931/2 and two skeleton.  
(There were still thirteen Fighter squadrons).



10. March, 1933WESSEX BOMBING AREAFormed:-

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
Day bomber (Regular)	12	Andover	Hart
	18	Upper Heyford	Hart
	33	Bicester	Hart
	35	Bircham Newton	Gordon (from Fairey III F July, 1932)
	40	Abingdon (Oct. 1932)	Gordon
	57	Upper Heyford (Sept. 1932)	Hart
	101	Andover	Sidestrand (two flights only)
	207	Bircham Newton	Gordon (from Fairey III F Aug. 1932).
Night bomber (Regular)	7	Worthy Down	Virginia
	9	Boscombe Down	Virginia
	10	Boscombe Down	Virginia (from Hinaidi Sept. 1932)
	58	Worthy Down	Virginia
	99	Upper Heyford	Hinaidi

Note:- In November, 1932 Nos. 18 and 57 replaced Nos. 35 and 207 as the two Bomber squadrons earmarked for Contingent A of the Expeditionary Force. In Dec. 1932 No. 33 was similarly earmarked for Contingent B (1) Nos. 35 and 207 were still designated as 'Emergency' squadrons.

No. 1 AIR DEFENCE GROUP

Day bomber (S.R.) (A.A.F.)	501	Filton	
	504	Hucknall	Horsley
	600	Hendon	Hart (from Wapiti Feb. 1933)
	601	Hendon	Hart (from Wapiti Feb. 1933)
	602	Abbotsinch (Jan. 1933)	Wapiti
	603	Turnhouse	Wapiti
	604	Hendon	Wapiti
	605	Castle Bromwich	Wapiti
	607	Usworth	Wapiti (effect- ively formed Oct. 1932).
	608	Thornaby	Wapiti
Night bomber (S.R.)	500	Manston	Virginia
	502	Aldergrove	Virginia
	503	Waddington	Hinaidi

Skeleton squadrons attached to A. & A.E. Establishment:-INLAND AREA

Day bomber (Regular)	15	Martlesham	Experimental		
	22	Martlesham	Experimental		
<u>TOTAL:</u> Day bomber:	Regular	8	Night bomber: Regular	5	
	S.R.	2		S.R.	<u>3</u>
	A.A.F.	8			<u>8</u>
	Skeleton	<u>2</u>			
		20			

= Twenty-eight Bomber squadrons, of which one formed 1932/3 and two skeleton.

(There were still thirteen Fighter squadrons)

(1) A.M. File S. 30973/24A, 31A.

DS 85048/1(163)

11. March, 1934Formed:-WESSEX BOMBING AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>
Day bomber (Regular)	* 12	Andover	Hart
	101	Andover	Sidestrand (two flights only)
Night bomber (Regular)  (S.R.)	7	Worthy Down	Virginia
	9	Boscombe Down	Virginia
	10	Boscombe Down	Virginia
	58	Worthy Down	Virginia
	500	Manston	Virginia
	502	Aldergrove	Virginia
	503	Waddington	Hinaidi

CENTRAL BOMBING AREA

(formed October 1933)

Day bomber (Regular)	* 18	Upper Heyford	Hart
	* 33	Bicester	Hart
	✓ 35	Bircham Newton	Gordon
	40	Abingdon	Gordon
	* 57	Upper Heyford	Hart
	✓ 207	Bircham Newton	Gordon
(S.R.)	501	Filton	
	504	Hucknall	Horsley
	99	Upper Heyford	Heyford (from Hinaidi Jan. 1934)
Night bomber (Regular)			

Note: \* Nos. 12 and 33 were now the two bomber squadrons earmarked for Contingent B of the Expeditionary Force, with Nos. 18 and 57 for Contingent A.

✓ Nos. 35 and 207 designated as 'Emergency' squadrons.

No. 1 AIR DEFENCE GROUP

(now in charge of A.A.F. squadrons only)

Day bomber (A.A.F.)	600	Hendon	Hart
	601	Hendon	Hart
	602	Abbotsinch	Hart (from Wapiti Feb. 1934)
	603	Turnhouse	Hart (from Wapiti Feb. 1934)
	604	Hendon	Wapiti
	605	Castle Bromwich	Wapiti
	607	Usworth	Wapiti
	608	Thornaby	Wapiti

Skeleton squadrons attached to A. & A.E. Establishment:-

INLAND AREA

Day bomber (Regular)	15	Martlesham	Experimental
	22	Martlesham	Experimental

<u>TOTAL:</u>	Day bomber:	Regular	8	Night bomber:	Regular	5
		S.R.	2		S.R.	3
		A.A.F.	8			8
		Skeleton	2			
			20			

= Twenty-eight squadrons, of which two skeleton.  
(There were still thirteen Fighter squadrons).

12. March, 1935APPENDIX 2WESSEX BOMBING AREAFormed:-

<u>Class</u>	<u>Sq. No.</u>	<u>Stations</u>	<u>Aircraft</u>
Day bomber (Regular)	* 12	Andover	Hart
	142	Andover	Hart (formed June 1934 at Netheravon)
Night bomber (Regular)	7	Worthy Down	Virginia
	9	Boscombe Down	Virginia
	10	Boscombe Down	Heyford (from Virginia Aug. 1934)
	58	Worthy Down	Virginia
	99	Mildenhall (Nov. 1934)	Heyford
(S.R.)	500	Manston	Virginia
	502	Aldergrove	Virginia
	503	Waddington	Hinaidi

CENTRAL BOMBING AREA

Day bomber (Regular)	15	Abingdon (June, 1934)	Hart (from experimental June, 1934, when re-formed with new personnel)
	* 18	Upper Heyford	Hart
	* 33	Upper Heyford (Nov. 1934)	Hart
	/ 35	Bircham Newton	Gordon
	40	Abingdon	Gordon
	* 57	Upper Heyford	Hart
	101	Bicester (Dec. 1934) (increased to 3 flights)	Sidestrans
(S.R.)	/ 207	Bircham Newton	Gordon
	501	Filton	Wallace
	504	Hucknall	Wallace

Note: \* Expeditionary Force squadrons.  
 / 'Emergency' squadrons.

No. 1 AIR DEFENCE GROUP

Day bomber (A.A.F.)	602	Abbotsinch	Hart
	603	Turnhouse	Hart
	605	Castle Bromwich	Hart (from Wapiti Dec. 1934)
	607	Usworth	Wapiti
	608	Thornaby	Wapiti

Note: Nos. 600, 601 and 604 were converted to Fighters July, 1934.

<u>TOTAL:</u> Day bombers:	Regular	10	Night Bomber:	Regular	5
	S.R.	2		S.R.	3
	A.A.F.	5			8
		<u>17</u>			

= Twenty-five Bomber squadrons of which one formed and one re-formed with new personnel 1934/5. Since March, 1934 three squadrons had been converted to Fighters and one skeleton squadron (No. 22) to Torpedo Bombers.  
 (There were now seventeen Fighter squadrons of which one formed and three converted from Bombers 1934/5).

13. March, 1936Formed:WESSEX BOMBING AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Stations</u>	<u>Aircraft</u>
Night bombers (Regular)	7	Worthy Down	Heyford (from Virginia April, 1935)
	9	Aldergrove	Heyford (from (Oct. 1935) Virginia March, 1936)
	10	Boscombe Down	Heyford
	38	Mildenhall	Heyford (formed Sept. 1935)
	58	Upper Heyford (1935)	Virginia
	97	Boscombe Down	Heyford (formed Sept. 1935)
	99	Mildenhall	Heyford
	102	Worthy Down	Heyford (formed Oct. 1935)
	214	Andover	Virginia (formed Sept. 1935 at Boscombe Down)
	215	Upper Heyford	Virginia (formed Oct. 1935)

CENTRAL BOMBING AREA

<u>Class</u>	<u>Sq. No.</u>	<u>Stations</u>	<u>Aircraft</u>
Day bombers (Regular)	15	Abingdon	Hart
	18	Bircham Newton (Jan. 1936)	Hart
	21	Bircham Newton	Hind (formed Dec. 1935)
	34	Bircham Newton	Hind (formed Dec. 1936)
	40	Abingdon	Hind (from Gordon March, 1936)
	49	Bircham Newton	Hind (formed Feb. 1936)
	57	Upper Heyford	Hart
	98	Abingdon	Hind (formed Feb. 1936)
	101	Bicester	Sidestrang
	104	Abingdon	Hind (formed Jan. 1936)
	218	Upper Heyford	Hind (formed March, 1936)

No. 1 AIR DEFENCE GROUP

<u>Class</u>	<u>Sq. No.</u>	<u>Stations</u>	<u>Aircraft</u>
Day bomber (A.A.F.)	500	Manston	Hart (from Virginia Dec. 1935)
	501	Filton	Wallace
	502	Aldergrove	Wallace (from Virginia)
	503	Waddington	Wallace (from Hinaidi)
	504	Hucknall	Wallace
	602	Abbotsinch	Hart
	603	Turnhouse	Hart
	605	Castle Bromwich	Hart
	607	Usworth	Wapiti
	608	Thornaby	Wapiti
	609	Yeadon	Hart (formed Feb. 1936)
	610	Hooton Park	Hart (formed Feb. 1936)
	611	Speke	Hart (formed Feb. 1936)

Note: Nos. 500, 502, 503, converted from night to day bombers 1935/6.  
 Nos. 500, 501, 503, 504 renamed A.A.F. instead of S.R. and transferred to  
 No. 1 A.D. Group. No. 502 so renamed and transferred July, 1936.

<u>TOTAL:</u>	Day bomber:	Regular	11	Night bomber:	Regular	10
		A.A.F.	<u>13</u>			
			<u>24</u>			

= Thirty-four Bomber squadrons of which fourteen formed and three converted from night to day Bombers 1935/6. In October, 1935 five squadrons (Nos. 12, 33, 35, 142, and 207) had been sent overseas owing to the Italo-Abyssinian crisis.

### U.K. BOMBER SQUADRONS

March, 1937

#### No. 1 GROUP (Formed from Central Area May 1936)

<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>	
15	Abingdon	Hinds	(Re-equipped from Harts April 1936)
18	Upper Heyford	Hinds	(Moved from Bircham Newton September 1936. Re-equipped from Harts May 1936)
21	Lympe	Hinds	(Moved from Bircham Newton to Abbotsinch July 1936. Moved from Abbotsinch to Lympe November 1936).
34	Lympe	Hinds	(Moved from Bircham Newton to Abbotsinch July 1936. Moved from Abbotsinch to Lympe November 1936).
40	Abingdon	Hinds	
57	Upper Heyford	Hinds	
90	Bicester	Hinds	(Formed March 1937).
101	Bicester	Overstrands	(Re-equipped from Sidestrands July 1936).
108	Farnborough	Hinds	(Formed Jan. 1937 at Upper Heyford. Moved February 1937).
218	Upper Heyford	Hinds	
226	Upper Heyford	Audaxes	(Formed March 1937).

#### No. 2 GROUP (Formed May 1936)

12	Andover	Hinds	(Returned from overseas August 1936).
35	Worthy Down	Gordons	(Returned from overseas August 1936).
44	Andover	Hinds	(Formed March 1937)
49	Worthy Down	Hinds	(Moved from Bircham Newton August 1936).
52	Upwood	Hinds	(Formed January 1937 at Abingdon. Moved to Upwood March 1937).
63	Upwood	Hinds	(Formed February 1937 at Andover. Moved March 1937).
83	Turnhouse	Hinds	(Formed August 1936)
98	Hucknall	Hinds	(Moved from Abingdon August 1936).
103	Andover	Hinds	(Formed August 1936).
104	Hucknall	Hinds	(Moved from Abingdon August 1936).
107	Old Sarum	Hinds	(Formed August 1936 at Abingdon. Moved February 1937).
142	Andover	Hinds	(Re-equipped from Harts Dec. 1936. Returned from overseas Dec. 1936. (One Blenheim prototype December 1936).
207	Worthy Down	Gordons	(Re-equipped from Vincents Sept. 1936. Returned from overseas August 1936).
502	Abbotsinch	Hinds	(Re-equipped from Harts June 1936).
605	Castle Bromwich	Harts	

No. 3 GROUP (Formed from Western Area May 1936)

Sq. No.	Station	Aircraft	
7	Finningley	Heyfords	(Moved from Worthy Down Oct. 1936).
9	Scampton	Heyfords	(Moved from Aldergrove Oct. 1936).
10	Dishforth	Heyfords	(Moved from Boscombe February 1937).
38	Mildenhall	Hendons	(Re-equipped from Heyfords November 1936).
51	Driffield	Ansons and Virginias	(Formed March 1937).
58	Boscombe Down	Virginias	(Moved from Upper Heyford September 1936).
61	Hemswell	Ansons	(Formed March 1937).
75	Driffield	Ansons and Virginias	(Formed March 1937).
78	Dishforth	Heyfords	(Formed November 1936 at Boscombe Down. Moved from Boscombe Down February 1937).
97	Leconfield	Heyfords	(Moved from Boscombe Down February 1936).
99	Mildenhall	Heyfords	
102	Finningley	Heyfords	(Moved from Worthy Down September 1936).
114	Wyton	Hinds	(Formed December 1936).
139	Wyton	Hinds	(Formed September 1936).
144	Hemswell	Ansons	(Formed January 1937).
166	Leconfield	Heyfords	(Formed November 1936 at Boscombe Down. Moved February 1937).
214	Scampton	Harrows	(Re-equipped from Virginias March 1937. Previously at Andover, then Aldergrove).
215	Driffield	Ansons	(Re-equipped from Virginias March 1937. Moved from Upper Heyford September 1936).

No. 6 GROUP (Formed from No. 1 Air Defence Group April 1936)

500	Manston	Hinds	(Re-equipped from Harts February 1937).
501	Filton	Hart	
502	Aldergrove	Hinds	(Transferred from 3 Group July 1936).
503	Waddington		
504	Hucknall	Wallaces	
603	Turnhouse	Harts	
609	Yeadon	Harts	
610	Hooton Park	Harts	
611	Speke	Harts	

TOTAL Fifty-three squadrons  
 since March 1936      seventeen new ones formed  
                                  four returned from Middle East (12, 35, 207, 142).  
                                  Two converted to fighter (608, 609).

March, 1938

No. 1 GROUP

15	Abingdon	Hinds	
18	Upper Heyford	Hinds	
21	Lympne	Hinds	
34	Lympne	Hinds	
40	Abingdon	Hinds	
57	Upper Heyford	Blenheims	(Re-equipped from Hinds March 1938).
62	Cranfield	Blenheims	(Formed at Abingdon May 1937 with Hinds. Moved July 1937. Re-equipped February 1938).
82	Cranfield	Blenheims	(Formed at Andover June 1937 with Hinds. Moved July 1937). (Re-equipped March 1938).

No. 1 GROUP (Contd.)APPENDIX 2

Sq. No.	Station	Aircraft	
90	Bicester	Blenheims	(Re-equipped June 1937 from Hinds).
101	Bicester	Overstrands	
103	Usworth (No. 12 Group Station)	Hinds	(Moved from Andover March 1937).
105	Harwell	Battle	(Formed April 1937 with Audaxes Re-equipped August 1937).
107	Harwell	Hinds	(Moved from Old Sarum June 1937).
108	Cranfield	Hinds	(Moved from Farnborough July 1937).
185	Abingdon	Hinds	(Formed March 1938).
218	Upper Heyford	Battles	(Re-equipped from Hinds February 1938).
226	Harwell	Battles	(Moved from Upper Heyford April 1937. Re-equipped from Hinds October 1937).

No. 2 GROUP

12	Andover	Battles	(Re-equipped from Hinds February 1938).
35	Cottesmore	Wellesleys	(Re-equipped from Gordons September 1937).
52	Upwood	Battles	(Re-equipped from Hinds November 1937).
63	Upwood	Battles	(Re-equipped from Hinds May-July 1937).
98	Hucknall	Hinds	
104	Hucknall	Hinds	
114	Wyton	Blenheims	(Re-equipped from Hinds March 1937).
139	Wyton	Blenheims	(Re-equipped from Hinds July 1937).
142	Andover	Battles	(Re-equipped from Hinds March 1938).
207	Worthy Down	Wellesleys	(Re-equipped from Gordons September 1937).
602	Abbotsinch	Hinds	

No. 3 GROUP

9	Stradishall	Heyfords	(Moved from Scampton March 1938).
37	Feltwell	Harrows	(Formed April 1937).
38	Marham	Hendons	(Moved from Mildenhall May 1937).
77	Honington	Wellesleys	(Formed June 1937 at Finningley. Moved July).
99	Mildenhall	Heyfords	
102	Honington	Heyfords	(Moved from Finningley July 1937).
115	Marham	Harrows	(Formed June 1937).
148	Stradishall	Wellesleys	(Formed June 1937).
149	Mildenhall	Heyfords	(Formed April 1937).
214	Feltwell	Harrows	(Moved from Scampton April 1937).

No. 4 GROUP

<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>	
7	Finningley	Whitleys V	(Re-equipped from Heyfords March 1938).
10	Dishforth	Whitleys	(Re-equipped from Heyfords June 1937).
51	Boscombe Down	Whitleys	(Moved from Driffield March 1937). (Re-equipped from Ansons March 1937).
58	Boscombe Down	Whitleys	(Re-equipped from Virginias January 1938).
75	Driffield	Harrows	(Re-equipped from Ansons September 1937).
76	Finningley	Wellesleys	(Formed April 1937).
78	Dishforth	Whitleys	(Re-equipped from Heyfords July 1937).
88	Boscombe Down	Battles	(Formed at Waddington with Hinds June 1937. Moved July 1937. Re-equipped Dec. 1937).
97	Leconfield	Heyfords	
166	Leconfield	Heyfords	
215	Driffield	Harrows	(Re-equipped from Ansons by November 1937).

No. 5 GROUP (Formed July 1937)

44	Waddington	Blenheims	(Moved from Andover June 1937). (Re-equipped from Hinds Dec. 1937).
49	Scampton	Hinds	(Moved from Worthy Down March 1938).
50	Waddington	Hinds	(Formed May 1937).
61	Hemswell	Blenheims	
83	Scampton	Hinds	(Moved from Turnhouse March 1937).
110	Waddington	Blenheims	(Formed May 1937. Re-equipped from Hinds December 1937).
113	Grantham	Hinds	(Formed at Upper Heyford May 1937. Moved August).
144	Hemswell	Blenheims	(Re-equipped from Ansons August 1937).
211	Grantham	Hinds	(Formed at Mildenhall June 1937 with Audaxes. Re-equipped August).

No. 6 GROUP

500	Manston	Hinds	
501	Filton	Hinds	(January 1938).
502	Aldergrove	?	
503	Waddington	?	
504	Hucknall	Hinds	(Re-equipped from Wallace May 1937).
603	Turnhouse	Hinds	(Re-equipped from Harts January 1938).
605	Castle Bromwich	Harts	
609	Yeadon	Harts	
610	Hooton Park	Hinds	(Re-equipped Harts January 1938).
611	Speke	Harts	

Total 68 Squadrons

Since March 1937 fifteen new ones formed.



U.K. BOMBER SQUADRONSMarch, 1939No. 1 GROUP

<u>Sq. No.</u>	<u>Station</u>	<u>Aircraft</u>	
12	Andover	Battles	
15	Abingdon	Battles	(Re-equipped from Hinds June 1938).
21	Eastchurch	Blenheims	(Re-equipped from Hinds August 1938) (Moved from Lympne August 1938).
40	Abingdon	Battles	(Re-equipped from Hinds June 1938).
57	Upper Heyford	Blenheims	
88	Boscombe Down	Battles	
90	Bicester	Blenheims	
101	Bicester	Blenheims	(Re-equipped from Overstrands June 1938).
103	Abingdon	Battles	(Moved from Usworth to Abingdon September 1938, and to Benson April 1939) (Re-equipped from Hinds July 1938).
105	Harwell	Battles	
107	Harwell	Blenheims	(Re-equipped from Hinds September 1938).
142	Andover	Battles	
150	Boscombe Down	Battles	(Formed August 1938).
218	Boscombe Down	Battles	(Moved from Upper Heyford April 1938).
226	Harwell	Battles	

No. 2 GROUP

18	Upper Heyford	Blenheims	(Re-equipped from Hinds August 1938).
34	Upper Heyford	Blenheims	(Re-equipped from Hinds July 1938).
35	Cottesmore	Battles	(Re-equipped from Wellesleys April 1938).
52	Upwood	Battles	
62	Cranfield	Blenheims	
63	Upwood	Battles	
82	Cranfield	Blenheims	
98	Hucknall	Battles	(Re-equipped from Hinds June 1938).
104	Bassingbourn	Blenheims	(Re-equipped from Hinds May 1938).
108	Bassingbourn	Blenheims	(Moved from Cranfield May 1938).
			(Re-armed from Hinds June 1938).
114	Wyton	Blenheims	
139	Wyton	Blenheims	
207	Cottesmore	Battles	(Re-equipped from Wellesleys April 1938).

No. 3 GROUP

9	Stradishall	Wellingtons	(Re-equipped from Heyfords January 1939).
37	Feltwell	Harrows	(Re-equipped to Wellingtons May 1938).
38	Marham	Wellingtons	(Re-equipped from Hendon November 1938).
75	Honington	Harrows	(Moved from Driffild July 1938).
99	Mildenhall	Wellingtons	(Re-equipped from Heyfords October, 1938).
115	Marham	Wellingtons	(Re-equipped from Harrows March 1939. Fully operational June 1939).

No. 3 GROUP (Contd.)

Sq. No.	Station	Aircraft	
148	Stradishall	Wellingtons	(Moved from Scampton March 1938. Re-equipped from Wellesleys February 1939).
149	Mildenhall	Wellingtons	(Re-equipped from Heyfords January 1939).
214	Feltwell		
215	Honington	Harrows	(Moved from Driffield July 1938). (Received Wellingtons July 1939).

No. 4 GROUP

7	Finningley	Whitleys III	(Hampdens received April 1939).
10	Dishforth	Whitleys	
51	Linton-on-Ouse	Whitleys	(Moved from Boscombe Down April 1938).
58	Linton-on-Ouse	Whitleys	(Moved from April 1938).
76	Finningley	Hampdens	(Re-equipped from Wellesleys March 1939).
77	Driffield	Whitleys	(Moved from Honington July 1938). (Re-equipped from Wellesleys November 1938).
78	Dishforth	Whitleys	
97	Leconfield		(Ceased to be operational June 1938 on formation of A.O.S.)
102	Driffield	Heyfords	(Moved from Honington July 1938).
166	Leconfield	Heyfords	(Re-equipped May 1939 to Whitleys). (Squadron ceased to be operational June 1938 on formation of A.O.S.).

No. 5 GROUP

44	Waddington	Blenheims	
49	Scampton	Hampdens	(Re-equipped from Hinds December 1938).
50	Waddington	Hampdens	(Re-equipped from Hinds December 1938).
61	Hemswell	Blenheims	
83	Scampton	Hampdens	(Re-equipped from Hinds December 1938).
106	Thornaby	Battles	(Formed June 1938 with Hinds Re-armed July 1938).
110	Waddington	Blenheims	
144	Hemswell	Hampdens	(Re-equipped from Blenheims March 1939).
185	Thornaby	Battles	(Re-equipped from Hinds June 1938. Moved from Abingdon September 1938).

TOTAL Fifty-seven squadrons.

Since March 1938 two had gone overseas 211 Sqdn. (April 1938) and 113 Sqdn. (May 1938), and twelve converted:

500 became G.R. November 1938  
 501 became fighter December 1938  
 502 became G.R. November 1938  
 503 disbanded November 1938  
 504 became fighter October 1938  
 602 became Army Co-op November 1938  
 603 became fighter October 1938  
 605 became fighter January 1939  
 609 became fighter November 1938  
 610 became fighter January 1939  
 611 became fighter January 1939  
 616 formed November 1938 and became fighter January 1939 (Gauntlets)  
 One new one formed.

ORDER OF BATTLEU.K. BOMBER SQUADRONS (WAR STATIONS)29TH AUGUST, 1939No. 1 GROUP

Mobilizable	12	Bicester	Battles	
	15	Abingdon	Battles	I.E. 24
	40	Abingdon	Battles	
	88	Boscombe Down	Battles	
	103	Benson	Battles	(These were peace stns.
	105	Harwell	Battles	(War stns. were in France
	142	Bicester	Battles	
	150	Benson	Battles	
	218	Boscombe Down	Battles	
	226	Harwell	Battles	
Non-mobilizable	35	Cranfield	Battles	I.E. 24
	52	Abingdon	Battles	
	63	Abingdon	Battles	
	98	Hucknall	Battles	
	207	Cranfield	Battles	

No. 2 GROUP

Mobilizable	18	Upper Heyford	(War Station France)	Blenheims I.)
	21	Watton		Blenheims I }
	57	Upper Heyford	(War Station France)	Blenheims I }
	82	Watton		Blenheims IV }
	90	West Raynham		Blenheims IV }
	101	West Raynham		Blenheims IV }
	107	Wattisham		Blenheims IV }
	110	Wattisham		Blenheims IV }
	114	Wyton		Blenheims IV }
	139	Wyton		Blenheims IV }
Non-mobilizable	104	Upper Heyford	Blenheims I }	If 18 and 57 Sqdns. go to France, otherwise Bassingbourn.
	108	Upper Heyford	Blenheims I }	

No. 3 GROUP

Mobilizable	9	Honington	Wellingtons	I.E. 12
	37	Feltwell	Wellingtons	I.E. 12
	38	Marham	Wellingtons	I.E. 12
	99	Mildenhall	Wellingtons	I.E. 12
	115	Marham	Wellingtons	I.E. 12
	149	Mildenhall	Wellingtons	I.E. 12
Non-mobilizable	75	Harwell	Wellingtons	I.E. 12
	148	Harwell	Wellingtons	I.E. 12
	214	Feltwell	Wellingtons	I.E. 12
	215	Honington	Wellingtons	I.E. 12

No. 4 GROUP

Mobilizable	10	Dishforth	Whitleys	I.E.16
	51	Linton on Ouse	Whitleys	I.E.12
	58	Linton on Ouse	Whitleys	I.E.16
	77	Driffield	Whitleys	I.E.12
	78	Dishforth	Whitleys	I.E.16
	102	Driffield	Whitleys	I.E.12

Non-mobilizable	97	Leconfield	Whitleys	I.E.12
	166	Leconfield	Whitleys	I.E.12

No. 5 GROUP

Mobilizable	44	Waddington	Hampdens	I.E.12
	49	Scampton	Hampdens	I.E.16
	50	Waddington	Hampdens	I.E.12
	61	Hemswell	Hampdens	I.E.12
	83	Scampton	Hampdens	I.E.12
	144	Hemswell	Hampdens	I.E.12

Non-mobilizable	7	Finningley	Hampdens	I.E.12
	76	Finningley	Hampdens	I.E.16
	106	Cottesmore	Hampdens	I.E.12
	185	Cottesmore	Hampdens	I.E.12

MOBILIZABLENON-MOBILIZABLE

	<u>Squadrons</u>	<u>Aircraft</u>	<u>Squadrons</u>	<u>Aircraft</u>
Mediums	20	400	7	152
Heavies	18	232	10	124
	<u>38</u>	<u>632</u>	<u>17</u>	<u>276</u>

Note: Two Squadrons had gone Overseas since March 1939.  
No new ones were formed.

## EXPANSION SCHEMES, 1922-1939

APPENDIX 3

## I PROGRAMME APPROVED DECEMBER, 1922

1. Home Defence Force

To provide by 31st March 1925 - 9 Fighter squadrons  
   5 Day bomber "  
   4 Night " "  
   18 Squadrons

Of these, there were already formed:-

Fighter - 1 squadron of two flights only (No. 56: the third flight was at Constantinople).  
           1 squadron (No. 25) temporarily detached to Constantinople.

Bomber - 1 squadron, day bomber (No. 100).

There were to form in 1923/4:-

Fighter - 5 squadrons  
 Bomber: Day - 4 "  
           Night - 1 "

There were to form in 1924/5:-

Fighter - 2 squadrons  
 Bomber: night - 3 "

2. Inland Area: Bomber - 2 'Reserve' (later 'Emergency') day bomber squadrons (Nos. 39, 207).  
                           Army co-operation - 2 squadrons  
                           Communications - 1 "

Note: No. 207(B) Squadron and one of the Army co-operation squadrons were actually at Constantinople.

3. Coastal Area: Naval co-operation - 4 squadrons.

II THE 1923 FIFTY-TWO SQUADRONS PROGRAMME1. The original aim of this programme(1)

To provide by 1928 a Home Defence force of 52 squadrons (598 first line aircraft), as follows:-

Fighter	- 17 Regular squadrons @ 12.I.E.	= 204 a/c
Bomber: day	- probably 14 Regular squadrons @ 12 I.E.	= 168 a/c
(22 sq.)	" 3 Special Reserve" " " "	= 36
	" 5 A.A.F. " " " "	= 60 = 264
night -	" 8 Regular squadrons @ 10 I.E.	= 80
(15 sq.)	" 4 S.R. " " "	= 40
	" 1 A.A.F. " " "	= 10 = 130
		394 = 394
	<u>Total</u>	= 598 a/c

(1) As laid down in the 'First Revise of the Expansion Scheme', 29th September, 1923 - A.M. File S.22846/I/21A.

The figures for day bomber and night bomber squadrons were provisional as the precise role of the last 11 bomber squadrons to be formed had not been definitely decided. Eventually in April, 1925<sup>(1)</sup> it was decided that the proportion should be 20 day to 15 night bomber squadrons instead of 22 to 13.

The 52 squadrons were to be completed with reserves (100% of first line strength in airframes, 150% in engines) by 1930.

The squadrons were to be formed as follows:-

18 by 31st March, 1925, as in the December, 1922 programme above  
 5 during 1925/6  
 10 during 1926/7  
 10 during 1927/8  
 9 during 1928.

The following home-based squadrons were not counted in the 52:-

Inland Area: 2 'Reserve' day bomber squadrons (Nos. 39, 207).

2 Army co-operation squadrons.

Coastal Area: Naval co-operation squadrons.

2. On 3rd December, 1925 the date for completing this programme was deferred from 1928 to 1935

The new programme for formation of squadron was:-

1926/7. 1927/8. 1929/9. 1929/30. 1930/31. 1931/2. 1932/3. 1933/4. 1934/5.

Fighter	12	12	12	13	14	16	17	17	17
Regular day bomber	5	5	5	6	8	9	11	12	12
" " night	4	4	4	4	4	6	6	7	10
A.A.F. and S.R.	7	7	8	9	10	11	12	13	13
	28	28	29	32	36	42	46	49	52

3. On 11th December, 1929 the date for completing the programme was again deferred, from 1935 to 1938

The new programme for formation of squadrons was:-

1930/1. 1931/2. 1932/3. 1933/4. 1934/5. 1935/6. 1936/7. 1937/8.

Fighter	13	14	15	16	17	17	17	17
Regular day bomber	8*	10	11	12	12	12	12	12
" night bomber	5	5	5	5	5	6	7	10
A.A.F. & S.R.	13	13	13	13	13	13	13	13
	39	42	44	46	47	48	49	52

\* Note: The two 'Reserve' or 'Emergency' squadrons (Nos. 207 and 35 vice 39) were now counted among the 52.

### III EXPANSION SCHEME A. JULY, 1934

Proposed in the Interim Report of the Ministerial Disarmament Committee,  
16th July, 1934 (C.P. 193(34))

Approved by the Cabinet, 18th July, 1934 (Cabinet 29(34))

Aims. (1) To increase the Home Defence force to 75 squadrons by adding 33 squadrons to the existing 42.

(2) To increase the overseas forces by 4 squadrons.

(3) To increase the Fleet Air Arm by  $4\frac{1}{2}$  squadrons.

Total increase  $41\frac{1}{2}$  squadrons.

Date for completion. 31st March, 1939

But only £1,200,000 was allowed for the provision of war reserves by this date and it was not intended to complete those reserves until 1942. The Interim Report, however, emphasised that the reserves must be provided before an outbreak of war became imminent.

Proposed final composition of the R.A.F. at 31st March, 1939:-

#### A. METROPOLITAN AIR FORCE

##### (1) Home defence force:

Bomber:	Light 25(8) x	squadrons at 12 I.E. =	300 a/c	
	Medium 8	squadrons at 12 I.E. =	96 a/c	(I.E. raised
	Heavy 8	squadrons at 10 I.E. =	80 a/c	from 8 to 12)
	41	squadrons	=	476 a/c
Fighter:	28(5) x	squadrons at 12 I.E. =	336 a/c	
Torpedo bomber:	2	squadrons at 12 I.E. =	24 a/c	
General				
Purpose:	4	squadrons at 12 I.E. =	48 a/c	
Total	75	squadrons	=	884 a/c

##### (2) Other home-based squadrons:

Flying boat:	4	squadrons at 4 I.R. =	16 a/c
Army co-operation:	5	squadrons at 12 I.E. =	16 a/c
Total	9	squadrons	= 76 a/c

TOTAL M.A.F. 84 squadrons = 960 a/c.

#### B. OVERSEAS AND FLEET AIR ARM

- (1) Overseas:- 27 squadrons = 292 a/c  
 (2) Fleet Air Arm:-  $16\frac{1}{2}$  squadrons = 213 a/c

TOTAL R.A.F. and F.A.A.  $127\frac{1}{2}$  squadrons = 1,465 a/c.

Original programme of squadron formation:-

	Home Defence	Overseas
1934/5	2	1
1935/6	8	-
1936/7	6	1
1937/8	8	1
1938/9	9	1

\* Figures in brackets represent the numbers of non-regular squadrons included in the total.

Accelerated programmes of squadron formation, October, 1934:-

	Home Defence	Overseas
1934/5	2 = 1 Light Bomber 1 Fighter	1 = 1 Flying Boat (1 Torpedo Bomber squadron already gone overseas).
1935/6	10 = 3 Light Bomber 1 Light Bomber to rearm to Medium 1939/40. 1 Heavy Bomber 4 Fighter 1 General Purpose (Also 1 Torpedo Bomber to replace squadron already gone overseas).	Nil
1936/7	11 = 2 Light Bomber 1 Light Bomber, to rearm to Medium 1939/40 2 Heavy Bomber 3 Fighter 3 General Purpose	Nil
1937/8	5 = 3 Light Bomber 2 Fighter	1 = 1 Light Bomber
1938/9	5 = 5 Medium Bomber	1 = 1 General Purpose or Light Bomber.

The 3 Heavy Bomber squadrons were to replace the 3 S.R. squadrons now converted from Night to Day bombers:-

Proposed ultimate distribution of the Bomber squadrons:-

No. 1 AREA (H.Q. Mildenhall)		No. 2 AREA (H.Q. Grantham)	
Mildenhall	2 squadrons	Grantham	2 squadrons
Marham	2 "	Waddington	2 "
Feltwell	2 "	Worthy Down	2 "
Stradishall	2 "	Boscombe Down	2 "
= 8 Regular Heavy Bomber squadrons.		= 8 Regular Medium Bomber squadrons.	

No. 3 AREA (H.Q. Abingdon)		No. 4 AREA (H.Q. Peterborough)	
Abingdon	2 squadrons	Bicester	2 squadrons
Harwell	3 "	Upper Heyford	3 "
Andover	2 "	Peterborough	3 "
Manston	1 " S.R.	Bircham Newton	2 "
	(Abingdon in war)		
Filton	1 squadron S.R.	Castle Bromwich	1 " A.A.F.
	(Andover in war)		
Aldergrove	1 squadron S.R.	Turnhouse	1 " A.A.F.
	(Odiham in war)		(Castle Bromwich in war).
Waddington	1 " "	Abbotsinch	1 squadron A.A.F.
Hucknall	1 squadron S.R.		(Bicester in war.)

Σ 7 Regular and 5 S.R. = 10 Regular and 3 A.A.F. =  
12 Light Bomber squadrons 13 Light Bomber squadrons



IV. EXPANSION SCHEME B. APRIL, 1935

Proposed by the C.A.S. in C.P.85(35), 15th April, 1935.

.. Abandoned in favour of Scheme C (below) after discussion by the Government.

Aim. To increase the Home Defence force to 102 squadrons; and to increase the overseas and Fleet Air Arm Squadrons.

Date for completion. 31st March, 1939

It was left to the Government to decide whether the war reserves for this force should be completed by 1939 or deferred, as under Scheme A. until 1942. The Air Staff favoured the latter alternative.

### Details of Scheme

Home Defence force: 67 Bomber squadrons (an addition of 20 to Scheme A).  
35 Fighter squadrons ( " " 7 " " ).  
12 General Purpose squadrons ( " " 8 " " ).  
5 Army Co-operative squadrons.

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119 squadrons giving a first line strength of 1,346  
a/c as against the 960 provided for by Scheme A.

Overseas: 40 squadrons (an addition of 13 to Scheme A) } all but 2½  
Fleet Air } F.A.A. to be  
Arm 35 ( " 17½ " " ) provided  
1939-1942

V. EXPANSION SCHEME C. MAY, 1935

Proposed, after the abandonment of Scheme B, 4th May, 1935 - A.M. File S.22846/III/30A.

Approved by the Cabinet 21st May, 1935 - Cabinet 29(35)

Aim. To provide a 'Metropolitan Air Force' of 1,512 first line aircraft in place of the 960 to be provided by Scheme A. This 'Metropolitan Air Force' would include all Bomber, Fighter, Torpedo-Bomber, Flying Boat, Army Co-operation, and General Purpose operational squadrons which were shore-based in the United Kingdom, but it would not include the Fleet Air Arm.

To allow for the expansion of the Overseas and F.A.A. squadrons as under Scheme A.

Date for completion. 31st March, 1937

The war reserves of this force remained as under Scheme A.

Details of the Scheme:-

1st line strength 1st April, 1935				Extra sqdns. under Scheme A			Extra sqdns. under Scheme C			Scheme C 1st line strength 1st April, 1939		
Sqdns. I.E. A/c.				changes in I.E.			Sqdns. I.E. A/c					
Bombers: Light												
(Regular)	9	12	108	8	2	-	19	12	228			
(A.A.F.)	3	12	36	-	3	-	6	12	72			
(S.R.)	5(a)	12	60(b)	-	-	-	5	12	60(b)			
Total Light	17	12	204	8	5	-	30	12	360			
Medium	1	12	12	7	10	-	18	12	216			
Heavy	5	10	50	3	12	+2	20	12	240			
Total Bombers	23	-	266	18	27	-	68	12	816			
Fighters (Regular)	14	12	168	9	7	-	30	12	360			
(A.A.F.)(c)	5	12	60	-	-	-	5	12	60			
Total Fighters	19	12	228	9	7	-	35	12	420			
Torpedo Bomber (d)	1	12	12	1	-	-	2	12	24			
Army Co-operation	5	12	60	-	-	+6	5	18	90			
Flying Boat	4(e)	4	16	-	2	+2	6	6	36			
General Purpose	-	-	-	4	3	+6	7	18	126			
Total M.A.F.	52	-	582(f)	32	39	-	123	-	1,512			

Note: (a) At present 3 of these squadrons were armed as Heavy Bombers at 10 I.E. each.

(b) Of which  $\frac{1}{3}$  (1 flight per squadron) = 20 were manned by Regular Personnel.

(c) At present 2 of these squadrons were armed as Light Bombers.

(d) Counted, for A.D.G.B. purposes, as Medium Bombers, to preserve the 3:2:2 (360:240:240) ratio between Light, Medium and Heavy.

(e) Excluding one squadron due to go overseas in autumn 1935.

(f) Corrected figure to allow for contemplated changes referred to in Notes (a) and (e).

Total R.A.F. strength (M.A.F. Overseas, F.A.A.) at 1st April, 1937 =  
 $164\frac{1}{2}$  sqdns. of 1,985 a/c  
 at 1st April, 1939 =  
 $166\frac{1}{2}$  sqdns. of 2,017 a/c

Proposed programme of squadron formation:-

1935/6 4 Fighter squadrons  
 4 Light Bomber "  
 1 Heavy Bomber "  
 1 Torpedo Bomber "  
 1 General Purpose"

11 squadrons

1936/7 12 Fighter squadrons  
 9 Light Bomber "  
 17 Medium Bomber "  
 14 Heavy Bomber " (a)  
 6 General Purpose"

58 squadrons

Note: (a) Two of these were to form with Light and one with Medium Bombers, rearming to Heavy Bombers in 1938/9.

DS 85048/1 (181)

THE DRAFT HAGUE RULES OF AIRWARFARE

There never has been any international law governing the use of aircraft in war, but the Draft Hague Rules provided the beginning and often the end, of most discussion on the subject of restricted bombing. In addition to being a document of some historic interest the Hague Rules are an indication of the types of problem which confronted the nations in their search for an international agreement to restrict aerial warfare.

Articles approved by the Commission

(Taken from "International Agreements" AHB IIA1/344 FOLIO I)

ART.

1. The rules of aerial warfare apply to an aircraft, whether lighter or heavier than air, irrespective of whether they are, or are not capable of floating on the water.

2. The following shall be deemed to be public aircraft:

(a) Military aircraft;

(b) Aircraft exclusively employed in the public service.

All other aircraft shall be deemed to be private aircraft.

3. A military aircraft shall bear an external mark indicating its nationality and military character.

4. A public non-military aircraft employed for customs or police purposes shall carry papers evidencing the fact that it is exclusively employed in the public service. Such an aircraft shall bear an external mark indicating its nationality and its public non-military character.

5. Public non-military aircraft other than those employed for customs or police purposes shall in time of war bear the same marks and for the purposes of these rules shall be treated on the same footing as private aircraft.

6. Aircraft not comprised in Arts. 3 and 4 and deemed to be private aircraft shall carry such papers, and bear such external marks as are required by the rules in force in their own country. These marks must indicate their nationality and private character.

7. The external marks required by the above articles shall be so affixed that they cannot be altered in flight. They shall be as large as is practicable, and shall be visible from above, from below, and from each side.

8. The external marks prescribed by the rules in force in each state shall be notified promptly to all other powers. Modifications adopted in time of peace of the rules prescribing external marks shall be notified to all other Powers before they are brought into force. Modifications of such rules adopted at the outbreak of war or during hostilities shall be notified by each Power as soon as possible to all other Powers, and at latest when they are communicated to its own fighting forces.

9. A belligerent non-military aircraft, whether public or private may be converted into a military aircraft, provided that the conversion is effected within the jurisdiction of the belligerent state to which the aircraft belongs, and not on the high seas.

10. No aircraft may possess more than one nationality.

11. Outside the jurisdiction of any state, belligerent or neutral an aircraft shall have full freedom of passage through the air and of alighting (sic).

12. In time of war any state, whether neutral or belligerent, may forbid or regulate the entrance, movement or sojourn of aircraft within its jurisdiction.

13. Military aircraft are alone entitled to exercise belligerent rights.

14. A military aircraft shall be under the command of a person duly commissioned or enlisted in the military service of the state. The crew must be exclusively military.

15. Members of the crew of a military aircraft shall wear a fixed distinctive emblem of such character as to be recognised at a distance in case they become separated from their aircraft.

16. No aircraft other than a belligerent military aircraft shall engage in hostilities in any form. The term hostilities includes the transmission during flight of military intelligence for the immediate use of a belligerent. No private aircraft, when outside the jurisdiction of its own country, shall be armed in time of war.

17. The principles laid down in the Geneva Convention, 1906, and the Convention for the adaption of the said Convention to maritime war (No. X of 1907) shall apply to aerial warfare, and to flying ambulances, as well as to the control over flying ambulances exercised by a belligerent commanding officer.

In order to enjoy the protection and privileges allowed to mobile medical units by the Geneva Convention, 1906 flying ambulances must bear the distinctive emblem of the Red Cross in addition to the usual distinguishing marks.

18. The use of tracer, incendiary or explosive projectiles by or against aircraft is not prohibited. This provision applies equally to states which are parties to the Declaration of St. Petersburg, 1868, and to those which are not.

19. The use of false external marks is forbidden.

20. When an aircraft has been disabled, the occupants, when endeavouring to escape by means of a parachute, must not be attacked in the course of their descent.

21. The use of aircraft for the purpose of disseminating propaganda shall not be treated as an illegitimate means of warfare. Members of the crews of such aircraft must not be deprived of their rights as prisoners of war on the charge that they have committed such an act.

22. Aerial bombardment for the purpose of terrorising the civilian population, of destroying or damaging private property not of a military character, or of injuring non-combatants is prohibited.

23. Aerial bombardment for the purpose of enforcing compliance with requisitions in kind or payment of contributions in money is prohibited.

24. (1) Aerial bombardment is legitimate only when directed at a military objective, that is to say, an object of which the destruction or injury would constitute a distinct military advantage to the belligerent.

(2) Such bombardment is legitimate only when directed exclusively at the following objectives: military forces: military works: military establishments or depots: factories constituting important and well known centres engaged in the manufacture of arms, ammunition or distinctively military supplies; lines of communication or transportation used for military purposes.

(3) The bombardment of cities, towns, villages, dwellings or buildings not in the immediate neighbourhood of the operations of land forces is prohibited. In cases where the objectives specified in paragraph two are so situated that they cannot be bombarded without the indiscriminate bombardment of the civilian population, the aircraft must abstain from bombardment.

(4) In the immediate neighbourhood of the operations of land forces, the bombardment of cities, towns, villages, dwellings or buildings is legitimate, provided that there exists a reasonable presumption that the military concentration is sufficiently important to justify such bombardment having regard to the danger thus caused to the civilian population.

(5) A belligerent state is liable to pay compensation for injuries to person or to property caused by the violation by any of its officers or forces, of the provisions of this article.

25. In bombardment by aircraft, all necessary steps must be taken by the commander to spare as far as possible buildings dedicated to public worship, art, science, or charitable purposes, historic monuments, hospital ships, hospitals and other places where the sick and wounded are collected, provided such buildings, objects and places are not at the time used for military purposes. Such buildings, objects and places must by day be indicated by marks visible to aircraft, the use of such marks to indicate other buildings, objects or places than those specified above is to be deemed an act of perfidy. The marks used as aforesaid shall be in the case of buildings protected under the Geneva Convention, the red cross on a white ground, and in the case of other protected buildings, a large rectangular panel divided diagonally into two pointed triangular portions, one black and the other white. A belligerent who wishes to secure by night the protection for the hospitals and other privileged buildings above mentioned must take the necessary measures to render the special signs referred to sufficiently visible.

26. The following special rules are adopted for the purpose of enabling states to obtain more efficient protection for important historic monuments situated within their territory, provided that they are willing to refrain from the use of such monuments and a surrounding zone for military purposes, and to accept a special regime for their inspection.

(1) A state shall be entitled, if it sees fit, to establish a zone of protection round such monuments situated in its territory. Such zones shall in time of war enjoy immunity from bombardment.

(2) The monuments round which a zone is to be established shall be notified to other powers in peace time through the diplomatic channel; the notification shall also indicate the limits of the zones. The notification may not be withdrawn in time of war.

(3) The zone of protection may include in addition to the area actually occupied by the monument or group of monuments, an outer zone not exceeding 500 metres in width measured from the circumference of the said area.

(4) Marks clearly visible from aircraft either by day or by night will be employed for the purpose of ensuring the identification by belligerent air-men of the limits of the zones.

(5) The marks on the monuments themselves will be those defined in Art. 25. The marks employed for indicating the surrounding zones will be fixed by each state, adopting the provisions of this article, and will be notified to other Powers at the same time as the monuments and zones are notified.

(6) Any abusive use of the marks indicating the zones referred to in paragraph five will be regarded as an act of perfidy.

(7) A State adopting the provisions of this article must abstain from using the monument and the surrounding zone for military purposes or for the benefit in any way whatever of its military organisation, or from committing within such a monument or zone any act with a military purpose in view.

(8) An inspection Committee consisting of three neutral representatives accredited to the State adopting the provisions of this article, or their delegates, shall be appointed for the purpose of ensuring that no violation is committed of the provisions of paragraph seven. One of the members of the Committee of inspection shall be the representative (or his delegate) of the State to which has been entrusted the interests of the opposing belligerent.

27. Any person on board a belligerent or neutral aircraft is to be deemed a spy only if, acting clandestinely or on false pretences, he obtains or seeks to obtain while in the air information within belligerent jurisdiction or in the zone of operations of a belligerent with the intention of communicating it to the hostile party.

28. Acts of espionage committed after leaving the aircraft by members of an aircraft or by passengers transported by it, are subject to the provisions of the Land Warfare Regulations.

29. Punishment of the Acts of espionage provided for in Art. 27 and 28 is subject to Articles 30 and 31 of the Land Warfare Regulations.

30. In case a belligerent commanding officer considers that the presence of aircraft is likely to prejudice the success of the operation in which he is engaged at the moment, he may prohibit the passing of neutral aircraft in the immediate vicinity of his forces, or may oblige them to follow a particular route. A neutral aircraft which does not conform to such directions, of which it has had notice issued by the belligerent commanding officer, may be fired at.

31. In accordance with the principles of Art. 53 of the Land Warfare Regulations, neutral private aircraft found upon entry in the enemy's jurisdiction by a belligerent occupying force may be requisitioned, subject to the payment of full compensation.

32. Enemy public aircraft other than those treated on the same footing as private aircraft, shall be subject to confiscation without prize proceedings.

33. Belligerent non-military aircraft, whether public or private flying within the jurisdiction of their own State are liable to be fired upon unless they make the nearest available landing on the approach of enemy military aircraft.

34. Belligerent non-military aircraft, whether public or private are liable to be fired upon if they fly (1) within the jurisdiction of the enemy or (2) in the immediate vicinity thereof and outside the jurisdiction of their own State or (3) in the immediate vicinity of the military operations of the enemy by land or sea.

35. Neutral aircraft flying within the jurisdiction of a belligerent and warned of the approach of military aircraft of the opposing belligerent must make the nearest available landing. Failure to do so exposes them to the risk of being fired upon.

36. When an enemy military aircraft falls into the hands of a belligerent, the members of the crew, and the passengers, if any, may be made prisoners of war.

The same rule applies to the members of the crew and the passengers if any, of an enemy public non-military aircraft, except that in the case of public non-military aircraft devoted exclusively to the transport of passengers, the passengers will be entitled to be released unless they are in the service of the enemy, or are enemy nationals fit for military service.

If an enemy private aircraft falls into the hands of a belligerent members of the crew who are enemy nationals or who are neutral nationals in the service of the enemy, may be made prisoners of war. Neutral members of the crew who

are not in the service of the enemy are entitled to be released if they sign a written undertaking not to serve in an enemy aircraft while hostilities last. Passengers are entitled to be released unless they are in the service of the enemy, or are enemy nationals fit for military service, in which case they may be made prisoners of war.

Release may in any case be delayed if the military interests of the belligerent so require.

The Belligerent may hold as prisoners of war any member of the crew, or any passenger whose service in a flight at the close of which he has been captured has been of special and active assistance to the enemy.

The names of individuals released after giving a written undertaking in accordance with the third paragraph of this article will be notified to the opposing belligerent who must not knowingly employ them in violation of their undertaking.

37. Members of the crew of a neutral aircraft which has been detained by a belligerent shall be released unconditionally, if they are neutral nationals and not in the service of the enemy. If they are enemy nationals or in the service of the enemy they may be made prisoners of war. Release may in any case be delayed if the military interests of the belligerent so require. The belligerent may hold as prisoners of war any member of the crew or any passenger whose service in a flight at the close of which he has been captured has been of special and active assistance to the enemy.

38. Where under the provisions of Arts. 36 and 37, it is provided that members of the crew or passengers may be made prisoners of war, it is to be understood that if they are not members of the armed forces, they shall be entitled to treatment not less favourable than that accorded to prisoners of war.

39. Belligerent aircraft are bound to respect the rights of neutral powers and to abstain within the jurisdiction of a neutral State from the commission of any act which it is the duty of that State to prevent.

40. Belligerent military aircraft are forbidden to enter the jurisdiction of a neutral state.

41. Aircraft on board vessels of war, including aircraft carriers shall be regarded as part of such vessels.

42. A neutral government must use the means at its disposal to prevent the entry within its jurisdiction of belligerent military aircraft and compel them to alight if they have entered such jurisdiction. A neutral government shall use the means at its disposal to intern any belligerent military aircraft which is within its jurisdiction after having alighted for any reason whatsoever, together with its crew and the passengers, if any.

43. The personnel of a disabled belligerent aircraft rescued outside neutral waters and brought into the jurisdiction of a neutral state by a neutral military aircraft and there landed shall be interned.

44. The supply in any manner, directly or indirectly, by a neutral Government to a belligerent power of aircraft, parts of aircraft or material, supplies or munitions required for aircraft is forbidden.

45. Subject to the provisions of Art. 45 (sic) a neutral power is not bound to prevent the export or transit on behalf of a belligerent of aircraft, parts of aircraft, or material, supplies or munitions for aircraft.



46. A neutral Government is bound to use the means at its disposal:

- (1) To prevent the departure from its jurisdiction of any aircraft in a condition to make a hostile attack against a belligerent power, or carrying or accompanied by appliances, or materials the mounting or utilisation of which would enable it to make a hostile attack, if there is reason to believe that such aircraft is destined for use against a belligerent power.
- (2) To prevent the departure of any aircraft the personnel of which belongs to the combatant forces of a belligerent Power.
- (3) To prevent work upon any aircraft designed to prepare it to depart in contravention of the purpose of this article.

On the departure by air of any aircraft despatched by persons or companies in neutral jurisdiction to the order of a belligerent power, the neutral Government must prescribe for such aircraft a route avoiding the neighbourhood of the military operations of the opposing belligerent, and must exact whatever guarantees may be required to ensure that the aircraft follows the route prescribed.

47. A neutral State is bound to take such steps as the means at its disposal permit to prevent within its jurisdiction aerial observation of the movements, operations or defences of one belligerent with the intention of informing the other belligerent.

This provision applies equally to a belligerent military aircraft on board a vessel of war.

48. The action of a neutral power is using force or other means at its disposal, in the exercise of its rights and duties under these rules cannot be regarded as a hostile act.

49. Private aircraft are liable to visit and search and to capture by belligerent military aircraft.

49A. (In this place there should have appeared an article fixing the conditions upon which the exercise of the right of visit and search and capture by military aircraft could be carried out; this question was referred by the Subcommittee to the Full Commission who however were unable to arrive at any agreed text.)

50. Belligerent military aircraft have the right to order public non-military and private aircraft to alight in or proceed, to a suitable locality reasonably accessible for visit and search. Refusal, after warning, to obey such orders to alight or proceed to such a locality for examination, exposes a neutral aircraft to the risk of being fired upon.

51. Neutral public non-military aircraft other than those which are to be treated as private aircraft are subject only to visit for the purpose of the verification of their papers.

52. Enemy private aircraft are liable to capture in all circumstances.

53. A neutral private aircraft is liable to capture if it:-

- (a) resists the legitimate exercise of belligerent rights.
- (b) violates a prohibition of which it has had notice issued by a belligerent commanding officer under article 30.
- (c) is engaged in unneutral service.
- (d) is armed in time of war when outside the jurisdiction of its own country.

- (e) has no external marks or uses false marks.
- (f) has no papers, or insufficient or irregular papers.
- (g) is manifestly out of the line between the point of departure and the point of destination indicated in its papers and after such enquiries as the captor may deem necessary, no good cause is shown for the deviation. The aircraft, together with its crew and passengers if any, may be detained by the belligerent pending such enquiries.
- (h) carries, or itself constitutes contraband of war.
- (i) is engaged in breach of a blockade duly established and effectively maintained.
- (k) has been transferred from belligerent to neutral nationality at a date and in circumstances indicating an intention of evading the consequences to which the enemy aircraft, as such, is exposed.

Provided that in each case (except (k)) the grounds for capture shall be an act carried out in the flight in which the neutral aircraft came into belligerent hands i.e. since it left its point of departure and before it reached its point of destination.

54. The papers of a private aircraft will be regarded as insufficient or irregular if they do not establish the nationality of the aircraft, the names and nationality of the crew and passengers, the points of departure and destination of the flight, together with particulars of the cargo and the conditions under which it is transported. The logs must also be included.

55. Capture of an aircraft or of goods on board an aircraft shall be made the subject of prize proceedings, in order that any neutral claim may be duly heard and determined.

56. A private aircraft captured upon the ground that it has no external marks, or is using false external marks, or that it is armed in time of war outside the jurisdiction of its own country is liable to condemnation.

A neutral private aircraft captured upon the ground that it has disregarded the direction of a belligerent commanding officer under article 30 is liable to condemnation, unless it establishes good cause for its presence within the prohibited zone. In all other cases the prize court in adjudicating upon any case of capture of an aircraft or its cargo, or of postal correspondence on board an aircraft, shall apply the same rules as would be applied to a merchant vessel or its cargo or to postal correspondence on board a merchant vessel.

57. Private aircraft which are found upon visit and search to be enemy aircraft may be destroyed if the belligerent commanding officer finds it necessary to do so, provided that all the persons on board have first been placed in safety and all the papers of the aircraft have been preserved.

58. Private aircraft which are found upon visit and search to be neutral aircraft liable to condemnation upon the ground of unneutral service, or upon the ground that they have no external marks or are bearing false marks may be destroyed, if sending them in for adjudication would be impossible, or would imperil the safety of the belligerent aircraft or the success of the operations in which it is engaged. Apart from the cases mentioned above a neutral private aircraft must not be destroyed except in the greatest military emergency which would not justify the officer in command in releasing it or sending it in for adjudication.

59. Before a neutral private aircraft is destroyed, all persons on board must be placed in safety, and all the papers of the aircraft must be preserved.

A captor who has destroyed a neutral private aircraft must bring the capture before the prize court, and must first establish that he was justified in destroying it under Article 58. If he fails to do this, parties interested in the aircraft or its cargo are entitled to compensation. If the capture is held to be invalid, though the act of destruction is held to have been justifiable, compensation must be paid to the parties interested in place of the restitution to which they would have been entitled.

60. Where a neutral private aircraft is captured on the ground that it is carrying contraband, the captor may demand the surrender of any absolute contraband on board, or may proceed to the destruction of such absolute contraband, if sending in the aircraft for adjudication is impossible or would imperil the safety of the belligerent aircraft or the success of the operations in which it is engaged. After entering in the log book of the aircraft the delivery or destruction of the goods, and securing in original, or copy, the relevant papers of the aircraft, the captor must allow the neutral aircraft to continue its flight.

The provisions of the second paragraph of Article 59 will apply where absolute contraband on board a private neutral aircraft is handed over or destroyed.

61. The term "military" throughout these rules is to be read as referring to all branches of the forces, i.e. the land forces, the neutral forces and the airforces.

62. Except so far as special rules are here laid down and except so far as the provisions of Chapter VII of these rules or international conventions indicate that maritime law and procedure are applicable, aircraft personnel engaged in hostilities come under the laws of war and neutrality applicable to land troops in virtue of the custom and practice of international law and of the various declarations and conventions to which the States concerned are parties.

APPENDIX 5SUGGESTED PROPAGANDA FOR GERMAN CONSUMPTION

There can be no doubt that at least some of the officers responsible for the initiation of the plan to drop propaganda on Germany from the air believed that it might have an important effect on the course of the war. The C.-in-C. Bomber Command had gone so far as to suggest that "it may well prove that skilfully dropped propaganda, distributed by aircraft, may prove a more potent weapon than bombs". On another occasion the D.C.A.S. had pointed out that "clumsy propaganda" might not only do no good, but might do "definite harm". (1)

To assist judgment on the probable efficacy of this plan some of the drafts of leaflets, which it was proposed should be dropped, are here reproduced. (2)

A.M. File  
S.46650/1  
Encl. 3A

Draft of a "Bombing Warning" Proposed by the D.D. Plans on 17th September, 1938

"German aeroplanes have bombed London (or Birmingham or Paris or wherever it is) with the utmost ruthlessness, causing terrible loss of innocent life. We do not believe that these acts have the approval of the German people, with whom we have no quarrel, but only with the Nazi Government etc. etc; and we wish to avoid taking similar action ourselves involving the loss of innocent life in Germany, unless we are forced to do so by the continuance of these brutal attacks by the German Air Force. But we are bound in self defence to limit the capacity of the Nazi Government for evil by crippling the production of those weapons and materials of war by which they are enabled to continue their aggression. With this end in view, we are compelled to take air against the Ruhr, which will be regarded as a war zone. But in order to enable you to evacuate non-combatants, women and children etc., and to avoid loss of innocent life, we do not propose to attack until at least 48 (or 72 or 96) hours have elapsed from the issue of this warning. The area which will be regarded as a war zone and subject to attack without further notice is bounded by the following lines..... (then describe the area.)" (3)

Draft of an Anglo-French Declaration Proposed by the Board of Education on 27th September, 1938

"The British and French Governments announce that their policy and their aim is to spare innocent civilian populations from air bombardment. They will not depart from this policy unless compelled to do so as a reprisal for the bombing of British and French civilians.

Ibid  
Encl. 9C.

(1) The C. in C.'s words are quoted in Chapter 7 and the D.C.A.S.' on page 295.

(2) It should be noted that these drafts were those prepared BEFORE the outbreak of war, and they are intended to illustrate the pre-war British view of propaganda.

(3) The Board of Education sent a draft of a warning notice to the Air Ministry very much on the lines of the one quoted.

A.M. File  
S.46650/1  
Encl. 9B.

Ibid  
11 C

Draft Leaflets sent to Sir Stephen Tallents by  
Sir Hughe Knatchbull Hugesson on 27th September, 1938. (1)

A. "German People! This message is from the British People.

Why are we fighting one another?

There was no need for war to enable your Sudetan brothers to join the Reich. Thanks to British intervention, the Czech Government had already agreed to allow this peacefully. But your rulers want more. They want to destroy the Czech State.

Is this worth a war to you? The Czechs are not Germans: they have no place in Grossdeutschland.

For five years your rulers have promised you peace. Now they are ready to sacrifice millions of German lives for a cause which is of no benefit to the German people."

B. "A Call from the British to all Germans.

Neither the British Government nor the British People wanted war with Germany. They feel no enmity with the German People. They do not wish to humiliate them nor to deprive them of territory which should be theirs. Great Britain has only one war aim, which is to re-establish peace and law among nations. Modern communications have brought all nations close together; we are parts of a great whole. Only by recognising this can we live and prosper.

We are fighting for this ideal and shall fight until the German People is ready to co-operate of its own free will in the establishing of a system of international life which will make war impossible".

We are always ready for a just and free peace, and one which will not harm the German Nation".

C. "Germans! Listen to the voice of the British People!

You did not want war. Nor did we. We are both driven to it against our will by your present masters.

We are fighting to rid you and the world of your oppressors: to make Europe free for the rule of law and mutual understanding, the only sure foundation of prosperity, happiness and equality. Help us for your own sakes! We want peace and prosperity for your own sakes and ours!"

D. "Where is the war guilt now?

The German nation is not guilty, the blame is on their masters who have fastened themselves upon the German nation and care nothing for their true interests and wishes.

Your masters have deceived you, your press has deceived you. You have never heard the truth. Your Masters are forcing you to fight for a false cause, and for their own selfish aims".

E. "Germans!

Your choice is between oppression and freedom, between terror and peace - peace of mind and peace of nations.

(1) Sir Stephen Tallents was at the time Minister of Information Designate.

APPENDIX 5

You have been forced to fight, but your choice should be free. If you must fight, fight for freedom and peace - join in the struggle to destroy your oppressors.

Down with Hitler!

F. "Mr. Chamberlain, the British Prime Minister, went to Berchtesgaden to help settle the return of three and a half million Sudetons to the Fatherland. The Fushrer claimed that these Sudetans demanded incorporation in the Reich.<sup>(1)</sup> The British, French and Czechoslovak Governments were ready to negotiate the transfer by peaceful means, so that those who wished to join the Reich could do so.

The settlement could have been carried out without bloodshed. But the Fuhrer wanted more. Thus the German nation is involved by Herr Hitler in a war which will spread far and wide, although he could have had what he wanted without shedding a drop of German blood".<sup>(2)</sup>

General Remarks

It seems unnecessary to comment on these drafts. They speak for themselves. All the same it should be pointed out that these were the messages which it was thought would prove a "valuable" weapon of war. It was thought that these messages, or similar ones, might cause a "great panic" and seriously disorganise the industrial life" of Germany. It was to carry such messages that it was thought a special propaganda flight might be created for the R.A.F., and even that this flight might be composed of "Ideal" leaflet bombers specially designed for the purpose.

Their merits or demerits should be borne in mind when any study of the propaganda plan is undertaken, for these drafts corresponded to the design and weights of the bombs to be used in the execution of the other plans.

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- (1) This contradiction of the main propaganda theme was not allowed to stand. The sentence is crossed out in pencil.
  - (2) It is only fair to point out that not all these drafts were considered good. For instance Sir Alexander Cadogan, who presumed that propaganda experts had been consulted, preferred A. and F. Of the rest he thought that B was the best.

Ibid  
Encl. 11 C.

THE OIL SUPPLY PROBLEM IN GERMANY (1)

A.H.B.  
II A1/6  
App. A

World production of crude oil increased from twenty million tons per annum at the beginning of the century, to three hundred million tons in 1938. It was, at the time, continuing to show further annual increase. Germany, like all the Great Powers, except Russia, lacked natural oil resources.

In 1938 German consumption of oil products was over six and a half million tons. Home production met two and a half million tons of this in that year.(2) In 1938 Germany imported sixty per cent of her oil requirements. The annexation of Austria and Czechoslovakia had increased her oil deficit, and in Europe only the annexation of Rumania could have reduced it.(3) Germany's minimum oil requirements for one year of war were estimated to be nine and a half million tons. Therefore existing home production could only meet about twenty per cent. of this. If Italy was allied to Germany the war oil deficit would be further increased as Albania and Italy only produced seven per cent of the latter's war requirements.

It was calculated that Germany could operate at a full scale of effort for not more than seven and a half months before her stocks of oil were exhausted, and that Germany allied to Italy could do the same for not more than six and a half months. Thereafter requirements would have to be cut down by eighty two per cent. to balance with home production.

The importance to Germany of her imports of oil was therefore fully demonstrated.

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- (1) This analysis is based on a report produced by Plans (Ops) in July, 1939. It was included as an appendix to the Air Ministry Appreciation on Plan W.A.6.
  - (2) This figure showed an increase of four hundred thousand tons over the production figure for 1937.
  - (3) It was estimated that if Germany seized Rumanian oil supplies "Lock, stock and barrel" she would gain a potential five to eight million tons of oil per annum. The difficulty of transporting this to Germany would however have remained.