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R. A. F. NARRATIVE

(FIRST DRAFT)

THE R. A. F. IN THE BOMBING OFFENSIVE

AGAINST GERMANY

VOLUME IV

A PERIOD OF EXPANSION AND EXPERIMENT
(March, 1942 - January, 1943)

AIR HISTORICAL BRANCH (1)
AIR MINISTRY

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P R E F A C E

The events which are to be described in the following pages may be numbered among the most significant in the whole history of strategic bombing. Indeed, the key to the period is contained in the title of this Volume. The eleven months March, 1942 to January, 1943, were essentially a time of experiment in which the bomber force developed by a process of trial and error from the makeshift period already described to the full maturity of 1943.

The broad principles of Anglo/American strategy had been determined in Washington at the beginning of 1942. It was there mutually agreed that Germany must be regarded as the prime enemy and that, notwithstanding events in the Pacific, the joint effort should be directed to the assistance of the Russians, then verging on collapse in the face of the German armies, and to the reduction of the German war effort to the point where an Allied re-entry into the Continent of Europe would become a practicable proposition. During the early months of 1942, Allied strategy, strongly backed by public and political opinion on both sides of the Atlantic, was centred on tentative plans and preparations for a Second Front in 1943 or, given certain eventualities, in 1942. It was not until the late summer that this policy was temporarily shelved in favour of a joint campaign in North West Africa in the autumn of 1942, a campaign which was to have a profound effect on the whole course of the war. The subsequent decision to exploit the rapid successes gained in that area by striking at what Mr. Churchill termed "the under-belly of the Axis" made invasion on a large scale in 1943 impracticable. Accordingly, attention was once again focussed on a great Anglo/American bomber offensive from the United Kingdom in 1943 in preparation for a Second Front in the spring of the following year. Thus by the time of the Casablanca Conference in January, 1943, the course which Allied strategy was to take in the remaining war years had been finally determined.

As far as the bombing offensive in 1942 was concerned, the R.A.F. were still virtually alone in the field. American bomber groups had begun to arrive in the British Isles in the spring but although they flew their first operational sorties over occupied territory in August, it was not until 1943 that they were in a position to undertake deep daylight penetration into Germany itself. In the meantime, the R.A.F. bomber force, which was rapidly growing in weight, tactical knowledge and experience, continued to strike with all its available strength at the major towns and cities in the German Reich.

Throughout the winter of 1941/42 the strategic offensive had been severely curtailed by a policy of conservation and by the diversion of a large proportion of the available effort to the attack of the German battleships in harbour at Brest. But by February, 1942, the imperative need to come to the aid of the Russians, together with other factors which will emerge, had led to an immediate resumption of the strategic offensive against Germany; only this time, it was an offensive with a difference.

Experience in 1941 had shown that night precision bombing was, generally speaking, beyond the capabilities of the bomber force as it then existed. The main theme of the bombing offensive in 1942, therefore, was the reduction of German civilian morale and particularly that of the industrial workers by area attacks on the principle industrial centres in Germany rather than by direct attack on specific factories and other key points in the German economic system.

The adoption of enemy civilian morale as a primary objective was a revolutionary step and one which called for a far greater weight and concentration of effort than had hitherto been attempted, together with the evolution of entirely new bombing tactics and technique. In order to

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devastate large areas in the main German towns and cities, it was no longer sufficient to allow scattered groups of aircraft to make their own way to the target. The force had to be welded into a coherent whole, capable of the concentration necessary to safeguard it against an efficient enemy defence system and to inflict really heavy damage over a wide area.

The success of the bombing offensive in 1942 was therefore dependent not only on the expansion of the force to a size in keeping with its increasing commitments but on the provision of technical equipment to enable it to overcome the limitations of weather and other tactical problems and on the development of new bombing methods in order to achieve the weight and concentration of effort required by its changed function.

This volume has accordingly been divided into three parts; the first dealing with the expansion, re-equipment and re-organisation of the Command; the second dealing with the development of the first radar aids to navigation and bombing together with the evolution of new tactics and technique; and the third containing a full account of changes in Allied Strategy and British Bombing Policy during this period together with detailed descriptions of the operations carried out.

The part played by the bomber force in the war at sea at this time although of considerable importance to the war effort as a whole does not fit easily into this pattern. It has therefore been included as an Annex together with a brief account of the build-up of the United States Air Forces in the British Isles in 1942. Finally, copies of the main Directives issued to Bomber Command together with charts and statistical information will be found at the end of the Volume.

In view of the wide field covered by this Volume and the considerable amount of detail included, it has been thought advisable to summarise the main points of interest at the end of Parts I and II respectively. In Part III each Chapter has been summarised separately while a final Chapter has been added which reviews the period as a whole and indicates the conclusions which may be drawn from it.

In general, the Narrative has been prepared in the Air Historical Branch from War Cabinet, Chiefs of Staff, Air Ministry and Command documents. Reference has been made to German documents wherever possible but it must be emphasised that in the spring of 1949 when this Volume was written, very little information was available from German sources regarding the results of bombing operations prior to 1943.

Finally, for more detailed information regarding the strategic background to the bombing offensive in 1942, the Reader is advised to consult the following A. H. B. Narratives and Monographs:

A. H. B. Monograph	"The Training of Pilots and Air Crews".
A. H. B. Signals Monograph	Vol. 2.
A. H. B. Narrative	"The North African Campaign".
A. H. B. Narrative	"The Liberation of North West Europe, Volume 2".

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January 1943.

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CHRONOLOGY OF PRINCIPAL EVENTS1941

- 8 Dec. Great Britain and United States of America declared war on Japan.
 11 Dec. Germany and Italy declared war on United States.
 22 Dec.
 14 Jan. Anglo/American Conference between Prime Minister and President
 at Washington. (Arcadia).

1942

- 2 Jan. United Nations anti-Axis pact signed in Washington by 26 nations.
 16 Jan. Formation of Combined Chiefs of Staff Committee in Washington.
 28 Jan. U.S. Military Headquarters established in Britain under Gen. Chaney.
 31 Jan. Gen. Eaker designated commander of USAAF Bomber Force in U.K.

 12 Feb. First operation by RAF Boston bombers.
 14 Feb. Air Ministry Strategic Bombing Directive issued to Bomber Command.
 20 Feb. Air Marshal Sir Arthur T. Harris appointed C-in-C Bomber Command.
 General Eaker arrived in London.
 22 Feb. Advanced detachment U.S. VIII Air Forces arrived in U.K.

 3/4 March. Night attack by RAF bombers on Renault Factory.
 8 March Daylight attack on Matford Works, Poissy, by Bostons of No. 2 Group.
 8/9 March First operational use of Gee - Essen.
 10/11 March First bombing operation by Lancasters - Essen.
 13 March Resumption of Circus operations approved.
 27/28 March Combined operation - St. Nazaire.
 28/29 March Incendiary Raid on Lubeck.

 8 April Mr. Harry Hopkins and General Marshall, U.S. Chief of Staff,
 arrived in London for discussions on Strategy and Supply.
 10/11 Apr. First 8,000 lb bomb dropped by Bomber Command - Essen.
 14 April H.M. Government accepted U.S. proposals to make the invasion
 of N.W. Europe the major contribution of the Western Allies
 to the defeat of Germany.
 15 April Establishment of U.S. 8th Air Force Bomber Command H.Q. at
 High Wycombe, near H.Q. R.A.F. Bomber Command.
 17 April Daylight Raid by Bomber Command Lancasters on M.A.N. Factory at
 Augsburg, 12 aircraft despatched, 8 aircraft attacked, 7 missing.
 The leader, S/Ldr. Nettleton, was awarded the Victoria Cross.
 20 April The "Air Bomber" was introduced as a separate member of Aircrew.
 "Observer" renamed "Navigator".
 29/30 Apr. Last Operation by Bomber Command Whitleys, except those in
 Operational Training Units.

 5 May General Carl Spaatz appointed Commanding General VIII Air Force,
 U.S. Army.
 5 May Directive - Attack on the G.A.F.
 12 May First Main Contingent of U.S. VIII Air Force arrived in Great
 Britain.
 19 May United Nations Air Training Conference opened at Ottawa.
 25 May Extension of Night Bombing to other Occupied Countries.
 26-31 May United Nations Air Forces Conference (U.N.A.F.) took place in
 London. (Bolero).
 30/31 May First R.A.F. "Thousand Bomber" Raid. (Cologne). 1,046 aircraft
 took part. 44 lost, over 2,000 tons of bombs dropped in
 90 minutes. O.T.U.s first employed on a bomb raid.
 30/31 May Mosquito bombers operated for the first time - Cologne.

 1/2 June Second R.A.F. "Thousand Bomber" Raid. (Essen). 1,006 aircraft
 took part, 35 lost, over 1,380 tons of bombs dropped in 90 minutes.

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1942

- 5 June Extended Empire Air Training Agreement signed in Ottawa by United Kingdom, Canada, New Zealand and Australia.
- 8 June American "European Theatre of Operations" Established with General Chaney as Commander of all U.S. Forces.
- 18-26 June Prime Minister visited Washington for conferences with President Roosevelt, on Operations for 1942 and 1943.
- 18 June General Spaatz assumed Command of U.S. VIII Air Force.
- 21 June Arnold-Towers-Portal Agreement on the allocation of American aircraft. Accepted by Combined Chiefs of Staff on 2.7.42.
- 25 June Major-General Dwight Eisenhower appointed Commander of U.S. Forces in E.T.O. vice. General J.E. Chaney.
- 4 July U.S. VIII Air Force Crews operated for first time in six Bomber Command Bostons in daylight raid on Dutch Airfields.
- 7 July General C. Spaatz appointed Commanding General U.S.A.A.F. in Europe.
- 6 August "Moonshine" R.C.M. first used operationally. Very successfully used for confusion on enemy early-warning radar as to number of aircraft.
- 8 August Major General Mark Clark placed in Command of U.S. Ground Forces established at Headquarters in England.
- 9/10 Aug. Initiation of jamming of Gee.
- 12 August Mr. Churchill arrived in Moscow for conversations with Marshal Stalin. Returned 24th August.
- 15 August Formation of Pathfinder Force under Command of Group Captain D.C.T. Bennett. No. 8 Group subsequently reformed and became No. 8(PFF) Group on 13.1.43.
- 17 August U.S. VIII Air Force Aircraft, led by General Ira Eaker, operated for the first time. Objective Rouen Railway Centre (12 Fortress Aircraft escorted by R.A.F. Spitfires).
- 18/19 Aug. Pathfinder Force carried out their first operation - Flensburg.
- 19 August Combined Operation against Dieppe (Jubilee). Bomber Aircraft used as Support.
- 10/11 Sept. First 4,000 lb Incendiary Bomb dropped by Bomber Command (Dusseldorf).
- 14/15 Sept. Last Operation by Hampdens of Bomber Command.
- 19 Sept. First Bomber Command Daylight Operation on Berlin.
- 25 Sept. Four R.A.F. Mosquitos made a Daylight Raid on the Gestapo Headquarters at Oslo.
- 16 Oct. Inauguration of the Fifty Squadron Plan.
- 17 Oct. Daylight R.A.F. Attack on Le Creusot (Sohneider Armament Works) by 87 Lancasters, plus 7 against the Transformer Station at Montchanin. One Aircraft missing from the latter attack.
- 24 Oct. Daylight R.A.F. attack by 88 Lancasters on Milan. This was the first daylight attack on Italy by home-based aircraft and involved a flight of approximately 1,400 miles.
- 25 Oct. Formation of No. 6 Group (R.C.A.F.) at Allerton Park.
- 29 Oct. Consolidated Bombardment Instructions issued.
- 3 Nov. First Operation by Bomber Command Venturas - Hengelo.
- 8 Nov. Allied forces landed in French North Africa (Torch) under the Command of Lieutenant-General Eisenhower.
- 11 Nov. German troops entered "Unoccupied" France.
- 6 Dec. Daylight Attack by No. 2 Group on Phillips Works at Eindhoven.
- 15 Dec. Arnold-Portal Agreement on Air Supplies to Britain in 1943.
- 20/21 Dec. Oboe first employed by Bomber Command in attack on Lutterade Power Station.

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1943

- 9 Jan. General Carl Spaatz assumed Command of Allied Air Forces in North Africa.
- 11 Jan. Area Bombing of U Boat Bases Approved.
- 14-24 Jan. Conferences between the Prime Minister and the U.S. President at Casablanca. (Symbol).
- 16/17 Jan. Target-Indicator Bombs (250 lb) used for the first time by Bomber Command in the first R.A.F. attack on Berlin since 7.11.41.
- 21 Jan. Casablanca Directive Issued by the Combined Chiefs of Staff defining the primary objects of the Combined Bomber Offensive.
- 22 Jan. First Operation by Mitchells of Bomber Command.
- 27 Jan. First U.S.A.A.F. air raid on Germany - Emden and Wilhelmshaven attacked by Fortresses and Liberators.
- 30 Jan. Mosquitos made their first daylight attack on Berlin during Goebbel's and Goering's addresses to the German Armed Forces at the tenth anniversary celebrations of Hitler's regime.
- 30/31 Jan. H2S first used by Bomber Command - Hamburg.

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PART I

THE EXPANDING FORCE

CHAPTER 1

LONG-TERM EXPANSION AND RE-EQUIPMENT
POLICY

(i) Target Force "E" Abandoned.

W.P. (40)
352.

"The Navy can lose us the war but only the Airforce can win it. Therefore, our supreme effort must be to gain overwhelming mastery in the air. The fighters are our salvation but the bombers alone provide the means of victory. We must, therefore, develop the power to carry an ever increasing volume of explosives to Germany so as to pulverise the entire industry and scientific structure on which the war effort and economic life of the enemy depends."

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C.A.S. Folder
590 Pt. II

This opinion was expressed by the Prime Minister in a Memorandum to the War Cabinet after the fall of France in 1940. Since that date an ever-increasing bomber offensive and, ipso facto, the expansion of the Force to meet it had repeatedly been put forward by the Chiefs of Staff and accepted by the War Cabinet as a cardinal factor in the programme for victory. In this they had the sympathetic support of American opinion. "Maximum impact on the enemy" was, in fact, the joint aim which formed the basis of all subsequent expansion programmes of which the latest, Target Force "E", was still in force in the spring of 1942 when this Narrative opens. As will be seen, prospects of achieving it were rapidly diminishing.

As far as the Metropolitan Bomber Force was concerned, Target Force "E" envisaged planned expansion to a front-line strength of 4,000 heavy and medium bombers by mid-1943. This figure could not be met from British production alone and its achievement was essentially dependant on a steady supply of aircraft from the United States. Every effort had been made during 1941 to stimulate American production and to ensure the allocation of a substantial proportion of it to the R.A.F. By the autumn of that year, the likelihood of the Americans entering the war and a consequent decrease in those allocations suggested that Britain must be prepared to meet a greater proportion of her needs from her own resources.

D.C. (S)
(42) 82.

In December, 1941, the Defence Committee authorised the adoption of a programme the main object of which was the production of 14,000 heavy and medium bombers by August 1943 and a peak output of 925 aircraft per month by December 1943. At the same time the Prime Minister ruled that the Ministry of Aircraft Production should be given the labour and machine tools necessary to enable them to complete that programme 100%. This latter point is of considerable importance and must be borne in mind when considering subsequent planning.

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On 7 December 1941 the United States entered the war and, as expected, allocations from that source were considerably reduced under the terms of the Arnold/Portal Agreement signed on 1 January 1942. By the spring, even those reduced expectations seemed unlikely to be fulfilled. Every indication was that the British were about to be "edged off the U.S. platform". These gloomy prognostications were confirmed when the President laid down in principle that every appropriate American aircraft should be manned by American crews. In short, American opinion was undergoing a change which seemed likely to have serious repercussions on Britain's own expansion plans. It is true that there was a reasonable hope that, by 1943, part at least of the loss would be made good by American Units operating in British theatres of responsibility but, in the interim, planned expansion would be jeopardised and there might be a vital weakening of effort in direct contrast to the accepted policy of intensification.

C. A. S. Folder
A/T/P. Agmt.
and AHB, II
7/4/42
AHB/IIJ/41

The culminating blow to hopes of achieving Target Force "E" came with the signing of the Arnold/Towers/Portal Agreement in Washington on 21 June 1942. In this, the Presidential policy that, with certain exceptions, every appropriate States-built aircraft should be manned by American crews was re-iterated. The United States undertook to allot sufficient aircraft to equip and maintain certain existing or projected units of the R.A.F. and Dominions in theatres of British and Combined strategic responsibility for which American units could not be substituted. In all other instances, American Units would be substituted for previously projected R.A.F. Units flying American aircraft. At the same time they would:

"continue during 1943 the allocation of aircraft necessary to meet attrition in British squadrons using American aircraft operational on 1 April 1943, and in their supporting O.T.Us. "

(ii) Target Force "G".

As has already been stated, expansion to a front-line strength of 4000 heavy and medium bombers could not be achieved when relying on British production alone. The new Agreement had reduced heavy and medium bomber allocations from America to the merest trickle. Under these circumstances there was nothing for it but to scrap Target Force "E" and prepare a new long term programme in keeping with reduced resources.

The new programme - Target Force "G" - received provisional approval from the E. R. P. Committee in July 1942. It aimed at expansion of the Force to 135 heavy and nine medium squadrons - a total of some 2,500 aircraft - by December 1943. Of these, 125 heavy squadrons would be in Bomber Command, the remaining 19 squadrons being distributed between the Middle East, India and Burma.

This programme was based on a calculated strategic requirement, taking into account the size of the Airforces which the United States had undertaken to provide in British theatres of responsibility. It was provisionally estimated that the 2,500 heavy and medium bombers required for Target Force "G", plus the American Units operating in British theatres of responsibility, plus a small force from the O.T.Us on nights of peak effort would, in effect, provide a combined bombing force of approximately 4,000 aircraft.

A. C. 55(42)
and
A. C. Draft
Conclusions
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Ibid.

In planning the new programme, the bomber figures had deliberately been set higher than could be attained by existing forecasts of British production and allocations from America under the A.T.P. Agreement. It was the view of the Chief of the Air Staff that the approved strategic needs of the R.A.F. should not, on principle, be subordinated to current production plans. He argued that the additional resources already promised should be given to the Ministry of Aircraft Production to enable them completely to fulfill their December 1941 programme. At the same time the Defence Committee should approve any necessary increases in that programme to enable the industry to change-over to the production of new types of bomber without jeopardising the normal output⁽¹⁾. So far the stated needs of the Industry had not been met with the result that output, so far as the heavy and light bombers were concerned, was consistently behind schedule.

S. 6 Folder ?
No. 118

Planning on these lines had not proceeded very far before the Air Member for Supply and Organisation was obliged to advise the Air Council that the aircraft position was such that, even assuming 100% of current production forecasts - which experience indicated as unlikely of realisation - O.T.U. aircraft requirements would prohibit all possibility of a front-line expansion to the 144 heavy and medium squadrons visualised in Target Force "G" by the end of 1943. Any attempt to provision on that basis must inevitably prove wasteful.

It may be of interest at this stage to compare figures prepared by the Air Member's staff showing expectations of expansion by squadrons when planning on (a) receipt of 100% of the production programme, taking into account the O.T.U. requirements and (b) the more realistic expectation of 85% of the same programme:

Ibid.

		1942		1943				1944			
		Sept.	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
(a)											
	Heavies	25	41	55	69	84	97	112	124	132	136
	Mediums	27	21	17	15	16	18	21	26	31	35
		52	62	72	84	100	115	133	150	163	171
(b)											
	Heavies	25	38	49	60	72	84	96	107	114	118
	Mediums	30	24	20	17	17	19	21	25	30	34
		55	62	69	77	89	103	117	132	144	152

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(1) The need for a heavy bomber of entirely new design to replace the Wellington and Warwick was beginning to make itself felt. The performance of British aircraft in comparison with those of the enemy was giving rise to considerable misgiving. It seemed likely that by 1944 we should be labouring under acute inferiority unless immediate steps were taken to design and produce a heavy bomber capable of meeting the increasing strain imposed by operational requirements and the rapidly improving enemy defence systems.

An examination of these figures shows that even on the most optimistic basis, the bomber element of the new programme - i. e. 144 heavy and medium squadrons - could not be achieved before the late spring of 1944 and, on a more realistic basis, probably not before the autumn.

A. C. 58 (42)
and A. C. Draft
Cnslsns.
14(42)

After considerable discussion, the Air Council finally agreed that, as an interim measure and since any further delay might seriously jeopardise the long-term programme, the A. M. S. O's expansion figures at (b) above should be accepted as a basis for provisioning and administrative planning until June, 1943, only. It was assumed that by that time output from British production would have been increased and the programme could then be stepped up accordingly. Moreover, the Air Council still clung to the hope that if American production reached the proportions expected of it, it would exceed their capacity to produce trained crews and, by the middle of 1943, a substantial flow of heavy bombers might once again become available to the R. A. F. from that source.

A. C. 55(42)

D. C. (S)
(42)82

The above decisions must not obscure the main issue. The Air Council were still of the opinion that if the bomber force were to expand to a size commensurate with strategic requirements, British industrial output should and must be increased. The Ministry of Aircraft Production must be given the means not only to overtake arrears and fulfill, in toto, the programme approved the previous December, but to develop additional capacity which would provide a "cushion" element enabling output to be maintained while developing and changing over to production of the urgently required new bombers. This was the case which the Secretary of State for Air presented for the approval of the Defence Committee (Supply) on 27 September 1942.

(iii) Breakdown of Target Force "G".

A. C. 49(42)

S. 84278/42.

A. C. Draft
Conclusions
13(42)

Discussion on Target Force "G" was still in progress when a new cloud appeared on the horizon. For some time past the Joint War Production Committee had been examining the manpower position in the light of the requirements of the Service and their supporting industries. In June 1942 the Air Council were invited to furnish a revised estimate following the A/T/P Agreement. This, based on the Air Member for Supply and Organisation's "realistic" programme, showed a requirement for an increased intake during the first six months - i. e. July to December, 1942 - of 126,950 men and women over and above the current authorised figure of 110,750. This increase was due less to the expansion of the force than to the fact that the number of personnel required to maintain a force of constant size was, itself, constantly increasing. Establishments were enlarging to keep pace with the increasing complexity of the equipment to be maintained, expanding training facilities, works services and so on. Nevertheless, the Secretary of State for Air was forced to warn the Air Council on 19 August 1942, that in view of the very serious manpower situation which had arisen, it was likely that this new demand would not be met and that Commands would have to effect cuts in their requirements by making do with less than their theoretically correct establishments.

P. M. Min:

M. 377/2

This view was confirmed by the Prime Minister on 17 September when he warned all Services that drastic revision of their estimates was essential. As far as the R. A. F. was

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S. 84278/42

concerned this must be achieved to the extent of 50% of their demands. In short, the expansion and, ipso facto, the offensive power of the bomber force was in danger of being seriously limited not only by lack of recruits to the Service but by lack of labour essential for the manufacture of aircraft and equipment. A rigorous scrutiny of existing establishments, methods and hours of work was ordered in all Commands with a view to reducing requirements to the minimum consonant with the maintenance of the operational effort.

W.P. (42)
539.

Cut after cut was made in the original estimate but on 20 November, Sir John Anderson was forced to admit that, even with the utmost effort and economy, only half the total demands of the Services and their supporting industries could be met. For a total requirement of 2.5 million men and women, there were only 1.6 million on which to draw.

W.P. (42)
556.

In December, the Prime Minister himself directed that the further necessary reductions over and above those already referred to must be effected by policy changes modifying the respective expansion schemes. The appropriate Ministers were instructed to show how this could be done and what the result of such modifications would be.

W.P. (42)
570.

As far as the bomber expansion programme was concerned, the position was now acute. It had been proposed to make an overall reduction of 325,000 on the joint manpower requirements of the R.A.F. and the Ministry of Aircraft Production. Of this, 100,000 was to be borne by industry alone. If this proposal were ratified, it would impose a very serious limitation on the whole expansion programme of which the brunt would fall on the heavy bombers. The main trend of the aircraft industry during 1943 was to have been towards the production of heavy bombers. Already some months behind in its labour intake, it had been estimated that even without the new developments, the industry's heavy bomber output during 1943 would have been some 1,600 aircraft behind schedule. The proposed reduction in labour resources would retard the output of heavy bombers still further with a consequent vital limitation in the expansion and effective strength of the Force.

W.M. (42)
167.

Urgent representations on these lines by the Secretary of State for Air failed to stem the tide. On 11 December, 1942, the proposed reductions were ratified by Cabinet decision and the joint manpower allocation to the R.A.F. and Ministry of Aircraft Production for the period July 1942 to December 1943 was fixed at 750,000 men and women.

A. C. Draft
Concl. 7(43)
and S. 6
Folder 118(a) ?

The Air Council were, therefore, forced to accept this most unwelcome curtailment of their long term expansion programme. Target Force "G" was no longer a practical proposition and was succeeded by Target Force "H" - planning and implementation of which properly fall within the scope of the next Narrative. It is worth noting, however, that prospects for 1943 were to prove considerably brighter than had at first been anticipated. Renewed negotiations with the United States culminated in the Arnold/Evill Agreement in December 1942, with its promise of increased allocations

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in the new year. In addition, the revised programme issued by the Ministry of Aircraft Production in January, 1943, forecast a better rate of production than had been anticipated at the time of the manpower discussions. There was, indeed, reason to hope that in 1943, the bomber force would achieve the expansion in weight and numbers essential if it was to take its full share of the Combined Anglo/American Bomber Offensive already being planned. But, as far as this Volume is concerned, this was still in the future. In 1942 expansion and re-equipment was limited by a winter of factors, what those factors were and the extent to which they were overcome will be demonstrated in the next Chapter.

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CHAPTER 2.

STAGES OF EXPANSION AND RE-EQUIPMENT.

(i) The Programme in Arrears.

As has been seen, at the beginning of March, 1942, expansion was still being pursued in terms of Target Force "E". With a total of only 44 (14 heavy and 30 medium) squadrons, the Command was still a long way off the target figure. The discrepancy was actually a little less at this time as six Hampden, three Whitley and a Wellington squadron were established at 27 U.E. giving ten additional flights or five standard-size squadrons. All but six squadrons were operational and the majority up to practically full strength. (1)

During the early months of the period the bulk of the operational effort continued to fall on the medium bombers but, by September, 1942, the Command medium strength had shrunk from 30 to 13 squadrons (owing to a number of causes which will be examined later) and the heavies were at last coming into their own. They had, in fact, expanded in six months from 14 to 25 squadrons although a number were very deficient in aircraft.

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E. O. Orders
of Battle.

As a result of the inauguration of the accelerated programme in September, (2) these figures were to rise by the end of January, 1943, to 36 heavy and 15 medium squadrons (excluding three Ventura and two Mitchell squadrons in No.2 Group). In effect, however, while a certain amount of re-equipment had changed the character of the force from medium to heavy, actual expansion during the whole period March to January was achieved to the extent of only seven squadrons and a hundred - odd aircraft.

Ibid.

Before examining the stages by which this expansion and re-equipment took place, consideration must be given to the contributory causes which prohibited expansion of the bomber force on anything like the scale originally envisaged.

(ii) Causes of Delay.

Briefly, these were (a) the failure of the Ministry of Aircraft Production to realise their forecasts (b) the crippling drain on the strength or potential strength of the Command in crews and aircraft to feed other Commands at home and overseas (c) the revision of the Arnold/Portal Agreement of January, 1942 and (d) the rapidly deteriorating manpower situation. Wastage

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(1) See Table at Appendix 1.

(2) See Chapter 2, Sections (vii) and (viii)

will be discussed in a later Chapter. In any event it was not, at this stage, a major factor delaying expansion.

The overall effect of the shortage of manpower and the failure of American supplies has already been examined in some detail. It was due to the inability of British aircraft production to achieve anything like the required output and, equally, to the persistent drain on Bomber Command's resources either actual or potential that the breakdown of expansion in the Command was primarily due.

As has been stated, inadequate supplies of labour were the main cause of under-production during this period, the brunt of which fell on the heavy bombers. By August, 1942, only 72% of the December, 1941 heavy bomber programme had been achieved and the deficit, in detail, amounted to 200 Stirlings, 110 Lancasters and 65 Halifaxes. Stirling production had proved extremely wasteful in manhours, requiring exactly double the number estimated for the Lancaster. The serious shortage of these aircraft was, in part, accounted for by failure to allow for this situation. The position was, in fact, so critical that by the autumn consideration was already being given to switching Stirling production capacity to Lancasters. It may be worth noting at this point that, on 30 December, 1942, the A.O.C.-in-C. complained to the Secretary of State for Air that No.3 (Stirling) Group was still only at half strength and the aircraft suffered from a high degree of unserviceability. Stirlings had, in fact, "made no worthwhile contribution to the bomber effort for some time."

The Halifax position was less serious. Trouble with the tailwheel had temporarily affected deliveries in the early summer but this had been overcome. The aircraft proved extremely unsatisfactory from the performance angle, however, and underwent considerable modifications both on the production line and in squadrons in an attempt to overcome their aerodynamic and other deficiencies. Lancasters on the other hand were well behind schedule. Difficulties of wing-structure at the beginning of the year had been overcome and labour and machine tool shortages were mainly responsible for the deficit.

The medium bomber output at this time was almost up to schedule with the vital exception of the Wellington Mk.III, deliveries of which were held up during the summer months owing to the shortage of propellers and constant speed units. This delay had considerable repercussions on the expansion programme as will be seen from the next Section.

Taking all in all, by the autumn of 1942, it had become only too clear that the Ministry of Aircraft Production's programme of December, 1941, based on their unrealised expectations of additional resources, had been over optimistic. Even their revised

/forecast

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Target Force "G"

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forecast of July, 1942, was showing no signs of achievement. At the same time, the new manpower survey was to frustrate all attempts to obtain for them the increased supplies of labour upon which the fulfillment of their programme depended.

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C. A. S. Folder
590 Pt. II

If the aircraft supply position was serious, the drain on those supplies during the first six months of the period both from the production line and the Command's own resources, was equally critical. Diversions of aircraft from the strength or potential strength of Bomber Command between 1 January and 1 September, 1942, in effect amounted to some 510 aircraft and represented a loss to the Command of approximately 28 squadrons at 18 U.E. The majority of these diversions were to Coastal Command and the Middle East, the brunt falling on the medium bombers. Not only did they represent a loss of aircraft but, in many instances, of crews as well and carried a further commitment to supply replacement crews and aircraft at regular intervals.

IIH/241/3/562 ✓

B. C. S. 27604
Encl. 24A.

The A.O.C.-in-C. protested frequently against this tendency to use Bomber Command as a "milch cow" but the overall shortage of aircraft was such that, while sympathising with his attitude the Air Ministry were unable to take any drastic steps to ease the position until September when the Prime Minister himself intervened with the ruling that for the next three months Bomber Command was to receive priority over all other commitments to enable it to expand to 50 heavy and medium squadrons operational by 31st December, 1942.

(iii) Medium Bomber Expansion and Re-equipment.

Until such time as the output of heavy bombers from production could be stepped-up to the required peak, expansion of the medium bombers remained a sine qua non of the long term expansion programme if the bomber force was to reach by the end of 1943 a size commensurate with the stated strategic requirements.

Nevertheless, the period March to September, 1942 saw a sharp decline in the medium strength of Bomber Command. This was partly due to the transfer of a number of squadrons to Coastal Command and the re-equipment of others to heavy types but, primarily, to the unexpected delay in the supply of Wellingtons Mark III referred to in the previous Section.

At the beginning of March, 1942, the Command had 30 medium squadrons established. During the next six months only one new squadron was formed. On the other hand, two Wellington, three Whitley (two on temporary loan only) and two Hampden squadrons were transferred to Coastal Command to offset the growing shortage of general reconnaissance aircraft and torpedo bombers. Whitleys completed their last operation - excepting O.T.U. aircraft - on 29/30 April, 1942 and by September, the remaining Hampden squadrons in Bomber Command had either re-equipped or were in the process of re-equipping to other types.

Hampdens undertook their last mission in Bomber Command on 14/15 September, 1942.

With the deletion of Hampdens and Whitleys from the front line, Wellingtons became the sole support of the medium bomber force. Marks 1c, II and IV were already at the end of their useful life as operational aircraft and were waiting to re-equip to heavy bombers or Wellingtons Mark III. Owing to the unexpected delay in deliveries of the latter between March and May, 1942, there were insufficient Mark III aircraft available to maintain existing squadrons let alone re-equip or form others. In fact, Mark 1c aircraft had to be allocated as replacements to operational squadrons in their stead. This not only diverted Mark 1c aircraft from O.T.U's which were seriously short of medium bombers but affected the development of the Gee force (1) since they were not equipped with the device.

By June, 1942, the position had eased sufficiently to enable all the existing Wellington Mark III squadrons to be brought up to full strength and maintained. By August, a further improvement enabled three other medium squadrons to be re-equipped to Mark III aircraft. These remained in short supply however and, with the one exception already mentioned, no expansion was possible prior to September, 1942.

Between March and September, 1942, as many as eleven medium bomber squadrons re-equipped to heavies and, as has been seen, seven others transferred out of the Command. Thus, although the heavy bomber force had increased in that time from 14 to 25 squadrons, the medium force had suffered a corresponding shrinkage from 30 to 13 squadrons and the overall strength of the Command had actually decreased to 38 squadrons from the 44 available at the beginning of the Period.

Before examining the steps taken to rectify this serious situation, consideration must be given to the progress of the heavy bombers which had troubles of their own.

(iv) Heavy Bomber Expansion and Re-equipment.

No expansion of the heavy bombers took place between March and September 1942, with the exception of Nos. 10 and 76 (Halifax) Squadrons which were increased to an establishment of 24 plus 3 in July during the detachment of two flights from each squadron on loan to the Middle East. These squadrons were subsequently reduced to standard size in September when the detached flights returned to the United Kingdom.

Output of Heavy bombers was a long way behind schedule during 1942 and those available between March and September were used to bring existing squadrons up to establishment and re-equip the mediums. By September, 1942, the heavy bomber strength of the Command had risen from 14 to 25 squadrons. By that time, also, six Manchester squadrons, four of which had re-equipped from medium bombers as an interim measure, had either re-equipped or were in process of re-equipping to Lancasters. The Manchester, which had proved a failure as a heavy bomber owing to its low power/weight ratio, completed its last operation on the night of 25/26 June, 1942 and was henceforth relegated to a training role.

/Despite

(1) See Part II

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Despite this increase in heavy squadrons, the position in September, 1942 was by no means as satisfactory as it appeared on paper. The Halifax, output of which was nearer schedule than any other heavy bomber, had failed to give the required performance under operational conditions. The aircraft suffered from a high degree of unmanoeuvrability with a tendency to go out of control when evading. This weakness, coupled with flame-throwing from the exhaust, undercarriage defects and inadequate speed at height, made the A.O.C.-in-C. unwilling to risk the lives of his crews by using the aircraft operationally until the defects had been remedied. Intensive efforts were made both in squadrons and by the Ministry of Aircraft Production in an attempt to satisfy the aerodynamic and altitude requirements but it was not until well on into 1943 that the Halifax became satisfactory as an operational aircraft.

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Stirlings, too, were giving a lot of trouble. (1) Not only were they in such short supply that by the end of the year the Stirling squadrons were at little more than half strength but their high rate of unserviceability reduced the operational availability of even those aircraft which reached the squadrons. On 30 December, the A.O.C.-in-C. complained to the Secretary of State for Air that he was "lucky" if he could raise thirty aircraft from No.3 (Stirling) Group for one night's operations even after a week of inactivity.

(v) The Position in September, 1942.

By September, 1942, the situation had, to all intents and purposes reached a deadlock. The new long-term expansion programme (Target Force "G") was on the point of breaking down as a result of the manpower crisis; the aircraft supply position remained unsatisfactory and, while further negotiations with the United States were giving rise to renewed hopes of increased allocations in 1943, these had yet to materialise. Meanwhile, despite all representations to the contrary, the drain on the resources of Bomber Command had, perforce, continued. (2)

As has been seen, far from expanding the bomber force had actually shrunk during the past six months by as many as
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6th Meeting

(1) Serious consideration was being given at this time to the possibility of switching both Halifax and Stirling production capacity to Lancasters, the only existing type of heavy bomber approaching the Command's operational requirements. After much discussion, the Defence Committee (Supply) agreed on 14th December 1942, that Austin and Short factories should be turned over from Stirling to Lancaster production as soon as possible - i.e. early in the new year. It was thought that any possible loss of output during the switch-over would be more acceptable than continuing to suffer heavy casualties not only to aircraft but to sorely needed crews. It was also agreed to postpone a decision on the Halifax until the result of the proposed modifications could be assessed.

(2) For details see Appendix 4.

six squadrons; a situation only partially alleviated by the increased number of heavy squadrons resulting from re-equipment of the mediums. The official return on 18 September shows the following position :--(1)

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Order of
Battle

A/C	No. of Sqdns.	Total I.E. & I.R.	A/C on Unit charge	No. of A/C Deficient
Stirling	5	80 plus 10	64	26
Halifax	10	160 " 20	127	53
Lancaster	10	160 " 20	162	18
Wellington (All Marks)	13	190 " 26	191	25
Total	38	590 " 76	544	122

The effective strength of the Command at this time was actually considerably less than the 38 squadrons shown on paper. Four Halifax, one Lancaster and two Wellington squadrons were non-operational. Three Polish medium squadrons were still operating on an establishment of 10 plus 2 giving the equivalent of only two standard-size squadrons. The total available operational strength of the Command was therefore no more than 30 squadrons; an unsatisfactory state of affairs further aggravated by the number of squadrons below establishment and the poor performance of Halifaxes and Stirlings.

(vi) The Prime Minister's Ruling.

P.M.
Personal
Minute
M.378/2

This then was the position when, on 17 September 1942, the Prime Minister instructed the Secretary of State for Air to prepare a scheme which would achieve "the prime military object" of raising the effective strength of Bomber Command to 50 heavy and medium squadrons, all operational, by the 31 December. At the same time he guaranteed that once the plan had been approved, it would become binding and, within certain unavoidable limits, would receive priority over every competing claim during the next three months.

(vii) The Fifty-squadron Plan.

S.5714
Encl.133A

As already stated, at this time the Command had the equivalent of 37 (2) heavy and medium squadrons formed or forming, leaving a balance of 13 to be found before the end of the year. The dominant factor in the success of the scheme was the aircraft position. Supplies could be augmented in two ways: (a) by curtailing the extraneous demands on the actual or potential strength of the Command and returning squadrons on loan and (b) by an increased output from production. If the new squadrons were to become operational by 31 December, the crucial months so far as production was concerned were October and November, leaving a further month for squadrons to 'work up'.

/Following

- (1) See Appendix 2
(2) Actually 38 squadrons on paper but with 3 Polish squadrons established at 10 plus 2, the number of standard size squadrons was reduced to 37.

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Following the Prime Minister's Minute, an immediate approach to the Minister of Aircraft Production resulted in a promise of 300 Halifaxes, 300 Lancasters, 181 Stirlings and 893 Wellingtons between September and November - altogether an increase of 260 heavy and 275 medium bombers on deliveries made during the previous quarter. The Minister made it clear that these increases were contingent on the supply of labour and better deliveries of machine tools and that the proposed withdrawal of the R.A.F. personnel lent to Industry during the year would limit production to a level below that required to make good the increased allocations. The medium bomber figures actually involved no increase from production but supplies were to be augmented by a more rapid flow from A.S.U's. At the same time, he made a further contribution by reducing the number of aircraft held in pool for experimental and development purposes.

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By 9 October, the Secretary of State was able to inform the Prime Minister that, assuming these promises were fulfilled, he expected to be able to find all but five of the thirteen squadrons required from the production line. Two more (Nos. 51 and 77) on loan to Coastal Command would have been returned by the beginning of November for re-equipment from Whitleys to Halifaxes. This left a balance of three squadrons which he proposed to find by :-

- (a) Suspending the flow of medium bombers to the Airborne Forces for two months and⁽¹⁾
- (b) Halving the flow of heavy bombers to the Middle East.⁽²⁾

Ibid.

As far as crews were concerned, the situation, already difficult, was further aggravated by a commitment to ferry Halifax and Wellington replacement aircraft to the Middle East. He proposed to relieve the Command of the whole of the Halifax and one third of the Wellington commitment. The remaining small deficiencies would be met by various expedients, including the accelerated return of tour-expired crews and pilots from the Middle East.

Ibid.

Equally indispensable to the success of the plan was an increased supply of mechanics to Bomber Command. If squadrons were to be ready in time, O.T.U.s. must be brought up to strength in ground-staffs immediately and men made available for the new squadrons as they formed. The Secretary of State hoped that economies to be effected in the provisions for the Airborne Forces would meet most of this requirement but

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~~C.O.S.~~
C.A.S. (42) (1) The Airborne Forces represented a heavy commitment for medium bombers direct from the production line. 100 medium bombers were already so employed and further 100 were required during the next two months. Although the aircraft were Whitleys and obsolescent as operational bombers, they would relieve the strain imposed on the training organisation by the accelerated expansion programme.

(2) Then at the rate of 8 per month.

any balance would have to be found by a decision to give the Command priority over all other claims during the vital months. While he expected that the losses thus inflicted on other Commands would, to a certain extent, be made good by the economies anticipated from the new manpower survey, he emphasised that Bomber Command itself must impose rigid economies and bear its share of the general acute shortage. Meanwhile a start was to be made with the return of airmen lent to industry. In view of the limiting effect this would have on production, however, the flow was to be restricted to 500 per month.

M. P.M.L.M.
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The above proposals were approved by the Prime Minister on 16 October 1942 and on 22 October received the formal agreement of the Chiefs of Staff subject to the proviso that the required personnel should be found without removing technical tradesmen from Coastal Command squadrons. A start had already been made towards their fulfillment and it now remains to examine the progress of the Command towards the target of "fifty squadrons" and the extent to which this was achieved.

(viii) Progress of the Accelerated Expansion Scheme.

It will be remembered that the fulfillment of the 50 squadron plan was contingent on the eleven new squadrons having formed by the end of November 1942. Forecasted expansion was as follows :-

L.M. 2698
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Sqdn.	Date of Formation	Aircraft
466 (RCAF)	15/10/42	Wellington III
424 "	"	Wellington II
426 "	"	Wellington III
427 "	7/11/42	Wellington III
428 "	"	Wellington III
429 "	"	Wellington III
196 (RAF)	"	Wellington III
199 "	"	Wellington III
431(1) "	"	Wellington III
90 "	"	Stirling
467 (RCAF)	"	Lancaster

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C.A.S.
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By 1 December, there were actually 51 squadrons in existence.⁽²⁾ Owing to production difficulties, however, the squadrons were some 150 aircraft short of establishment and, but for an unexpected drop in the wastage rate over the previous three

/months

- (1) A second Stirling squadron (No.166) was to have formed in November but was cancelled on the decision to re-equip No.115 (Wellington III) squadron to Stirlings in the same month. No.431 squadron was authorised to form on Wellingtons in its place.
 (2) This figure includes the three Polish squadrons which, throughout the 50 squadron plan were counted as two and the additional squadron provided by the third flights of Nos.7 (Stirling) and 35 (Halifax) squadrons which had been temporarily expanded for training with special Radar equipment.

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months⁽¹⁾ the shortage would have been even greater. It was now evident that not all the established squadrons would be operational by the end of the year. The following table will serve to illustrate the position on 1 December, 1942:-

Ibid .

A/C	Sqdns Established	A/C short of Establishment	Sqdns op: 31 Dec.
Lancaster	15	32	15
Halifax	11½	12	11
Stirling	7½	37	6
Wellington III	15	73	11
Wellington IV	2 ϕ	-	2
	<u>51</u>	<u>154</u>	<u>45</u>
	ϕ Three Polish squadrons.		

The deficit on Lancaster and Halifax aircraft in relation to the number of squadrons was comparatively small and all squadrons were in fact on a working basis. The Stirling position on the other hand was disappointing. Eight squadrons had been planned but it was clear that no more than six would be operational in time. It was to the serious shortage of Wellingtons, however, that the breakdown of the programme was primarily due. This and other causes will be discussed in the next Section.

Ibid

The official return from Bomber Command on 31 December, 1942, confirmed expectations. Only 44 squadrons were operational⁽²⁾ and the majority were much deficient in aircraft. The position was actually rather worse as the 44 squadrons included one on loan to Coastal Command for Bay of Biscay patrols and Nos. 142 and 150 (Wellington) squadrons with detachments of twelve aircraft each in North West Africa.

Meanwhile, re-equipment of the force had continued. The two Whitley squadrons (Nos. 77 and 51) had returned from Coastal Command and commenced to re-equip to Halifaxes in October and November respectively. No. 51 squadron became operational at the beginning of January but although No. 77 squadron actually received its full complement of Halifax Vs, the aircraft developed undercarriage troubles and had to be changed for Mark II which were not operational until February, 1943.

By the first week in the new year the heavy force had been further augmented by the re-equipment of two Wellington squadrons to Halifaxes and one to Lancasters. A fourth (No.156) had been authorised to re-equip to Lancasters in December but remained operational on Wellingtons until February. Two Halifax and a Stirling squadron also re-equipped to Lancasters. The Stirling position remained serious. Two medium squadrons were

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(1) E.g. Losses in November, 1942 had dropped to 3.9% from 5.4% the previous month. This was partly accounted for by the lighter defences of the Italian targets but in view of long distances flown to these targets and the bad weather encountered over Germany this was still an appreciable drop.

(2) This figure increased to 45 next day (1 January 1943)

to have re-equipped with them in November but although No. 75 (N.Z.) squadron was operational by the end of the year, Stirlings were in such short supply that No. 115 squadron remained operational on Wellingtons until February, 1942 when it commenced re-equipment to Lancasters instead.

(ix) Causes of the Delay.

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C.A.S.
Folder 590
Pt. II

Despite every effort, the 50-squadron plan had broken down. In a Minute to the Prime Minister on 7 January 1943, the Secretary of State for Air attributed this failure to (a) production disappointments and (b) the diversion of medium bombers to North West Africa for operation Torch. Subsidiary reasons given by the C.-in-C. in his report included unfavourable weather for squadron training and shortage of certain ground and airborne equipment in Units.

Undoubtedly the major factor was the shortage of aircraft, particularly Wellingtons and Stirlings. Once again, the Ministry of Aircraft Production were unable to fulfill, in toto, their promises of increased supplies during the vital months September to November. On the 27 November, the M.A.P. reported the position as follows :-

C.S.17032
Encl. 17A

A/C	Forecasted Supply	Produced by 27 November	Anticipated Deficit by 1 December
Lancasters	300	229	26
Halifaxes	300	266	NIL
Stirlings	181	125	43
Wellingtons	893	648	193
Whitleys	177	158	NIL

Ibid

The serious shortage of Stirlings was attributed partly to a strike at Short Hartlands and partly to difficulties encountered in the change over from Mark I to Mark III production.

Once again, however, it was to the Wellingtons that the breakdown of the programme was mainly due. Large numbers of these aircraft were held in A.S.Us. awaiting completion as a result of the continued shortage of constant speed units and propellers. During December the position eased but the damage had been done and a long spell of bad weather prevented those squadrons which received their aircraft from completing their training in time to become operational by 1 January 1943. (1)

(x) The Gap Filled.

It has been seen that the deadline for the fifty-squadron plan was 30 November, 1942, by which time all squadrons had to be formed in order to complete their training and become operational by the end of the year. On that date Bomber Command already had 51 squadrons established but only 45 of these were operational by the 1 January, 1943, and a number were greatly deficient in aircraft.

/Very

(1) Only three of the nine new Wellington squadrons (Nos. 199, 466 and 427) were operational by 1 January, 1943.

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E. R. P. 239

Very little expansion beyond the accelerated programme was possible in December and January as all available aircraft were required to bring existing squadrons up to full strength. One squadron formed on Lancasters in December, (1) however, and two Halifax squadrons were expanded by a third flight each. (2) Against this, the two squadrons in North Africa were reduced to a 'number only' basis in January and No. 166 squadron was formed from their home echelons.

Thus the end of the Period under review in this Narrative (1 March 1942 to 1 February 1943) found Bomber Command with 52 heavy and medium squadrons of which 49½ were fully operational. Moreover, all squadrons were up to practically full establishment in aircraft. The C.-in-C. now had under his command 36 heavy and 16 medium squadrons - representing a total strength of 944 aircraft, all but 40 of which were operational. By no means an insignificant figure. (3)

The following Table may be useful for a rapid comparison of Command States at the beginning and end of the Period. (4)

Aircraft	6 March 1942			4 February 1943		
	Sqdns. Estbd.	Total I.E. & I.R.	A/C on Unit charge	Sqdns. Estbd.	Total I.E. & I.R.	A/C on Unit charge
Lancaster	2	32 plus 4	27	17	272 plus 34	315
Halifax	5	80 " 10	88	11	200 " 25	228
Stirling	4	64 " 8	49	8(1)	136 " 17	119
Manchesters	3	48 " 6	61	-	- " -	-
TOTAL	14	224 " 28	225	36	608 " 76	662
Hampdens	7	120 plus 15	160	-	- " -	-
Wellingtons	20	328 " 41	364	15(ii)	240 plus 30	282(i)
Whitleys	3	72 " 9	90	-	- " -	-
Total	30	520 " 65	614	15	240 " 30	282
GRAND TOTAL	44	744 plus 93	839	51	848 plus 106	944

E. R. P. 237

From

- (1) No. 100 squadron
- (2) Nos. 51 and 158 squadrons
- (3) Figures given in this para. include
 - (a) No. 405 squadron on loan to Coastal Command for anti-submarine reconnaissance.
 - (b) Three Polish squadrons counted as two
 - (c) The third flights of Nos. 51 and 158 squadrons. They do not include the third flights of Nos. 7 and 35 squadrons formed temporarily for training with H. 2. S.
- (4) Figures for the Table have, for convenience, been taken from Bomber Command Orders of Battle dated 6 March 1942 and 4 February 1943 respectively. For detailed analyses see Appendices 1 and 3.
 - (i) This figure includes No. 115 squadron established on Stirlings, operational on Wellingtons until mid-1943.
 - (ii) The three Polish squadrons established at 10 + 2 have been counted as two standard size squadrons (16 + 2).

ATH/Despatch and A.M.W.R. Manual of Bomber Cd. Operations From the above figures it can be seen that, in eleven months, Bomber Command had expanded by no more than seven squadrons and a hundred odd aircraft. Actually availability throughout 1942 averaged only 300 aircraft with crews. During the moon periods when leave was restricted this was increased to approximately 400 and on nights of special effort by the use of every possible aircraft including those from training units, this could even be raised to the spectacular peak of 1000 bombers.

Ibid Against the comparatively small numerical expansion achieved must be set the greatly increased bomb-lift of a force now primarily heavy in character. Air Ministry War Room figures for the whole of 1942 show an increase in the potential bomb-lift of the force of as much as 1112 tons or 69%⁽¹⁾

Before going on to examine the domestic problems of the Command consequent upon the expansion plans outlined in the preceding pages, attention must be paid to the expansion and re-equipment of the light bomber force which, as will be seen from the next Section, was a very different story.

(xi) Expansion and Re-equipment of the Light Bombers.

E.R.P. 140 Target Force "E" (Revised) had aimed at 20 light bomber squadrons of which 15 were to be Mosquitoes. The new Target Force "G" (July 1942) proposed 17 squadrons, four for the Army Air Support Group. As has already been shown Target Force "G" was to break down over the manpower position and it was not until January 1943 that a new expansion and re-equipment programme for No. 2 Group was finally prepared.

S.67148 Encl.77A The beginning of this Period found the light bomber force in a seriously depleted condition and with its future prospects still uncertain. On 4 March 1942, the A.O.C.-in-C. advised the Air Ministry that of the ten squadrons still officially 'on the books', only five were effective, viz:-

114 Blenheim)	107 Boston)	Non-operational
88 Boston)	Operational	for
226 Boston)	105 Mosquito)	re-equipping.

These included Nos. 88 and 226 squadrons on loan from Northern Ireland - each with a commitment to return for three weeks in every quarter for Army Air Support exercises - and No. 105 (Mosquito) squadron still with only five aircraft. Of the remaining squadrons four were about to transfer overseas and the fifth (No. 139) was on a 'number only' basis.

Ibid The C.-in-C. was anxious to maintain as many squadrons in being as possible - even, if need be, below strength, - in order to have the squadron organisation available when a decision as to the re-equipment of the Group had been made. He proposed therefore that the Blenheims thrown up by Nos. 82 and 110 squadrons which were transferring to India as complete /squadrons

A.M.W.R. Manual of Bomber Cd. Operations. (1) Bomb-lift 31 December 1941 was 1609 tons as opposed to 2721 tons on 31 December 1942. Heavy bomber figures for the same period jumped from 588 to 2052 tons.

AHB/TH/84

SECRET

E.R.P. 193 squadrons less aircraft should be used to maintain Nos. 18 and 21 squadrons whose aircraft and flying crews had been posted to Malta. This was approved but the prevailing shortage of aircrews⁽¹⁾ kept both squadrons non-operational until the end of May. By that time the first of the new Venturas had become available and No. 21 Squadron was authorised to begin re-equipping. No. 18 squadron remained on Blenheims until September when, with No. 114 (Blenheim) squadron, it re-equipped to Blenheim V's prior to the transfer of both squadrons to North West Africa in November.

L.M. 496/
D.D.O.P. The Blenheim - for so long the mainstay of the light bomber force - had, in fact, virtually reached the end of its operational life in Bomber Command and was to complete its last mission on 17/18 August 1942.⁽²⁾ It was intended that No. 2 Group squadrons should ultimately be equipped entirely with Mosquitoes but this could not happen for some considerable time owing to the serious under-production of those aircraft - in fact, by the autumn of 1942, only 62% of the December 1941 production programme had been achieved.

L.M. 2045/0.7 Meanwhile a successor to the Blenheim had to be found and Boston IIIs had already been earmarked for the purpose. By March 1942, three squadrons had already re-equipped although one (No. 107) was still non-operational. Future prospects were less promising. The allocation of large numbers of Bostons to Russia at the end of 1941 had greatly reduced expectations of supplies from America and it was now likely that very few more would be available before June 1942. Further re-equipment to Bostons was, for the time being, impossible and it was even anticipated that, by the end of the year, existing squadrons might have to re-equip to other types.⁽³⁾ Venturas, Mosquitoes and
/Mitchells

D.B.Ops/
Folder No. 2
Group Ops

(1) During the first three months of this Period, virtually the entire output from both Blenheim O.T.U's (60 crews per month) was being absorbed by a commitment to supply 42 crews per month for overseas and 16 for the Hudson Ferrying Flight. On 22 April D.B.Ops warned the D.C.A.S. that, unless some relief could be afforded from this drain on the Group's resources, there was little prospect of maintaining the existing light squadrons let alone expanding them. Action was subsequently taken and by the end of June 1942 No. 2 Group had been relieved of its commitments. The two O.T.U's had by then increased their output to approximately 75 crews per month and the Group was beginning to show a surplus.

Ibid

AHB/JH/84
A.M.W.R.
Manual of
B.C.Ops.

(2) All Blenheim IV's off the production line and the whole of the Blenheim V output for the first six months of 1942 had already been allocated to the Middle East.

(3) Despite these gloomy prospects, Bostons proved themselves the mainstay of the light bomber force and between 1st January and 31 December 1942 actually contributed more than half the total operational sorties of the Group viz:

Bostons	1261 sorties
Blenheims	570
Mosquitoes	373
Venturas	81
TOTAL	2285

Mitchells were all in prospect as replacements but throughout 1942, the aircraft position remained so fluid that the Air Ministry were unable to issue a definite programme.

The first of the Mosquito squadrons (No. 105 had commenced to form as early as November, 1941. At the end of April 1942, the squadron had seven aircraft and had been non-operational for six months. Latest figures indicated that no more than ten Mosquitoes would become available in the next three months - i.e. by the end of July.

BC/S.
23746/2

Ibid The primary role of the Mosquito, when available in sufficient numbers, was to be daylight harassing attacks from high level on built-up areas in Germany. By the Spring of 1942, hopes of operating them in force before the winter weather set in seemed negligible and on 6 May the C.-in-C. authorised high altitude bombing against large towns in Western Germany by single aircraft only. Mosquitoes operated for the first time in Bomber Command on 31 May, when four aircraft attacked Cologne in daylight as a follow-up to the thousand-bomber raid the previous night. Later in the year Mosquitoes were to undertake highly successful low level attacks on precision targets - notably the attack on the Gestapo Headquarters at Oslo during the Quisling Anniversary Rally on 25 September 1942.

E.R.P. 216 In October the E.R.P. Committee authorised the equipment of a second Mosquito squadron. No. 139 squadron had remained on a 'number only' basis until 6 June when it had re-formed on non-operational Blenheim V's. The C.-in-C. had pressed for this arrangement in order to absorb some of the surplus aircrews in the Group⁽¹⁾ and enable the squadron to complete a large proportion of its initial training while waiting to re-equip. The squadron received its first allocation of Mosquito aircraft at the end of October but is not shown on the operational strength of the Command until the end of the year by which time it had seven Mosquitoes to its credit.

E.R.P. 201

S. 67148
Encl. 92A

Meanwhile, despite the absence of a definite programme, the expansion of the light bombers continued. As stated above, No. 21 Blenheim squadron was authorised to re-equip to Venturas in May. By the end of the month the squadron had received three aircraft but subsequent deliveries were held up by the development of tank defects and it was not until the middle of July that Venturas were finally cleared. The aircraft were not in action, however, until 3 November. Two further squadrons had commenced to re-equip to these aircraft in August (Nos. 464 and 487) and by the end of the year all three were operational. Venturas were slow, steady unmanoeuvrable aircraft, however, and it was not anticipated that they would be of much value other than for night Intruder work and night bombing of area targets. It was thought that their lack of speed and unmanoeuvrability would make them unsuitable for low level attacks in daylight and the majority of Circus operations.

E.R.P. 200

E.R.P. 207

BC/S.
23746/2

Ibid The first of the Mitchell bombers also made their appearance in the summer. These were much more all-round

/aircraft

(1) See Footnote (1) Page 19

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aircraft and it was envisaged that they would undertake similar tasks to the Bostons, namely: Circus operations as a primary role with the subsidiary roles of night Intruder work, daylight low level attacks against Circus targets and, from time to time, operations against enemy major Naval Units. The lower speed of the Mitchell was counterbalanced by its improved defensive armament.

E.R.P. 207
E.R.P. 214

The equipment of the first two Mitchell squadrons had been authorised in July. The two remaining Blenheim IV squadrons (Nos. 18 and 114) were obvious first choice for re-equipment to the new aircraft but the decision in August to transfer two Blenheim V squadrons to North West Africa led to a change of plan. Both squadrons re-equipped to Blenheim V's in September and Nos. 98 and 180 squadrons formed on Mitchells in their place. It was not until 22 January 1943 however that Mitchells undertook their first operation.

E.R.P. 239

By the end of 1942, the light bomber force had expanded to ten squadrons, composed of three Bostons, three Venturas, two Mitchells and two Mosquitoes. In accordance with a decision taken at an Extraordinary General Meeting of the E.R.P. Committee on 4 January the establishment of all ten squadrons was reduced, on 10 January 1943 to 16 plus 2. Hitherto established at 16 plus 4, this brought them into line with the rest of the Force. The official return for No.2 Group on 6 February 1943, shows the following strengths: Bostons, three squadrons, 48 aircraft; Mosquitoes, two squadrons, 47 aircraft; Venturas, three squadrons, 59 aircraft; and Mitchells, two squadrons, 39 aircraft.⁽¹⁾ Unfortunately, this satisfactory position was not maintained during the next three months due to the transfer of a number of Bostons to North West Africa, the complete failure of the Bendix turrets in the Mitchells and the general shortage of aircraft.

(1) For detail see Appendix 3.

SECRET

CHAPTER 3

RE-ORGANISATION TO MEET EXPANSION

(i) Need for increased concentration.

S. 82201
Enc. 6A.

Meanwhile the whole policy for the organisation of Bomber Command was under review in the light of new airfield commitments. Re-organisation to meet expansion to the front-line strength of 4000 heavy and medium bombers visualised in Target Force "E" had begun in June, 1941. Provision was to be made for the accommodation of one squadron of 24 I.E. and three I.R. aircraft on each aerodrome. At the same time, to save on overheads and facilitate communications, aerodromes were to be banded together in 'Clutches' of three, each clutch consisting of one 'parent' and two satellites.

Ibid.

By February, 1942, it had become clear that a much greater degree of concentration than previously visualised must be accepted in order to meet the many additional airfield commitments which had arisen. The most urgent of these were the requirements of advanced flying training and the proposed allocations to the U.S. Army Air Forces.

(ii) Two squadrons per Airfield.

Bomber Command were accordingly invited to attend a Conference with D.C.A.S., D.G.O., D.B.Ops and representatives of the Air Ministry Branches concerned on 10 February 1942 to discuss the possibility of accommodating two squadrons on each airfield in place of one. (1) After much discussion it was finally agreed in principle that:-

Squadron establishment should revert to 16 plus 2 from 24 plus 3.

Two squadrons - i.e. 36 aircraft - should be accommodated on each aerodrome.

A Station or 'Clutch' should still consist of one Parent and two satellites.

Seven such Stations or 'Clutches' - i.e. 21 aerodromes - should comprise a Group.

The effect of this would be to release for other purposes about one-third of the previously estimated requirement for 189 airfields.

(iii) Expansion to three-flight squadrons.

Bomber Command representatives had agreed that on aerodromes with the required facilities it should be possible to operate the increased number of aircraft proposed without appreciable reduction in effort. It would be many months, however, before the expansion of the Command and the arrival of American forces in large numbers compelled the general adoption of this degree of concentration. In the interim there would be plenty of opportunity to examine and test the operational and administrative problems involved.

/On

(1) See Volume III, Pages 12 and 13.

S. 82201
Enc. 1A

On 26 June 1942, the C-in-C put forward a strong recommendation that the expansion to two squadrons per airfield be accomplished in three stages, viz:-

- Stage 1. Squadrons established at 16 plus 2 to increase to 24 plus 3 by the addition of a third flight.
- Stage 2. When all squadrons had been so increased, the third flights to break away and form a second squadron on the same aerodrome.
- Stage 3. Each of the two squadrons could then increase to 24 plus 3 as occasion demanded, giving two squadrons of 24 plus 3 on the same aerodrome.

Ibid.
Enc. 7A

The C-in-C's proposal was discussed and agreed in principle at a meeting under the Director General of Organisation on 20 July 1942. At the same time the D.G.O. explained that the formation of No. 6 (Canadian) Group and the undertaking that it would be increased by the addition of ten new squadrons before the end of November 1942, necessitated some modification in the C-in-C's recommendation which envisaged the formation of no new heavy or medium bomber squadrons before February/March 1943. He submitted that the undertaking to the Canadian Government had been given at very high level and there was no option but to implement it unless convincing proof could be given that it would interfere seriously with the operational effort.

S. 67148
Enc.
126-127A.

On 29 December 1942, the C-in-C again sought authority to proceed with Stage one of his programme. He pointed out that the existing aerodrome capacity of his Command was fully occupied by the expansion programme up to 1 January 1943 and that it was unlikely that more than three of the seven aerodromes with runways still under construction would be operationally serviceable before April. Expansion during the first three months of the new year would, therefore, have to be mainly by the addition of third flights to existing squadrons - where technical facilities permitted. These facilities, he claimed, were still severely limited. 'Parent' stations had been designed to provide maintenance facilities for only 32 aircraft and the increased technical accommodation at satellites had not yet been provided. (1)

Ibid.

As an alternative, he suggested that planned expansion might be postponed for two or three months and the available aircraft used to consolidate the expansion so far achieved and to form a small pool to increase the immediate reserve behind squadrons. This would be at the rate of two aircraft per squadron plus the appropriate maintenance personnel and would, in fact, be the equivalent of increasing squadron establishment to 16 plus 4 with two of the I.R. aircraft under station control. He argued that the reserve aircraft would be used as replacements only and would help to avoid the delay normally occasioned in waiting for aircraft from MU's.

Ibid.
Mins
127 - 129.

After some discussion between A.C.A.S. (Ops) and the D.G.O. it was agreed that Bomber Command should go ahead with the addition of third flights to existing squadrons where possible but the Pool was refused on the grounds that it transferred to Bomber Command a function properly the concern of No. 41 Group.

/(iv)

(1) See Chapter 3 Section (vi) .. on "Availability of Airfields".

SECRET

(iv) Introduction of the 'Base' Organisation.

S. 84330
Encl. 2A.

Two squadrons per airfield remained, however, the ultimate aim for which organisational planning must allow. A Conference of Group Commanders was held at Bomber Command on 19 May 1942, to consider in detail the implications of the new policy. The immediate question at issue was: could a Group Commander continue to exercise direct control over 21 or even 15 aerodromes, each accommodating the equivalent of two squadrons or 36 aircraft. The general opinion was that he could not. After considerable discussion, the following skeleton organisation for the Command was prepared and submitted for Air Ministry approval⁽¹⁾:-

Every aerodrome to become a self-contained station under a Group Captain and the term 'satellite' to be discontinued.

One aerodrome in each clutch of three to continue to be known as the 'parent' or Main station.

Three stations to comprise a 'Base' with an Air Commodore in command.

The Base Headquarters to be located at the main station with a separate operations room but the Base Commander to be relieved of the administrative and operational control of that station.

Five Bases - i.e. 15 stations - to comprise a Group.

The main departures in Bomber Command's proposals were (i) the raising of satellites to station status (ii) the reduction of the number of stations in a Group from 21 to 15 and (iii) the introduction of a subordinate command in the form of a Base Headquarters.

S. 82201
Enc. 7A.

A new Conference under the Director-General of Organisation was held on 20 July 1942, to discuss the above proposals which were agreed in principle subject to the following recommendations:-

Aerodromes to be self-contained as regards equipment but the Base Station to be responsible for such administration and accounting as could conveniently be centralised.

The Base Headquarters to exercise operational control only; the Group to remain responsible for administration.

Heavy Conversion Units to be allotted on the basis of three per Group. Three stations in each Group to be set aside for this purpose.

/The

(1) It had also been recommended that Conversion Flights should continue to operate from the same aerodrome as a 24 plus 3 heavy bomber squadron but at a subsequent Meeting at Air Ministry on 7 July, it was decided that Conversion Flights should amalgamate with Conversion Units (see Ch. 4 Sec. iv).

The question of the rank of the Base Commander and the exact degree of control to be exercised by him had yet to be decided. A decision to establish 35 new posts of Air rank - five to each of seven Groups - could not be taken lightly.

With no experience to go upon, it remained to be seen whether the introduction of a Base Headquarters - involving as it did a new link in the chain of command with all its attendant problems of establishment and control - would in the event, prove necessary. In the opinion of the A.M.S.O. and D.G.O., such an organisation at that stage would be premature. Writing to the C-in-C on the 11 August 1942, Sir Christopher Courtney (A.M.S.O.) urged him to 'have another think' on the subject. In a further letter on 21 August, he reminded him that it would be many months before congestion became sufficient to warrant the setting up of a subordinate command - if at all. In the meantime, the load would be taken gradually. In the first stage, each clutch would accommodate three squadrons at 16 I.E.; in the second, three squadrons at 24 I.E.; and in the third, six squadrons at 16 I.E. It would be for decision then whether the Commanding Officer of the parent station could, with an augmented staff, easily control the three stations or whether a Base Commander would become necessary.

Ibid.
Mins 13 - 14

Enc. 12A

Enc. 15A

S.84330
Enc. 5A

S.82201
Enc. 16A

The C-in-C had, meanwhile, decided to give the proposed new organisation a trial in order to elucidate the major problems. By the end of December, 1942, he was able to submit his official request for the introduction of the Base organisation forthwith - basing his request on experience gained during the past months. His new recommendations differed from those already agreed in one important respect. He proposed that the Base Commander should exercise administrative as well as operational control over the three stations in the Base. The extent to which he would decentralise would depend on local circumstances but the C-in-C emphasized that "the Base Commander's principal function will be operational although the ultimate responsibility for all matters concerning the efficiency of the Base will rest with him."

Ibid.
Encl. 21A

The Air Ministry's main objections to this proposal were that if the Base administrative staff were separate from the station on which it was located, it would mean a duplication of records, staffs etc. and another link in the chain of correspondence. If, on the other hand, the Base staff were to be an integral part of the station, they would be serving two masters - i.e. the Base Commander and the local Station Commander.

After some discussion and a meeting between the Deputy C-in-C Bomber Command and the A.M.S.O. and D.G.O. on 9 January 1943, the following compromise was arrived at:-

Ibid.
Enc. 23A
& 33A

- (i) An Air Commodore⁽¹⁾ as Base Commander to control operationally and administratively three airfields each accommodating two squadrons or one H.C.U.
- (ii) The Base Commander also to command, officially, the station at which he was located.

/(iii)

(1) The rank of Air Commodore was to be granted when a Base controlled 72 aircraft or more.

(15 aerodromes) per Group, a maximum of six operational Groups would be required to accommodate the ultimate bomber force with a further Group of 15 aerodromes to be provided as an insurance. On this estimate, Bomber Command would be composed as follows:-

Seven operational Groups each with
Fifteen aerodromes. (Two additional aerodromes in the case of No. 3 Group to accommodate the two S.D. squadrons and the newly formed Bomber Development Unit).
Ten aerodromes in every Group each to accommodate two squadrons of 16 I.E.
Three aerodromes each to accommodate one H.C.U. of not less than 32 aircraft - i.e. equivalent to two squadrons.
Two aerodromes in every Group to be spare for the accommodation of ancillary units, etc.

Ibid.

It was planned that Nos. 1, 2, 3, 4 and 5 Groups would, with certain minor re-allocations of stations, occupy their original areas; Headquarters No. 5 Group would ultimately move to Moreton Hall near Swinderby and Headquarters No. 2 Group from Huntingdon to Bylaugh Hall. No. 7 Group which was to occupy the accommodation vacated by No. 5 Group at Grantham actually did not form until 1944 when it took over control of the H.C.U.'s from the operational Groups.

The nucleus of the New Canadian Group (No. 6)⁽¹⁾ commenced to form in the northern-most area on 25 October 1942 with its Headquarters at Allerton Hall near Knaresborough. In January 1943, it took over the R.C.A.F. squadrons hitherto accommodated in No. 4 Group, together with the stations in the North Riding at which they were located. Some compensatory adjustment of airfields between Nos. 1 and 4 Groups subsequently became necessary.

L.M. 1196/DDOP

By the end of January 1943, two new factors, viz:-

- (i) the curtailment of the airfield construction programme and
- (ii) the raising of the Pathfinder Force to Group status

necessitated a further revision. On 22 January 1943, the three existing stations of the Pathfinder Force split off from No. 3 Group to form No. 8 (PFF) Group⁽²⁾ with Headquarters temporarily located at Wyton pending the vacation of the Huntingdon accommodation by No. 2 Group. It was intended that the new Pathfinder Group would ultimately consist of six aerodromes hacked out of the No. 3 Group area. This reduced the planned number of aerodromes in the latter to nine (excluding the two set aside for the S.D. squadrons and B.D.U.).

Meanwhile, as a result of the decision in December 1942 to curtail the airfield construction programme⁽³⁾, the seven remaining sites still under consideration to complete the original requirement for 107 bomber aerodromes were deferred

/indefinitely.

(1) It should be noted that Nos. 6 & 7 (O.T.U.) Groups had been re-numbered Nos. 91 & 92 (O.T.U.) Groups in May 1942.

(2) See "Formation of the Pathfinder Force" - Chapter 9.

(3) See Section (vi).

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indefinitely. There were now 100 aerodromes for division among eight Groups and at the end of January, the position was as follows⁽¹⁾:-

L. M. 846/DDOP and L. M. 346/O. P. 1 (Appendix 'A')	<u>Group</u>	<u>Ultimate Location</u>	<u>Planned No. of Aerodromes</u>	<u>Actual No. of Aerodromes</u>	<u>Deferred Sites</u>
	1	Bawtry	15	11	-
	2	Bylaugh Hall	14	9	1
	3	Exning	11*	13 [∅]	-
	4	York	15	15	-
	5	Moreton Hall	15	17	-
	6	Allerton Hall	11	7	4
	7	Grantham	13	-	2
	8 (PFF)	Huntingdon	6	3	-
			100	75 [∅]	7

* Including Tempsford and Gransden Lodge for S. D. squadrons and B. D. U.

∅ Two on loan from U. S. A. A. F.

S. 72228/OP1
5 Jan 1943

As can be seen, No. 6 Group was the most affected by the curtailment of the airfield construction programme. It was not anticipated, however, that the ultimate number of R. C. A. F. squadrons would exceed 15 which could be accommodated on 7½ aerodromes leaving 3½ for H. C. U's and miscellaneous units. No. 2 Group on the other hand had a planned total of 14 airfields for 15 light bomber squadrons whereas nine was considered ample. It was suggested that five airfields:-

L. M. 344/OP1

Feltwell	(Lakenheath Methwold)
Marham	(Downham Market)

should be transferred from No. 2 Group to No. 3 Group (to whom they formerly belonged) to make up for the transfer of the six aerodromes to the Pathfinder Group but no decision on this point was reached at that time.

(vi) Availability of Airfields⁽²⁾

(a) Provision of Airfields to meet R. A. F. Expansion

As has been seen, the number of airfields required to meet the ultimate operational needs of the Combined Bomber Force in the United Kingdom had been estimated at 132 - 75 for the U. S. A. A. F. and 107 for the R. A. F. Bomber Command. The latter figure had been arrived at on the assumption that each aerodrome would accommodate the equivalent of two squadrons at 16 I.E. It was now necessary:-

/(a)

(1) Full details of the ultimate lay-out of operational Groups planned at this stage together with a map are at Appendix 6.

(2) A Narrative on "The Airfield Construction Programme" is in course of preparation by the Works Department (Mr. Foster).

O.P.1
Folder 84
18 August

- (a) to upgrade all existing and construct all new aerodromes to the standard requirement of two squadrons of 16 I.E. and
- (b) to construct runways on at least 14 existing grass aerodromes.

As regards the latter, it was planned to start on six immediately (i.e. August, 1942) and the remaining eight when labour became available - probably early in 1943.

Ibid.

The availability of aerodromes to meet the progressive expansion and re-equipment of the R.A.F. Bomber Force was, therefore, dependant on three things: (a) the speed with which new aerodromes could be completed to the required standard: (b) the rate at which existing aerodromes could be brought up to the standard two squadron accommodation and (c) the availability of labour to construct runways at the selected 14 existing grass aerodromes.

Ibid.

On 1 September 1942, the aerodrome position was as follows:-

Existing aerodromes (with runways)	40
" " (grass)	21
Aerodromes under or awaiting construction	28
Aerodromes loaned to other Commands or in use as O.T.U's	7
Total	<u>96</u>

An analysis of aerodrome availability in relation to Bomber Command's expansion requirements on 1 October 1942, 1 January and the Spring of 1943 respectively, showed that, in theory at least, and provided sufficient labour could be made available, there would be sufficient aerodrome capacity to meet Bomber Command's requirements at all stages up to the spring of 1943.

Note by
A.M.S.O.
O.P.1.
Folder 84.

There was, in fact, a paper surplus of eight aerodromes on 1 October, rising to sixteen by 1 January 1943, but as the A.M.S.O. made clear in a note on the subject dated 19 August 1942, this surplus could only occur if accommodation were upgraded to two-squadron standard in time. He warned that too much reliance could not be placed on the completion of aerodromes to schedule during the winter months. The optimistic picture presented by the analysis depended entirely on the twin factors of labour and weather.

O.P.1.
Folder 84.

Contracts for existing or partially constructed aerodromes to be upgraded to two squadrons standard had been let as follows:-

July, 1942	22 aerodromes
August, 1942	16 "
September, 1942	24 "
Total	<u>62</u>

It was planned to let the contracts for the remaining aerodromes before the end of the year so that all would be ready by April, 1942. It was expected that the work would

/take

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take from three to six months at each aerodrome, depending on the extent of the alterations to be effected.

Note by
A.M.S.O.
O.P.I.
Folder 84.

A further analysis of availability in relation to requirements at the beginning of December, 1942, however, showed that while in theory there was still no lack of airfields, in practice the accelerated expansion scheme inaugurated in September, 1942, would require all available aerodromes, up to 1 January 1943 and until February/March 1943 there was likely to be fairly acute congestion owing to an insufficient margin to permit flexibility. This situation was mainly accounted for by:-

- (a) delays in the completion of runways at seven former grass aerodromes,
- (b) the fact that it had proved impossible to develop satellite aerodromes up to full two squadron standard as quickly as expected,
- (c) the accelerated 'rolling up' of Conversion Flights into H.C.U's which were more expensive in aerodromes.

It was now clear that 20 of the aerodromes for which contracts had been let earlier in the year would not be ready by 1 April 1943.

(b) Provision of Airfields for U.S.A.A.F.

Provision of airfields for the Americans, on the other hand, was well in excess of their requirements owing to a reduction in the rate at which Units were arriving in this country. A list was prepared in August, 1942, showing the aerodromes allocated to the VIII (U.S.) Bomber Command and the dates at which they were expected to become available. An analysis of this Table shows the following position:-

O.P.I.
Folder 84.

Existing aerodromes (with runways)	20
" " (grass)	6
Aerodromes under or awaiting construction	41
Sites still under consideration	8
Total	75

Ibid
Folder 84.

On the assumption that one R.A.F. bomber aerodrome when fully developed would accommodate one U.S. Group, irrespective of type, contracts for the upgrading of 27 of those aerodromes to full 'two squadron' standard had been let as follows:-

July, 1942	5 aerodromes
August, 1942	18 "
September, 1942	4 "
Total	27

Ibid.

It was planned to let the Contracts for the remaining airfields in time for their completion by April, 1943, and that the construction of at least 17 of the 41 listed as under or awaiting construction would be undertaken by the Americans.

Note by
A.M.S.O.
O.P.1
Folder 84.

By the beginning of December, 1942, a new factor had arisen. It had been recently agreed that the U.S. Fighter Groups should be employed primarily in an offensive role in support of U.S. Bomber operations and plans were in hand to divorce the fighter squadrons from R.A.F. Fighter Command and locate them on U.S. Bomber airfields.

Ibid.

A new analysis of aerodrome availability in relation to U.S. requirements at this time and based on their latest 'flow chart' showed that, even allowing for this latest development, sufficient capacity would be available up to 1 April, 1943, for both U.S. Bomber and Fighter Groups and still leave a considerable margin for flexibility and the accommodation of ancillary units. In addition, arrangements were being made for the temporary loan of five airfields⁽¹⁾ to the R.A.F. - three to Bomber and two to Flying Training Command - to ease the current congestion.

(c) Effect of Manpower Crisis on Aerodrome Construction Programme.

Training Narr.
Page 136.

Meanwhile, the manpower crisis was in full swing. In December 1942, the Minister of Labour and National Service (Mr. Ernest Bevin), in a bid for economy, had raised the question of Air Ministry Works in general and airfield construction in particular. A detailed review of the position resulted in a War Cabinet embargo on the construction of any new airfields or landing grounds not absolutely vital to the operational effort. The construction of the remaining 15 aerodrome sites still under consideration for the completion of the aerodrome programme - eight for the Americans and seven for Bomber Command - was consequently deferred indefinitely. The planned total of operational aerodromes to meet the ultimate needs of the Combined Bomber Forces in the United Kingdom was now reduced to:-

R.A.F.	100 aerodromes
U.S.A.A.F.	67 "
Total	<u>167</u>

Trg. Narr.
P. 137

At the same time, a cut of 26% had been imposed on R.A.F. labour allocations with a consequent slowing down of airfield construction.

The position was now more serious. Up to the end of 1942 it had been possible - mainly due to the slow rate of expansion - to meet the operational needs of R.A.F. Bomber Command at each stage. In 1943, the unavoidable slow down caused by the labour shortage and the indefinite deferment of 15 aerodrome sites was to make it increasingly difficult to meet the demands of the expanding force and the additional facilities required for the growing number of heavy bombers to be accommodated.

(d) Provision of airfields for O.T.U.

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Finally, a word must be said about the provision of airfields for the expanding training organisation. It had
/been

(1)	E. Wretham	}	Bomber	Watton	}	Flying
	Ridgewell			Bodney		Training
	Wethersfield			Command		Command

SECRET

been estimated that 25 O.T.U. s each accommodated on a Parent station with one satellite would meet Bomber Command's ultimate requirements but that in order to allow for unforeseen expansion, unserviceability of aerodromes etc. provision should be made for an eventual total of 27 O.T.U. s organised in three Groups of nine each.

Ibid.

The immediate requirement, however, was for 25 O.T.U. s by June, 1943. In August, 1942, there were 22 O.T.U. s either formed or forming of which five were to be transferred to new locations in order to release their existing airfields for operational and other purposes. In planning airfield allocations, precedence had to be given to the five due for transfer and it was not expected that aerodromes for the three remaining O.T.U. s required would be available before Mid-1943. Until then expansion of O.T.U. capacity must be achieved by increasing establishments at existing O.T.U. s.

Ibid.

Nevertheless, the analysis for August, 1942, showed that there would be sufficient capacity available up to the spring of 1943 to meet training requirements. The slight deterioration in the position which appeared in the analysis prepared in December, 1942, was accounted for by the closing of one O.T.U. (Finningley) during the construction of runways. It was proposed to overcome this small deficiency by increasing the capacity of other existing O.T.U. s.

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CHAPTER 4.

PROVISION OF TRAINED AIRCREWS(1)

(i) The "New Deal".

Side by side with the foregoing plans for the expansion and re-organisation of Bomber Command, steps were also being taken to improve the standard of aircrews posted to operational squadrons. In December, 1941, the C-in-C (A/M Peirse) had written officially to the Air Ministry complaining of the low standard of training of the aircrews reaching his O.T.U.s. In particular, it was felt that Pilots and Observers were getting insufficient night-flying experience in the pre-O.T.U. stage. This protest did no more than stress the already growing conviction that, with the crisis created by the Battle of Britain well passed, the emphasis in the production of aircrews should revert from quantity to quality. There was no longer a shortage of Pilots - in fact, large numbers passing through the shortened overseas courses were piling up behind the bottleneck represented by the O.T.U. stage. At the same time, the slow down in expansion due to production shortfalls and the large-scale re-equipment of the Bomber Force to heavy aircraft, created a suitable opportunity to concentrate on a higher standard of training rather than increased output.

By February, 1942, the revision in the training organisation proposed by the Air Member for Training and known as the "New Deal" had been generally accepted by all concerned. Briefly, this allowed for:-

- (a) lengthened courses at all stages,
- (b) the introduction of a further stage at Advanced Flying Units in this country for Pilots and Observers,
- (c) provision of 180 to 230 flying hours for pilots at the end of the S.F.T.S. stage and a further 60 hours at A.F.U.s.

As far as new intakes were concerned, the effects of the New Deal on the standard of aircrews could not be felt for at least a year but this was partly mitigated by the immediate increase in the lengths of current courses and by the fact that, as far back as November, 1941, Bomber Command had increased - unofficially - the length of time pilots received at the controls from the standard 30 hours to 45 hours. This increase, although not meeting all Bomber Command's requirements, was having its effect on the general standard of aircrews reaching squadrons. At the

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(1) This Chapter is not intended to be more than a brief account of the main changes in the training organisation behind the front line in 1942 as they affected Bomber Command. The subject is treated fully in the A.H.B. Monograph "Training of Pilots and Aircrew" from which most of this Chapter has been taken.

same time, mainly owing to the difficulty of fitting in the required amount of night flying, pilots were spending lengthy periods in O.T.U. s - often as long as 17 weeks - and consequently creating a serious bottleneck in the whole training organisation.

At this time it was the policy to have two pilots to each heavy and medium bomber. Thus, the very small capacity available at the O.T.U. stage was being taken up in an attempt to train both first and second pilot to a reasonable standard. Clearly any increase in course lengths to meet the new requirements would create such a blockage at the O.T.U. stage as to be insupportable.

(ii) Change in Crew Composition.

In his "New Deal", the A.M.T. had proposed certain changes in the composition of heavy and medium bomber crews - in particular, the elimination of the second pilot so that all available time and resources of the training organisation could be concentrated on raising the one pilot to a higher standard of efficiency.

This proposal had been firmly opposed by the new C-in-C (A/M Harris) and at the beginning of this Period (March, 1942) a final decision on the New Deal was held up pending agreement on the proposed changes in the composition of heavy and medium bomber crews.

As an interim measure, it had been agreed in February 1942, that medium bomber pilots should each receive 45 hours at the controls and pilots destined for heavies should receive 55 hours each at the controls of medium bombers and a further 20 hours at the controls of a heavy bomber. This still fell short of the C-in-C's requirements and it was now apparent that any further increase could only be accomplished by the elimination of the second pilot.

After considerable discussion, agreement was finally reached at a meeting under G.A.S. on 29 March, 1942, at which the A.O.C.-in-C. Bomber Command was present. The main proposals were:-

- (a) that all medium and heavy bomber crews should have one pilot only,
- (b) that the functions of the present Observer in medium and heavy bombers should be divided between a navigator and an Air Bomber,
- (c) that the number of W.O./A.Gs. should be reduced from two to one; the second W.O./A.G. being replaced by a straight Air Gunner in aircraft carrying a dorsal as well as a tail turret.

On the one-pilot basis, it was now possible to ensure that each pilot would reach his squadron fully trained to Captain standard and able, after a small number of initiating sorties, to take part in operations. At the O.T.U. stage, each pilot would have an average of 80 hours at the controls plus a further 30 hours on a heavy type if destined for a heavy bomber squadron.

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At the same time, squadrons established at 16 I.E. and hitherto carrying 40 pilots, would now have 20 pilots-plus six to allow for 'initiating' new Captains, sickness etc. It was agreed by Bomber Command (9 April) that it would be necessary to have only five experienced pilots to start each squadron, while the number of staff pilots at an O.T.U. could be reduced to 45 of whom only 30 need have had operational experience.

It was also proposed to provide a 'pilot's mate' - this duty normally to be undertaken by the Flight Engineer who would assist with the cockpit controls and, in the event of the pilot becoming a casualty, would fly the aircraft home on 'George' until over friendly territory, when the crew would normally bale out.

The splitting of the functions of the Observer between a Navigator and Air Bomber was the result of experience with the latest aids to navigation. It was realised that the Observer had to leave his post in the navigations position sooner than was desirable if he was to have sufficient time to accustom his eyes for the difficult task of target location and the use of the bomb-sight under dark conditions. Under the new proposals, the Navigator and Air Bomber would remain in their respective positions throughout the flight except that the latter would act as front gunner when needed.

(iii) Provision of O.T.U. Capacity.

Theoretically, the elimination of the second pilot from bomber crews halved the pilot training requirements but this saving was more than taken up by the lengthened courses now to be introduced. As far as O.T.U.s were concerned, it was actually necessary to increase the capacity as one pilot would now get 80 hours flying as opposed to 30 hours for each of two pilots.

It was estimated that the provision of 25 O.T.U.s - each with one satellite - would meet the requirements of Bomber Command's training organisation behind the front line. To provide against unforeseen expansion and the unserviceability of aerodromes etc., it was proposed to provide, ultimately, a total of 27 O.T.U.s organised into three Groups of nine O.T.U.s each.

Nos. 6 and 7 O.T.U. Groups - renumbered Nos. 91 and 92 O.T.U. Groups in May, 1942 - were actually in existence at this time and No. 93 O.T.U. Group commenced to form with its Headquarters at Burton-on-Trent in June, 1942.

By the middle of August, 1942, there were already 22 O.T.U.s formed and forming - leaving five more to complete the ultimate planned total. It was not anticipated that these would be formed before mid-1943 as it was necessary to move five of the existing O.T.U.s to new airfields to release those they were then occupying for operational and other purposes. Nevertheless, it was anticipated that, by increasing establishment, there would be sufficient capacity to meet operational requirements.

It is not proposed to examine here the internal problems

/confronting

confronting Bomber Command in balancing the availability of trained aircrews against the requirements of planned expansion and the drain on output to other theatres. Generally speaking, the supply was - with a certain amount of internal juggling - equal to the demand at this time. Undoubtedly this was mainly due to the shortfalls in the aircraft production programmes and the consequent slowing down of expansion during the first nine months of the year. As has already been seen, the introduction of the accelerated expansion programme in September 1942, necessitated certain steps being taken to improve the position but shortage of aircrews was not, during this Period, a limiting factor in the expansion of Bomber Command.

(iv) Conversion to Heavy Bombers.

It will be remembered that, as the first heavy bombers began to reach the Command, the conversion training of aircrews to fly them had been undertaken, initially, in small Conversion Units (16 I.E.) established in each operational Group as the need arose. As the number of heavy bomber squadrons increased, it had become necessary to provide additional facilities and this had been met by the establishment of small Conversion Flights (four aircraft) affiliated to and located alongside squadrons re-equipping.

With the introduction of the "two squadron per aerodrome" policy, it was realised that two squadrons at 16 I.E. plus two Conversion Flights would constitute a greater congestion of aircraft than could be supported by one aerodrome. The problem had been discussed at a meeting of Bomber Command Group Commanders on 19 May 1942, when it had been agreed that Conversion Flights could continue to operate from the same aerodromes as one squadron at 24 I.E. but Groups were adamant that, with two squadrons at 16 I.E., the position would be untenable.

As the number of heavy bomber squadrons steadily increased, it began to be appreciated that the provision of aircrews was not only a simple matter of conversion from one type of aircraft to another but was actually a definite stage in the training programme and one which called for skilled instruction of the first order. The problem was, therefore, two-fold: in the first place to relieve the congestion on operational airfields and in the second place, to provide an adequate organisation to meet the rapidly increasing needs of conversion training.

After much discussion between Bomber Command and the Air Ministry Departments concerned, it was eventually decided that Conversion Flights should amalgamate with Conversion Units which would be located on separate aerodromes within the operational Groups. It was planned that, ultimately:

Each H.C.U. would be accommodated on one aerodrome with landing rights at two others in the vicinity.

Each H.C.U. would have a minimum establishment of 32 aircraft and would be capable of supporting eight operational squadrons.

H.C.U.'s would be accommodated in Heavy Bomber Groups on the scale of three per Group.

Instructions were eventually issued in September 1942 and the rolling-up of Conversion Flights into Conversion Units commenced in October 1942. Initially there were to be nine Heavy Conversion Units, three in each of Nos. 4 and 5 Groups, two in No. 3 Group and one in No. 1 Group. All but two were well below strength but it was intended that they should be raised to full strength only as and when expansion and wastage requirements demanded.

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CHAPTER 5

SUMMARY AND CONCLUSIONS TO PART I

The reduction in the allocations of aircraft from the United States for British use as a result of America's entry into the war was a severe blow to R. A. F. expansion plans which had to be severely curtailed to meet the new situation. Certainly there was the likelihood that the loss would be made good, at least in part, by large numbers of American-manned aircraft operating in British and combined theatres of strategic responsibility in 1943, but in the meantime, it was only too clear that, once again, Britain had been thrown back on her own resources. The rate at which the bomber force could be expanded was therefore dependant on the extent to which the British aircraft industry could increase its output while at the same time turning over to the production of heavy bomber types. This in its turn was dependant on the adequate provision of manpower and machine-tools both of which were in short supply.

Far from expanding indeed, between March and September, 1942, the R. A. F. bomber force actually decreased as the direct result of three separate factors: reduction in the supply of aircraft from America; the failure of British aircraft industry, itself involved in the change-over to heavy bomber types, to realise its forecast output; and the drain on the strength or potential strength of Bomber Command to other Commands and other Theatres as a result of the overall shortage of aircraft. It was not until September, 1942, and then at the direct intervention of the Prime Minister, that this drain was halted and Bomber Command relieved of the majority of its external commitments to enable it to build up to fifty squadrons operational by the end of the year. Even then, the Ministry of Aircraft Production, still severely hampered by the continued shortage of labour and tools, failed to make good its promises of increased allocations of aircraft with the result that the fifty-squadron plan was retarded by one month and it was not until the beginning of February, 1943 that the Command had fifty squadrons all operational and at practically full strength.

In spite of these set backs, the period was not without its achievements. As a result of the strenuous efforts made to increase the production of heavy bombers and to reduce the drain on the strength of Bomber Command, the end of the period saw the establishment of a force primarily heavy in character and with a correspondingly greater potential bomb-lift. The Manchester, Hampden and older Marks of Wellington had been or were being swept away and more and more Lancasters were coming into the Front Line. Nor was progress confined to the heavy and medium bomber force. The light bombers of No. 2 Group, themselves labouring under considerable difficulties, had expanded in the same eleven months from five to eleven squadrons while the obsolete Blenheim had been withdrawn from operations and the Group re-equipped with Bostons, Mosquitoes, Venturas and Mitchells.

To meet the administrative and operational control problems proposed by this growing force, steps were taken /during

during the year to re-organise the Command on the basis of six operational Groups each comprising fifteen stations on which would be located the equivalent of two operational squadrons or 36 aircraft. Thus each Group Headquarters would ultimately control the equivalent of 30 squadrons and in order to relieve it of some of this additional strain it was planned to introduce a new link in the chain of command in the form of a Base Headquarters one to be allotted to each 'clutch' of three stations. Finally, the old parent and satellite system was done away with and all satellites raised to full station status; grass runways were replaced by concrete and work begun on new aerodromes in preparation for planned expansion, revised training commitments and the arrival of large numbers of American Bomber Groups in the United Kingdom.

Side by side with the expansion and re-organisation of Bomber Command, drastic changes were also being made in the training organisation during 1942. Courses were lengthened at all stages and pilots given longer at the controls. To reduce the bottleneck represented by the O.T.U. stage, the second pilot in heavy and medium bomber crews was eliminated while other changes in crew composition included the splitting of the function of Observer between a Navigator and Air Bomber thus ensuring that the former would be free to give his whole attention to Gee and other radar aids to navigation and bombing as they came along, particularly during the vital stage of the run-up to the target. To meet these new requirements, it was decided to increase the capacity at O.T.U.s. A third Training Group was formed in June 1942 and it was planned that, ultimately, each should control nine O.T.U.s. Finally, to meet the increasing needs of heavy conversion it was decided to amalgamate the existing conversion flights and units into Heavy Conversion Units on the basis of three to each operational Group.

In the case of many of these plans, the ink was scarcely dry on the paper at the end of this period; in others, much progress had been made. In either event, the foundations had been laid not only of a strong and well equipped force but of a system of operational and administrative control which was to prove wholly adequate to meet the increasing strain imposed by strategic commitments in the later war years. Side by side with these developments, revolutionary advances were being made in the tactical and technical field and it is to this aspect of events in 1942 that attention will be directed in Part II of this Volume.

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PART II

THE EXPERIMENTAL FORCE

CHAPTER 6

EARLY STANDARDS OF BOMBING ACCURACY

(i) The Evidence of Night Photography.

To obtain a clear picture of the revolutionary changes in bombing tactics and technique resulting from the introduction of Gee in March, 1942, it may be helpful to examine briefly the position in the nine months immediately prior to that date.

For some time, the Air Ministry had been uncomfortably conscious that, despite the often exuberant claims of the aircrews themselves, the success of the night bombing offensive was by no means commensurate with the effort expended and the losses incurred.

It was hoped that the carrying of cameras on night bombing operations, - inaugurated early in 1941, - would enable more accurate assessment of the results of attacks to be made but it was not until the autumn of that year that the technique of night photography and its interpretation had advanced sufficiently to make scientific analysis a practicable proposition.

C. S. 9607
Encl. 24C.

The first of these analyses, made by Dr. Butt (a member of the War Cabinet Staff) in September, 1941, indicated that of the total number of sorties despatched on bombing missions between 2 June and 25 July 1941, only one in five actually got to within five miles of the target.

C. S. 11275
Encl. 1A

In October, 1941, A. T. (R) attempted a comparison of Air Staff and Bomber Command Operational Summaries with results as shown by night photographs and post-raid reconnaissance. An analysis was made of 14 representative raids over the period 15 June - 29 September 1941. From this it appeared that in practice very little success had been achieved despite the fact that in almost every instance it had been claimed that the target was more or less severely damaged. Twenty-eight per cent of the photographs taken were all of places other than the target while sixty-five per cent indicated that places varying between 4 and 40 miles from the true target had been bombed. Fifty-seven per cent of the photographs of the true target showed no damage at all despite claims of successful raids. It was now evident that whereas it had previously been thought that something between fifty per cent and eighty per cent of the bombs were finding their mark, in practice, only about five per cent were doing so. (1) The position was the more serious as normally at least seventy-five per cent of the aircrew claimed, in all good faith, to have attacked their objective. Clearly, they were being seriously misled in their task of target identification.

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(1) D. D. B. Ops. Paper "Night Bombing Tactics and Tactical Development" - Dec. 1943.

O. R. S/B. C.
S. 22

In September 1941, the Operational Research Section was established in Bomber Command and immediately turned its attention to the same problem. In December it produced a Report analysing the success of 118 raids occurring between 26 July and 31 October, 1941 and indicating (on the basis of current standards) the percentage of successes which could be expected under varying conditions. It was estimated that, on moonlight nights under very good weather conditions, fifty per cent of sorties despatched might be expected to reach their target areas in German coastal towns, forty-five per cent in Prussia and on the Upper Rhine and only thirty per cent in the Ruhr. In moonlight but with haze or 5/10th cloud, these percentages would drop considerably and on dark nights, even under the best conditions, the best results obtainable would be in the order of thirty per cent on the coast and fifteen per cent elsewhere.

In considering these early analyses it is as well to remember that the percentage of photographic successes recorded may represent a considerable bias. Only a proportion of the bombers were carrying night cameras at that time - about seventy-five per cent by the end of 1941 - and squadrons exhibited a very natural tendency to allocate these to their best crews. Nevertheless, from the evidence available, the following facts clearly emerged:-

- (i) Given haze, cloud or any other hindrance to visual navigation and target finding, the percentage of successes immediately dropped severely.
 - (ii) The type of target was having considerable influence on results which were much better over coastal towns than inland.
 - (iii) Over the Ruhr with its ever-prevalent industrial haze and absence of distinctive landmarks, the percentage of successes was almost invariably low.
 - (iv) Crews were being seriously misled in their task of target identification. A considerable number claiming to have attacked their objectives had actually bombed towns in some cases as much as 40 miles distant.
- (ii) The Navigational Problem.

In short, the chief factor influencing the success of night bombing operations prior to March 1942, was visibility. Since only on clear, moonlight nights could visual fixes be made with any degree of accuracy, it follows that the number of nights in a month when the bomber force could be expected to operate with any real success were remarkably few.

The Navigator-~~o~~um-bomb aimer of this time was faced with a two-fold problem. With no other aids than map, compass and sextant, occasional air to ground radio fixes within a limited range and such visual fixes as could be obtained by the light of moon or stars, he was required to penetrate deep into enemy territory. Once in the target areas he was faced with the even more difficult and vital task of obtaining a visual fix of the aiming point itself or of some easily identifiable point from which a D.R. run could be made. A lengthy period was frequently spent in searching for the target in this way -

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A.T.H./Despatch
Appendices
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often in the face of blinding glare from the searchlights, heavy flak and intensive night fighter activity - and called for considerable skill, courage and endurance.

Ibid.
App. D

During 1941, the enemy's night fighter defence system had achieved considerable proficiency. Following the occupation of France and the Low Countries an early warning Radar system had been installed along the coast and a belt of G. C. I. stations backed by a searchlight belt covering the Ruhr, extended through Denmark and Holland, down the western frontier of Germany. Each of these G. C. I. stations controlled one fighter within a 'box' of relatively small dimensions. All boxes in the belt were contiguous and once 'manned' following the receipt of an early warning from the coastal Radar stations, the fighter could be directed onto any single bomber entering the box. A scattered bomber force therefore presented a comparatively easy target.

Ibid.

By the end of 1941, this system already covered a large area and aircraft had to be very carefully routed if they were not to pass through a large number of G. C. I. boxes. The task of the Navigator therefore became increasingly difficult. In order to avoid the enemy night fighters, not only were aircraft forced to fly at a considerable height which made the obtaining of accurate visual fixes almost impossible but the difficulty of flying a steady course hindered the use of dead reckoning and astro-navigation.

Meanwhile, plans were already in hand for the large scale expansion of the R. A. F. and with the growing number of heavy bombers becoming available and the introduction of the 4,000 and 8,000 lb bombs,⁽¹⁾ the potential striking power of the bomber force was increasing. It was now fully appreciated that if losses were to be kept down and the new weapon employed to the maximum advantage, urgent measures must be adopted to overcome the navigational difficulties facing Bomber Command.

It had long been realised that insufficient attention had been paid before the war to the development of radar aids to navigation and bombing.

The decision to proceed immediately with the development of T.R. 1335 - subsequently code-named Gee - had been taken as early as the autumn of 1940. By August 1941, a small number of these sets were available for immediate use but for reasons which will be explained later, it was decided to postpone the introduction of Gee until a larger proportion of the bomber force could be equipped, and it was not until March 1942, that it came into operational use.

Gee had originally been designed purely as an aid to navigation but by the time of its introduction into the service, the need for a blind-bombing device was so urgent that consistent attempts were made during the first weeks of its operational life to use it in this capacity. As will be seen, the high hopes held of its success in that role

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(1) The 8,000 lb (H. C.) bomb was dropped for the first time on 10/11 April, 1942 - Target Essen.

were subsequently proved unfounded and it was not until the introduction of Oboe and H2S that the problem was on the way to even partial solution.

In November 1941, however, the introduction of Gee was still several months distant and, in the absence of operational experience, its value either as a navigational or a blind-bombing aid remained problematical. Moreover, it was anticipated that, once introduced into the Service, its useful operational life would not last longer than five or six months at the maximum by which time the enemy would be aware of its existence, jamming would be introduced and its effectiveness severely curtailed.

With these conditions in mind the Air Staff turned their attention to evolving a bombing technique which would not only enable the new device to be employed to the maximum advantage but, in the event of it being rendered unusable by jamming, would provide some solution to the ever present problem of target identification.

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CHAPTER 7

EARLY DEVELOPMENTS IN BOMBING TECHNIQUE

(i) The Incendiary Plan.

S. 46368/11
Encl. 116B

Simultaneously with the analyses of night bombing photographs a careful comparative study was being made of photographs of German and English towns recently attacked by forces approximately equal in numbers although differing in the make-up of their bomb loads. From this study the astonishing fact had emerged that, whereas it was thought that H.E. bombs dropped by the R.A.F. were definitely superior to similar ones used by the enemy, in point of fact, the area of devastation was considerably more widespread in English than in German towns. From this, the Air Staff concluded that the greater damage achieved by the enemy was directly attributable to the higher proportion of incendiary bombs carried by his aircraft. (1)

Ibid.

As will be seen later, the attack of town areas for moral effect was already fully appreciated as a profitable offensive strategy. Since the ultimate aim of such an attack was to break the morale of the civilian population, the effects to be achieved were two-fold: in the first place the town must be rendered uninhabitable and in the second, the people must be made conscious of constant personal danger.

Ibid.

From their comparison of British and German methods, the Air Staff were convinced that this two-fold aim could best be achieved by the use of an Initial Fire-raising Party to launch an incendiary attack of sufficient weight and concentration to saturate the enemy's fire-fighting organisations and cause wide-spread damage. The Fire-raising Party would be followed by the Main Force carrying maximum H.E. loads which they would aim into and around the fires.

S. 44091
Encl. 25B

The principle of a Fire-raising Party in itself was nothing new. Groups, individually, had already experimented with similar schemes but these had not been well enough organised or of sufficient size to achieve the object of saturation. So far as the Command as a whole was concerned, there had been no combined tactical plan other than spasmodic experiments in joint routing and bombers were still operating, in the main, as a collection of individual aircraft. In the face of the increasingly well-organised enemy defences, it was realised that, if the best value was to be obtained from the potential striking power of the bomber force, a combined tactical plan must be formulated which would weld the collection of individual aircraft into a single hard-hitting instrument.

By October, 1941, a further and more detailed examination of the problem had confirmed the Air Staff in

/their

(1) It was estimated that whereas our own incendiary loads had averaged 15%, rising occasionally to 30%, those of the enemy had averaged 30% and had sometimes reached 60%.

S.46368/II
Encl. 123A

their belief in the incendiary bomb as a major weapon of destruction. The original conception of a combined incendiary and H. E. attack was now abandoned in favour of a maximum incendiary load being carried by all aircraft and a detailed Plan of Attack was prepared.

Encl. 123B

The whole essence of the Plan as then conceived was to ensure the saturation of the fire-fighting organisations in the early stages of the attack. To this end, the force envisaged consisted of an Initial Fire-raising Party of 39 heavy bombers who would drop a minimum of 30,000 incendiaries on the target within a space of about 20 minutes with the object of:-

Saturating the fire-fighting organisations in the shortest possible time and providing a clearly recognisable bombing beacon for the main force.

The initial fire-raising party would be followed 45 minutes later, when the fires had developed into a major conflagration, by 300 or more aircraft of the Main Force also carrying maximum incendiary loads. Any spare stowage space was to be devoted to 500 lb. and/or 250 lb. G.P. bombs which would encourage the spread of fires by breaking windows, severing water mains and generally adding to the difficulties and dangers of fire-fighting.

S.46368/II
Min. 124

It was now imperative to obtain operational experience of this new technique if full advantage was to be derived from the introduction of Gee within the next two or three months.

Ibid:
Encl. 123A

On 27 October 1941, the C.A.S. instructed the C-in-C to initiate in the next moon period a full-scale operational trial of the technique - adhering as strictly as possible to the Air Ministry Plan of Attack. In the absence of special navigational aids, good weather conditions both en route to and over the target were emphasised as a prerequisite of success.

For various reasons, the Incendiary Plan was not put into practice until March, 1942, but in its general conception at that time, it is of interest for two reasons:-

- (a) It constituted the first big step forward towards a co-ordinated tactical plan for the whole bomber force and
- (b) in calling for an Initial Fire Raising Party to lead the Main Force to the target, it foreshadowed the formation of the specialised Target or Pathfinder Force which, despite the vigorous opposition of the C-in-C, subsequently came into existence in August, 1942.
- (c) The use of massed incendiaries as a bombing beacon for the Main Force constituted the first tentative step towards the concentration of the bomber effort now recognised as essential.

The obvious drawback of the Incendiary Plan as first conceived lay in the continued emphasis on good weather as essential to the successful recognition and identification of the target by the Fire-Raising Party. Even assuming that the above-average crews chosen to lead the attack were capable of accurate navigation to the target area - a bold assumption in the light of previous experience - good

/visibility

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visibility over the target itself remained a pre-requisite of success. Moreover, any inaccuracies in placing the initial incendiaries would result in scattered fires which, in the nature of the scheme, would be perpetuated by the Main Force thus resulting in the attack being dispersed over a wide area.

S.44091
Encl. 23 & 25.

The Air Staff now turned their attention to this aspect of the problem and in November, 1941, A/Cmdre Bufton (D.D.B.Ops.) produced a Paper outlining a scheme for 'focussing' the bombing effort by means of flares dropped in sufficient concentration to illuminate the target areas and produce the effect of 'daylight bombing'.

(ii) Combined Flare and Incendiary Technique.

Ibid.

This scheme called for a small force of aircraft manned by specially selected or trained screws who would locate and then illuminate the target with a high concentration of flares. It was estimated that a concentration of something in the region of 100 or more flares maintained throughout the period of attack would achieve two things:-

- (a) A homing beacon would be provided which would draw all aircraft which had successfully navigated to within 20-30 miles of the target.
- (b) Under normal conditions, the illumination thus provided would enable the target to be seen clearly and aircraft to bomb with an accuracy approaching that achieved in daylight.

To assist in maintaining the required concentration, bombing aircraft would continue over the target after their bombing run and drop as many flares as possible. If necessary, relays of special flare-dropping aircraft could be interspersed throughout the attack by the Main Force. Finally, as a further refinement, it was suggested that coloured flares might be dropped to denote the exact position of the actual target within the illuminated area.

Ibid.

While the suggested flare-dropping technique would, from the target-finding point of view, do away with the requirement for an Initial Fire-raising Party, it was realised that the ideal would be a combination of the two schemes. Illumination of the target area by flares would help to ensure that the incendiaries were dropped fair and square on the target and the concentration of fires thus produced would act as bombing beacons to following aircraft. At the same time, the effect of 'daylight bombing' would assist the Main Force in distinguishing between genuine fires and those started by scattered bombs or enemy decoys.

This scheme marks a very important step forward in bombing methods now being evolved and, as will be seen, actually formed the basis of the majority of bombing techniques used during 1942. As with the Incendiary Plan, the success of the scheme depended on the ability of the leading crews to navigate to, identify and illuminate the targets accurately. Obviously, in the absence of satisfactory navigational aids, such a task called for

above-average ability, and very careful co-ordination and timing of the initial flare dropping force over the target area.

(iii) First proposals for a Target Finding Force.

It was at this point that D.D.B. Ops. put forward his proposals for the formation of a Target Finding Force as a separate entity, basing them on the assumption that, over a given period, above-average crews would find the target when ever it was possible to do so. If this were true, he argued, then the Target Finding Force should be composed of above-average crews. Going further, if those crews could be welded together into a specialist force located on one or two stations, joint briefing, routeing and timing would result in the proper co-ordination of the flare-dropping force over the target. Other advantages would accrue from the development of new ideas through discussion, specialised training and the allocation of special equipment available only in limited quantity.

In short, "specialisation" would result in the production and trial in practice of new methods and D.D.B. Ops. looked forward to "a very rapid initial increase in efficiency".

As will be seen, these proposals elicited vigorous opposition from the new C-in-C (Sir Arthur Harris) and it was not until many months later than the Target Finding Force actually came into existence as such.

In the meantime, the flare-dropping technique underwent a full-scale operational trial on 3/4 March 1942, when 235 aircraft attacked the Renault Motor and Armament Plant at Billancourt, Paris. The operation was planned to take place in three stages. Stage I aircraft, composed entirely of heavies, were instructed to drop sufficient flares to enable them to illuminate and identify the target before bombing. After dropping their bombs, they were to release the remainder of their flares to windward. Following aircraft were to repeat this procedure with the object of maintaining the illumination. The Advance Force was to be closely followed by the Main Force composed of medium bombers flown by selected crews and carrying 1000 lb G.P. bombs. These in turn were to be followed by the Rear Force composed of Manchesters, Halifaxes and Wellingtons carrying 4000 lb bombs. All aircraft were ordered to carry the maximum number of flares compatible with their allotted loads.

Owing to the nature of the target, incendiaries were not used in quantity on this operation but it is of interest as an early experiment in co-ordinated tactics and proved an unqualified success. Weather was excellent and crews reported that the flare concentration could be seen from the French Coast - i.e. some 125 miles away.

Meanwhile, the first aircraft to receive the long-awaited Gee apparatus had been equipped and were standing-by. Four nights later, on 8/9 March 1942, a force of 211 bombers, led for the first time by Gee-equipped aircraft, attacked Essen and the opportunity was taken for a full-scale trial of the combined flare and incendiary marking technique.

Before going on to examine the results of this and subsequent Gee operations, it would be as well to pause here and review, very briefly, the introduction of the equipment into the Service and the pronounced and formative effect it had on bombing policy at this time.

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CHAPTER 8.

GEE, THE FIRST RADAR AID

(i) Development of Gee.

R.3. Folder
14 October
1940

Experimental work on Gee - the first radar device to be developed purely as a navigational aid - was begun at T.R.E. with Air Ministry approval as early as July 1940. In October of that year representatives of Bomber Command visited T.R.E. to examine the system in detail and were sufficiently impressed with its possibilities to recommend that it be proceeded with on the highest priority. Thereafter, development of Gee continued as a matter of urgency.

AHB/TH/237
A.F.H./
Despatch
Appendix A

The system in itself was very simple, consisting of three high powered ground pulse transmitters - one Master and two "Slaves" - set as widely apart as possible and a special aircraft receiver with a cathode ray tube display and calibrated time base.

Ibid

The Master station transmitted a pulse signal and, simultaneously, a synchronised signal was emitted from one of the "slave" stations. The Gee apparatus in the aircraft measured the time difference in the reception of the two signals and thus determined the difference in its distance from the two stations. From this the navigator was able to place the aircraft somewhere along a line of constant difference from the two stations. This line was the hyperbola springing from the two stations and was shown as a "lattice line" on a specially prepared chart carried in the aircraft.

Ibid -

Another set of transmissions from the same "Master" and the second "slave" station, gave a position along a second series of hyperbola and the point at which the two curves intersected, showed the actual position of the aircraft.

Ibid

This apparatus could be used in two ways. Either the Navigator could take a periodical fix on which to base his D.R. navigation or he could fly a track along a "lattice line" checking his position at any time from the other lattice lines as they crossed. One of the great advantages of Gee was that the apparatus itself did not radiate and could not therefore be plotted or homed on by the enemy. The main danger lay in the jamming which would inevitably occur once the enemy had realised its existence.

C.S. 8337/1
22A.

C.S. 8135/43

By 9 July 1941, the first three ground stations giving Gee coverage eastwards over enemy territory had been completed and 12 Wellington aircraft of No. 115 squadron, Marham, fitted with the apparatus in time for service trials on 15 July 1941.

C.S. 8337/1
49A & 51A

Results of the trials proved highly satisfactory. Bomber Command reported that an aircraft could be kept on track up to a distance of more than 450 miles from the most distant ground station and tests over an inland bombing range at 4000 feet gave an accuracy of the order of 200 yards.

/Since

C.S. 7515 Since the production of Gee receivers in quantity would take some considerable time, it had been agreed by the Air Staff in November 1940 that, as an interim measure, a number of handmade sets should be produced for use by leading aircraft who would act as "fire-raisers" to the Main Force.

C.S. 8337/1 This policy of fitting "fire-raisers" was abruptly abandoned in August 1941, when, despite the strictest security measures, an aircraft equipped with the apparatus was lost over Hanover.

Ibid This loss coupled with the highly successful service trials led to an immediate decision in August 1941, to suspend the use of Gee for some considerable time in an endeavour to mislead the enemy. The policy of fitting one squadron as a "fire-raiser" was cancelled and it was agreed to defer the operational use of the apparatus until sufficient aircraft could be equipped to operate in force over enemy territory. Ultimately, all bomber aircraft were to be fitted with Gee.

C.S. 8337/1 Meanwhile, the production of Gee aircraft receivers was ordered on top priority. An order for 300 hand-made sets was placed in August 1941 followed by a further order for 200. Mass production was expected to start in May 1942 and arrangements were made to modify heavy bombers on the production line. Despite every effort, by November 1941 it seemed unlikely that more than 100 aircraft would be fitted in time for the target date of 1 January 1942 and, for tactical reasons, it was decided to defer the operational use of the equipment until more Gee aircraft were available.

Ibid
Min. 38 So great was the importance attached to the operational use of Gee that the Prime Minister was twice asked for a ruling on the target date. This was first fixed for 1 February 1942 by which time it was anticipated that approximately 235 fully modified aircraft would have been delivered.

Ibid
Encl. 89A Owing to various delays in production of heavy bombers and the unexpected shortage of Wellington III propellers, the C.A.S. was forced to advise the Prime Minister on 28 January that although there was no shortage of aircraft sets, the promised 235 bombers would not be ready before 1 March 1942. This in turn had held-up the training of crews, with the result that there would only be 58 modified aircraft available with crews by 1 February, rising to 94 on 15 February and 154 by 1 March. (1) In the view of the Air Staff, 58 aircraft was insufficient to provide any chance of tactical success but it was thought that 94 would be adequate for successful fire-raising. Rather than keep large numbers of fitted aircraft immobilised (for security reasons) until 1 March, it was proposed to fix the new target date for 15 February.

With this view the Prime Minister concurred and on 4 February 1942, the C.-in-C. was instructed to initiate attacks as soon as there was reasonable certainty of at least

AHB/TK/24/167 ✓
O.R.S/B.C. (1) It is worth recording that the percentage of operational sorties equipped with Gee rose from about 30% in early March to about 60% in the middle of May, 1942.

G.169087/RGF/1/50/30

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BC.ORB.
App.2.
May 1942

a short spell of good weather. As from the 25 February the following Gee-equipped squadrons were standing by but Gee did not receive its operational baptism until the attack on Essen on 8/9 March 1942 :-

<u>No.3 Group</u>	<u>No.3 Group</u>	<u>No.4 Group</u>	<u>No.5 Group</u>
<u>Wellington III</u>	<u>Stirling</u>	<u>Halifax</u>	<u>Lancaster</u>
No. 9 Squadron	No.7 Squadron	No.35 Squadron	No.44 Squadron
No. 57 Squadron	No.218 "		
No. 75 Squadron			
No.101 Squadron			
No.115 Squadron			

(ii) Method of Operating Gee-equipped Aircraft.

BC/S26382
Encl. 5B

On 17 January 1942 a Meeting attended by D.B.Ops. was held at Bomber Command to discuss the best use to be made of the limited number of Gee-equipped aircraft shortly due to come into service. There appeared to be two alternatives :-

- (a) Main Force operations led by Gee aircraft on targets within and beyond Gee cover.
- (b) Blind bombing operations by Gee aircraft only.

In view of the small number of Gee aircraft available at that stage, it was considered more practicable to adopt the first alternative whenever possible, resorting to the second only when weather conditions made it unlikely that Main Force aircraft would find the target even when aided by Gee aircraft. It was also agreed that targets beyond Gee cover should generally only be attacked in good visibility and when there was a moon and that on all occasions the need to conserve the equipment should be borne in mind and operations not ordered when conditions were likely to lead to unnecessary loss of aircraft.

Ibid

As regards the best method of leading Main Force aircraft to the target, considerable work had already been done in evolving the flare and incendiary techniques described above. It was pointed out, however, that when the "bombing beacon" method was used, flares would also be required, especially on dark nights, to prevent incendiaries being put down in the wrong place. In view of the desirability of conserving stocks, it was decided to instruct Groups that incendiaries should not form part of the normal bomb load unless specifically ordered by Command Headquarters, but the use of flares for finding and illuminating a target for the main force was agreed and it was arranged that the Command should initiate experiments over this country in order to determine the best technique of collaboration between flare-dropping Gee aircraft and the Main Force.

Ibid

The first Exercise (Crackers I) over the Isle of Man on 13 February was unfortunately spoilt by the partial

/failure

Ibid
Encl. 14A

failure of one of the ground stations and an exceptionally high wind. Valuable information on methods of flare-dropping was provided, however, and it was decided to undertake a further Exercise (Crackers II) on 19 February with the Railway Station at Brynhir (North Wales) as 'target'. This was very successful. Crews reported that the flares provided a good homing beacon visible from between 20 and 30 miles. The opportunity was also taken to test the efficacy of Gee as a blind-bombing device and a study of photographs taken 'blind' on Gee fixes indicated that the majority of aircraft engaged in that phase of the trial were within two and three miles of the target: (1)

BC/ORB
App.B.1920
April 1942

Bomber Command were now able to formulate a general plan of attacks to be used on Gee-led operations. It was recommended that the leading aircraft of the Advance Party should act as flare-droppers whose task it would be to find and illuminate the target. The remaining aircraft of the Advance Party would carry maximum incendiary loads with which to mark the target, dropping their bombs by the light of the flares. Aircraft of the Main Force would then bomb the fires. This Plan formed the basis of the "shaker" technique used on the majority of Gee-led operations during 1942.

(iii) Effect of Gee on Operational Policy.

There is no doubt that the advent of the new radar aid to navigation had a profound formative effect on operational policy at the beginning of 1942. (2) The offensive against Germany had been seriously curtailed since November 1941 by the policy of conservation. Moreover, since December 1941, roughly 40% of the available effort had been diverted to the attack of the German Warships at Brest. These attacks had been made at the direct request of the Admiralty and had proved both wasteful and unproductive.

The Air Staff were now anxious for a resumption of the main offensive against Germany and, in particular, the morale of the German people. It will be remembered that the strategic importance of the attack of morale had long been recognised and, as has been shown, the Air Staff were fully convinced of the value of incendiary attacks against such an objective. Hitherto, the degree of concentration essential to the twin aims of "destruction and fear of death" had rarely been achieved - mainly owing to the lack of co-ordination in routeing and timing in the absence of a reliable navigational aid. Such an aid was now to hand and it was recognised that if the best results were to be obtained from incendiary attacks they must be carried out in conjunction with Gee operations.

/It

(1) It will be noted that these results were considerably less satisfactory than those experienced on the trials in August 1941, and foreshadowed the virtual failure of Gee as a blind-bombing device under operational conditions.

(2) It is not intended in this Section to do more than indicate, in general terms, the influence of Gee on bombing policy at this time. The subject will be discussed in detail in Part III of the Narrative.

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A.W.A. report
No. 3RA/3

It was confidently expected that not only would the new aid have a profound influence on night navigation and tactics but that it would enable an aircraft to bomb a selected area in or through 10/10ths cloud. This piece of wishful thinking on the part of the Air Ministry was fostered by an Air Warfare Analysis Paper in which it was estimated that in an attack on Essen - the most difficult objective in the Ruhr - in 10/10ths clouds 47% of the bombs dropped would fall on the target and that Gee should therefore be regarded as a blind bombing device and not merely as a navigational aid. Experience - foreshadowed by the February exercises - was to prove this totally wrong.

The governing factor in the use of Gee was the comparatively short 'life' expected for it. It was estimated as "of first importance" to exploit the advantages it offered to the full before its range and - ipso facto - its effectiveness was limited by enemy countermeasures.

With these considerations in mind, it was decided in February 1942, to release Bomber Command from the shackles of "conservation" and launch a full-scale offensive against Germany with morale as the primary objective.

The Air Staff were confirmed in this decision by two external factors :-

- (a) The Russian counter-offensive in the East was gaining momentum and it was believed that a resumption of the main offensive at such a time would not only hearten our Allies but further depress the morale of the German people already suffering under the impact of the Russian successes.
- (b) The time of year, with its severe weather and sharp frosts, would present the enemy with the most difficult conditions in which to withstand the effect of concentrated incendiary attacks.

On these lines, the new Directive was drawn up and issued to Bomber Command on 14 February 1942. In preparing the lists of targets for attack within this Directive, account had to be taken of the range-limitations of Gee. On the Eastern Chain this was accepted as roughly 380 miles, giving cover over North Western Germany and the Ruhr. Targets were accordingly grouped under four headings in the following priority :-

- (a) Area targets within Gee range.
- (b) Area targets involving penetration beyond Gee range.
- (c) Precision targets within Gee range.
- (d) Precision targets beyond Gee range.

It was stipulated that targets in the last three categories should only be attacked when conditions were particularly favourable and when experience had indicated the accuracy and powers of concentration obtainable with the equipment and the likelihood of the efficacy of such attacks.

/It

It is proposed in the next Sections of this Chapter to examine briefly the results of Gee operations from the point of view of the effectiveness and limitations of the equipment in its dual role as a navigational aid and a blind bombing device.

(iv) Accuracy of Gee - Operational Evidence.

During the first two months immediately following its introduction into the Service, Gee attacks were carried out mainly on an experimental basis in order to determine its effectiveness under varying conditions. Thus, during March and April, 1942, Gee operations fall naturally into three categories :-

- (a) Attacks on targets in the Ruhr and Rhineland.
- (b) Attacks on targets beyond Gee cover.
- (c) Blind bombing attacks.

It is proposed to examine representative operations in each of the above categories in order to arrive at a proper estimate of the value of the device.

Attacks on the Ruhr.

Gee was used for the first time operationally on 8/9 March 1942 when a force of 211 bombers, including 82 Gee-equipped aircraft, were despatched against Essen using the combined flare and incendiary technique described above.

BC/ORB.
App.B.
1920
April 1942

The detailed plan for this operation is significant in its emphasis on precise timing, the sequence of attack allowing only a small margin for error, as follows :-

Zero to Zero + 15 mins.

Flare-dropping aircraft timed to arrive in groups at precisely 3 minute intervals, to illuminate the target.

Zero + 2 to Zero + 15 mins.

Fire-raising aircraft to bomb visually by the light of the flares.

Zero + 15 mins.

First wave aircraft of the Main Force to bomb visually on the resulting fires. Following aircraft were timed to arrive in waves at approximately 15 minute intervals.

First aircraft over the target were instructed to release their flares 'blind' on Gee fixes to avoid being misled by enemy decoys. The remaining flare-dropping aircraft were to do the same unless the target could be clearly identified in the light of the first flares.

These detailed timing requirements, upon which the success of the attack depended, are remarkable as the most exacting demands made, to date, on navigational accuracy - a demand only made possible by the accurate timing and

/routeing

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routing anticipated from the use of Gee.

ORS/BC.
S.46

Although the operation was carried out in moderate weather conditions - apart from the ground haze usually associated with the Ruhr - results were disappointing, a considerable proportion of the effort being drawn away onto Hamborn and Duisburg. Post raid cover showed that little damage had been done to the target and an examination of the causes indicated that, while flare-dropping was on the whole accurate many of the incendiary force arrived after the flares were out and scattered their bombs over a wide area, thus attracting other aircraft of the Main Force.

ATH/Despatch
Appendix B

ORS/BC/S.46

Seven further major attacks were made on Essen during March and April but results remaining disappointing. Post raid cover showed little or no damage to the target itself while an examination of night photographs indicated that, in the majority of cases, at least a proportion of the effort was drawn away onto other targets. An analysis of 122 plotted photographs taken during these eight raids showed that two were on the target; two within one mile; eight between one and five miles; 104 between five and twenty-five miles; and six between 25 and 100 miles from the target. 90% of the aircraft bombed points between 5 and 100 miles from the target.

G.S. 12848/41
Encl. 18A

The failure to achieve the required concentration was partly attributed to the fact that Essen was at the extreme range of Gee and the accuracy of the equipment was seriously diminished by the obtuse cut of the lattice lines in that area. In view of the more successful attacks on other targets at this time, however, it was concluded that the main difficulty lay in the nature of the target itself. While the use of Gee enabled a much larger proportion of the force than hitherto to navigate accurately to within a reasonable distance of the target, in the final stage crews were still dependent on visual methods. Visual identification was rendered more difficult by the close proximity of other towns in the Ruhr of similar size to Essen and aggravated by the prevalence of heavy industrial haze and the peculiar absence of any clearly distinguishable landmarks. Any failure of incendiary aircraft to drop their bombs in the right place resulted in an immediate dispersion of effort. Moreover, instructions to the Main Force to bomb visually on fires made the non-equipped aircraft particularly vulnerable to the enemy decoy system - as on the 25/26 March when the whole attack was diverted by the decoy at Rheinberg. Similarly, on the 9/10 March, a Stirling hit by Ack Ack jettisoned a heavy incendiary load on Hamborn. A concentrated attack developed and, while Essen remained unscathed, considerable damage was done to the Thyssen Steel Works in mistake for Krupps.

Ibid

Attacks on Cologne.

Attacks on Cologne, on the other hand, were much more satisfactory. Altogether four raids were carried out on this target during March and April in varying weather and moon states and photographs showed that considerable damage had resulted. The raid on 13/14 March may be noted as an

/example

example. Although Gee was still suffering from teething troubles and it was a dark night with drifting cloud, 58% of the successful photographs showed the target area and post-raid reconnaissance confirmed that considerable damage had been inflicted on the industrial areas of the town. On only one previous occasion had anything like this degree of success been achieved. The average for all other attacks on Cologne since July 1941 was only 10%.

Ibid Attacks on Targets beyond Gee cover.

ORS/BC
S.54
ORS/BC
S.46
The opportunity was also taken to test the value of the new equipment in the attack of targets beyond Gee cover and a number of operations were carried out against such targets as Lubeck, Rostock and Kiel. On these attacks Gee was used primarily as an aid to navigation, providing a means of accurate track keeping over the greater part of the route and a reliable "springboard" for the remainder of the journey. Altogether four major attacks were made on Rostock, two on Kiel and one on Lubeck. Concentration in all but one instance was good and it was confidently asserted that the raid on Lubeck (28/29 March) and the last three raids on Rostock (24/25, 25/26 and 26/27 April) were the most successful operations so far carried out by Bomber Command on German targets.

Gee as a Navigational Aid - Preliminary Assessment.

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S.46
It was now possible to attempt a preliminary assessment of the value of Gee as a navigational aid. From a comparison of successful night photographs it was found that, during March and April 40% of all aircraft despatched in all except poor weather conditions had bombed within five miles of the target as opposed to 26% in the preceding three months. Similarly, the percentage of sorties claiming to have attacked main targets rose from 60% during the period December - February to 73% during March - April. Average success over the Ruhr and Rhineland in the latter period was found to be nearly twice that achieved previously while the attack on Cologne on 13/14 March was more than five times the previous average.

Attacks on the Ruhr were, on the whole, disappointing for the reasons already given but, in considering these results, it should be remembered that hitherto it had never been thought worth while to attempt operations in that area unless there was some moon. During March and April 1942, more than half the operations had been undertaken when there was no moon. While the similarity and close proximity of targets in the Ruhr, together with the industrial haze and heavy searchlight glare common to highly defended areas made the visual identification of individual targets difficult, considerable damage was inflicted on other important industrial areas in mistake for the true target. A comparison of the percentage of photographs showing built-up areas in the Ruhr indicated that during March and April this had risen to 30% from 20% in the previous nine months. A further 12% showed outskirts of towns and villages as opposed to 9% previously.

Blind Bombing Attacks.

So far Gee had been used only as an aid to navigation. It was now necessary to obtain evidence of the effectiveness

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of the device as a blind-bombing aid and on 22/23 April 1942, 60 Gee-equipped aircraft were despatched against Cologne with instructions to bomb on Gee fixes only, approaching the target along the B lattice line. Unfortunately the weather was cloudy and photographs were limited to five taken during bombing and four shortly afterwards. From this scanty evidence it was estimated that the attack had been scattered over an area five to ten miles around Cologne and probably only a very small percentage of the force actually hit the built-up area.

Ibid

In view of the importance placed on blind-bombing with Gee these results were most disappointing. It was clearly impossible on such limited evidence to gain any authentic estimate of the value of the device in that capacity. A few photographs had, however, been obtained during attacks on Essen, Dortmund and Cologne by crews who, unable to locate the target visually, had resorted to 'blind-bombing' on Gee fixes. An attempt was now made to group together all such photographs - carefully excluding any in which aircraft had been assisted by visual navigation - in order to assess, broadly, the operational accuracy of this method of bombing.

Ibid

Although the evidence was, admittedly, scanty, it was generally agreed that the accuracy achieved by crews blind-bombing heavily defended targets such as the Ruhr and Rhineland was more than three times worse than that obtained by expert crews during trials over this country. On current indications, about 50% of bombs could be expected to fall within a five mile radius of targets in the Ruhr and Rhineland and only 10% within two miles. These estimates were, in fact, consistent with the results of the blind bombing attack on Cologne referred to above. As regards Essen, it was estimated that no more than 5 - 10% of bombs dropped 'blind' would fall on Essen itself and only about 2 - 3% on the Krupps Works.

ORS/BC
S.54

From this analysis it was concluded that results achieved by this means might be superior to visual attacks in poor weather but inferior to those obtained visually - using Gee as an aid to target location - in medium and good weather. In general, the accuracy of the device was not of sufficiently high an order to make it worth while for Bomber Command to undertake blind-bombing attacks on any scale relying on Gee alone.

On the other hand, as an aid to navigation it showed definite promise. Admittedly, Essen - mainly due to its natural characteristics - had remained invulnerable, but the highly successful raids on Cologne within and Lubeck and Rostock beyond Gee cover had shown a remarkable increase in navigational accuracy both to and from the target. Aircraft were now able to arrive within a minute or two of an exact pre-arranged timing and could be routed to avoid as far as possible enemy night fighter areas.

/The

The Policy of concentration.

The immediate result of this increase in accuracy was the strategic concentration of a large number of bomber aircraft both along the route as a tactical countermeasure to the enemy's early warning radar system and over the target in order to saturate the enemy defences and A.R.P. organisations.

ORS/BC
S.54

This policy - long approved but hitherto impossible to implement - culminated in the famous and most successful 'thousand-bomber' raid on Cologne on 29/30 May 1942. The flare technique was not used on this operation owing to the bright moonlight but maximum incendiary loads were carried by all aircraft. The operation was an outstanding success, such a concentration being achieved that the enemy ground defences seemed completely overwhelmed.

Although the strength of Bomber Command would not permit operations on this scale to be attempted very frequently, the concentration of the maximum available effort both en route to and over the target was now adopted as a standard of bomber operations.

(v) Initiation of Enemy Jamming.

ORS/BC
S.60

On 9/10 August 1942, jamming was experienced for the first time. Crews returning from a raid on Osnabruck that night reported that Gee was ineffective east of the Zuider Zee. This initial jamming was not very complex and within a matter of days a minor modification to all sets in the Command had restored the equipment to almost its old range. Nevertheless, the writing was on the wall and it was realised that it was only a matter of time before Gee was rendered ineffective over the majority of German targets. By a judicious use of multiple frequencies and the expansion of the system resulting from the opening of additional Chains, Gee facilities were retained for some considerable time, but its range progressively decreased as the effectiveness of the enemy's jamming increased.

C.17185/1

Work on a Southern Chain had begun early in 1942 and, by the end of May, the Chain was completed and satisfactorily tested. Unfortunately the existing Mark I aircraft receiver was only capable of operating on one pre-set radio frequency on any one mission and the Southern and Eastern Chains could not be used together. A Mark II receiver was designed but, owing to production difficulties, did not become available until some months later. Partly for this reason but mainly because, under the existing Directive, first priority was accorded to German targets, the Southern Chain was not used operationally until October 1942.

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As a result of the jamming in August, however, it was decided to attempt to confuse the enemy by confining Gee operations to the Southern Chain which operated on a different frequency. The first operation took place on 17 October, when 94 aircraft were despatched to bomb Le Creusot. From 17 October until 11 December 1942, the Southern Chain was used almost exclusively for all major operations which, at that time, were directed mainly against targets in Northern Italy. No jamming was experienced and the average

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operational range was approximately 387 miles.

By January 1943, the jamming war had increased in intensity and although various measures were introduced to overcome the problem, the value of the device over the Continent was rapidly declining. It continued to enjoy great popularity with crews, however, providing accurate fixes to the limits of its range (approximately the enemy coastline) thus reducing the distance to be flown purely on D/R and at the same time providing a known point of departure from which to base future calculations. On the return journey it was no less valuable, providing a ready means of homing to base and, in adverse weather, permitting descent through cloud with comparative ease. It is notable that during April, 1942, the number of Gee aircraft landing away from base was roughly 12% as opposed to 35% of non-equipped aircraft.

ORS/BC
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(vi) Advantages and Limitations of Gee.

Following its introduction in March 1942 Gee experienced a period of five months complete immunity from interference prior to the initiation of jamming in August 1942. It may be helpful to pause here and review, briefly, the general method of attacks adopted and the advantages and limitations experienced with Gee during this period in its triple function as an :-

Aid to navigation and homing; an
Aid to target location and
A blind bombing device.

A Navigational Aid.

While the effect of Gee on the bombing effort was by no means as spectacular as had been hoped, there is no doubt that as an aid to navigation and homing it was an unqualified success. In this capacity, navigators were urged to use it as an adjunct to normal navigation rather than as a continuous plotting device. Once the aircraft had gained operational height, the navigator attempted to determine the wind by flying a steady course and taking Gee fixes. Thereafter he navigated by D/R, using Gee to check his position at intervals. By this means he was able to follow the prescribed route, arriving at the turning point for the run in to the target at approximately the correct time. After the first few operations, the direction of approach to all targets within Gee cover was laid down by Bomber Command, a suitable lattice line being chosen to enable the navigator to use the 'homing technique'. It was reckoned that this method would bring the aircraft within about a mile of the actual target, giving the navigator a good chance of locating it visually. Similarly, approaching the English coast on the return journey, navigators were enabled to 'home' to base along the appropriate lattice line.

ORS/BC
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Ibid

In the attack of targets beyond Gee range, the device was invaluable as a navigational aid over a large part of the route, thus reducing the distance to be flown on D/R alone and providing accurate fixes and wind data on which to base future calculations.

ATH/Desp.
Appendix
A

The immediate and striking improvement in accurate timing and track-keeping on both the outward and homeward journey at last made possible the co-ordinated timing and routing essential to the achievement of the twin-policies of 'concentration' and 'saturation'. At the same time, as a homing aid, Gee did much to minimise the problem of handling large numbers of bomber aircraft returning to bases in this country. Finally, it was now possible to attempt more accurate routing of aircraft to avoid as far as possible the growing number of enemy G.C.I. night fighter 'boxes'.

An Aid to Target Location.

Unfortunately, once in the target area, the operational accuracy of Gee was found to be approximately three times worse than that experienced with it in trials over this country, the 50% zone being about five miles in radius. While in poor weather when visual identification was quite impossible Gee used as a blind-bombing device might be expected to achieve better results than non-equipped aircraft, it was clear that in all other circumstances, blind-bombing attacks would be less successful than visual methods. This bitter blow was only softened by the knowledge that two new radar aids to blind-bombing (Oboe and H2S) were already under development and due to make their appearance at the end of the year.

As an aid to visual location, Gee was rather more successful, particularly on such attacks as those on Cologne where the flare and incendiary techniques could be used to the best advantage. There were, however, a number of factors militating against the complete success of the device in that capacity, particularly in attacks on the Ruhr.

ATH/Desp.
Appendix
B

Not only was Gee less accurate than had been hoped, but the majority of crews were still inexperienced in its use particularly at extreme range and against such heavily defended targets as Essen. It took an experienced and determined crew to press home an attack in the face of heavy flak, search-light glare and night fighter activity. The combination of technical and operational difficulties frequently resulted in an initial scattering of flares which were further dispersed by the effect of wind drift. Also, against a background of the heavy industrial haze common to the Ruhr, the unshaded flares then in use produced a dazzle effect which crews complained was more hindrance than help in seeing the target. Considerable experimental work was carried out in this connection but the problem was not satisfactorily solved until the 7 inch hooded flare came into general use in 1944.

On many occasions, the cumulative effect of these weaknesses resulted in an indifferent illumination over a fairly wide area. Fire raising aircraft, unable to see their target or to locate it accurately on Gee fixes, tended to drop their incendiary bombs in the wrong places. These errors were further increased by non-equipped aircraft of the Main Force which, with instructions to bomb on fires only, were more easily misled by enemy decoys or fires lit in the wrong place by the Advance Forces.

/Shortage

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Shortage of Air Bombers.

A further and most important factor influencing the success of the bombing techniques at this time was the shortage of air-bombers, the majority of whom were still under training. In theory, the navigator was instructed to remain at his table throughout the period of attack in order to keep the aircraft on track and to bomb blindly on Gee if necessary. In practice, very few crews as yet carried trained air-bombers and the navigator was compelled to leave his instruments a few miles from the target in order to take up the bomb-aimer's position. Not only had he to accustom his eyes to dark conditions after the glare of the cathode-ray tube but there was no one to operate Gee or to give the signal to bomb blind in the event of visual identification of the target proving impossible.

A Definite Improvement.

Nevertheless, despite the many difficulties, an appreciable improvement occurred in the bombing effort under certain conditions of attack. Thus, in raids on the Ruhr and Rhineland in moderate weather, the percentage of successful photographs showing the target area increased from 11% in the period June 1941 - February 1942, to 18% in March and April 1942. There was also a marked rise in the percentage of sorties claiming attack on primary targets during the latter period. On the other hand there was no evidence that Gee had had any significant effect on operations in poor weather or in optimum conditions of bright moonlight and good visibility. Although in poor weather some little improvement might be expected from the use of Gee for blind-bombing, the accuracy of the device was not of sufficiently high order to make such attacks worth while. In general, the effect of Gee was most marked against shorter range targets when conditions were less favourable for visual identification. It must be remembered, however, that it was now possible to attempt attacks on targets within cover without regard to the state of the moon.

ORS/BC
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Wastage.

The effect of Gee on wastage was rather less marked than had been expected. A preliminary investigation covering March and April, 1942 showed that there was no appreciable difference in the overall missing and crash rates of Gee-equipped and other aircraft although the number of aircraft landing away from base was noticeably lower in the case of Gee aircraft. A further analysis covering the months March to October 1942, indicated that, over the whole period, the missing rates of equipped and non-equipped aircraft were identical (4.4%), but that action and other damage rates were slightly less for aircraft fitted with Gee. (1.9% and 1.2% as compared with 2.2% and 1.4% respectively.) A more detailed comparative analysis of raids on targets within and beyond Gee cover, however, suggested strongly that the fitting of Gee tended to reduce the missing and damage rates - probably because those aircraft kept more accurately to the main bomber stream. The effect of the policy of concentration

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on the overall wastage of the bomber force will be discussed in Chapter 6.

Range.

One of the advantages of the Gee aircraft receivers was that the equipment itself did not radiate and could not therefore be homed on by enemy night fighters. On the other hand the system was very liable to jamming which severely limited the effective range at which ground transmissions could be received. The limited range of the equipment was, indeed, one of the major disadvantages of the Gee system. Over the Eastern Chain during the pre-jamming period, this was estimated as about 385 miles from the Master Station at Daventry, varying by plus or minus 25 miles from night to night. In the direction of Mannheim, the range was slightly better being in the region of 400 - 420 miles from Daventry with variations of plus or minus 30 miles on occasions. Two notable exceptions may be mentioned here. On 4/5 May, crews attacking Stuttgart (beyond normal Gee cover), reported obtaining satisfactory fixes at a range of 450 miles. At the other extreme, in a daylight attack on Essen on 31 March 1942, pulses faded out over Holland at a distance of about 250 miles. Both these and other exceptions were attributed in the main to the peculiar meteorological conditions pertaining on each occasion.

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The initiation of jamming in August reduced the average operational range to 304 miles during the period 9/10 - 18/19 August when modifications were completed to aircraft sets and it rose again to 350 miles during the period 24/25 August - 8/9 September. Thereafter the range fell consistently. In October operations were switched to the Southern Chain which gave an average operational range of 387 miles - i.e. approximately the same as that experienced on the unjammed Eastern Chain - although the average range in an attack on Turin on 8 December 1942 was 488 miles and some fixes were obtained over the target at 610 miles. These ranges were the greatest ever obtained with Gee but were thought to be the result of freak conditions.

(vii) Summary.

From what has already been said, it will be clear that, as a navigational and homing aid - for which purpose it was originally designed - Gee was extremely successful, subject to the limitations of range already mentioned. Over the target, its effect on operations was disappointing and it was early realised that until the new radar aids to blind-bombing then being produced were ready for service, much of the success of bombing operations must depend on the ability of the leading crews to find and mark the target visually. The logical outcome of this conclusion was the formation of the Pathfinder Force which will be discussed in the next Chapter.

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CHAPTER 9

FORMATION OF A PATHFINDER FORCE

(i) The Argument.

It was the failure of Gee to come up to expectations as a blind-bombing device that gave the final twist to the tail of the argument already in progress between the Air Ministry and the C-in-C Bomber Command on the formation of a Target Finding Force.

While Gee had largely overcome the initial difficulty of navigation to a selected area, the problem of finding the actual target in the face of searchlight glare, heavy flak and night fighter activity, remained unsolved. In the last and most important stage, crews were still dependent on visual methods. Any failure of the first arrivals to drop flares and incendiaries in the right place resulted in later arrivals being misled by widely scattered flares, fires and enemy decoys. Moreover, Essen, the most important target in the Ruhr had remained invulnerable to current bombing methods. The prevalent industrial haze and the geographical nature of the target prevented visual identification except by low attack when casualties might be expected to be heavy.

The Air Staff were now firmly convinced that the success of a large scale operation depended primarily on the ability of the initial force to find and mark a selected aiming point visually - a task which recent evidence had shown could only be carried out accurately by specialist crews of great experience and determination.

It will be remembered that the advantages to be obtained from the formation of a Target Finding Force composed entirely of picked crews located in one area and under one control had been put forward by D.D.B. Ops. as early as November, 1941. It was, in fact, an essential complement to the flare and incendiary technique then being evolved.

S.44091
Encl. 25B.

D.B. Ops
Folder 2073
17 March

On 17 March 1942, he again put forward his suggestions this time to the new C-in-C, Sir Arthur Harris. The potent argument for an immediate decision once again lay in the time element governing the use of Gee. To enable the device to be fully exploited in the limited period it was expected to remain effective, it must be coupled with the highest operational skill. Moreover, it was argued that the existence of such a force would provide an effective spearhead to the Bomber effort if and when the use of Gee was denied.

D. D. B. Ops/D. O.
11 April 1942

From a Conference held at Bomber Command shortly afterwards, it was evident that both the C-in-C and his Group Commanders were firmly opposed to such a step - mainly on the grounds of administration and morale. There was strong feeling that the 'creaming off' of experienced crews from operational squadrons to form a corps d'elite would have a very adverse effect on the morale of the remaining squadrons in the Command. Moreover, the expert crews chosen would

normally be first in line for promotion which would be seriously affected by their transfer to a small specialised unit. Finally, the administrative difficulties entailed in forming and maintaining such a force out of the Command's then limited resources would be insupportable until the strength of the Command as a whole was considerably greater.

D.B.Ops.
Folder 2073

Undeterred by this opposition D.D.B.Ops continued to solicit support for his scheme. In April he produced yet another Paper on the subject in which he proposed that, initially, the Target Finding Force should consist of six squadrons - two heavy and four medium - located in one area and under one control. These squadrons would work in close co-operation with the scientists and a Bomber Development Unit so that new ideas could be discussed and tried out with the least possible delay.

Ibid.

As regards the objection that the formation of such a force would involve the 'creaming off' of best crews he explained that this would not be the case as, in the first instance, only one crew would be taken from each operational squadron. While not disputing the C-in-Cs contention that the adoption of this proposal would result in a 'corp d'elite', D.D.B.Ops. argued that the difficulties of target finding and identification were now realised to be so great that such a step would be fully justified.

Ibid

This Paper was then circulated to a number of Station and Squadron Commanders with operational experience in the current war. Comments were, without exception, both favourable and enthusiastic. The general feeling was that Captains would be only too pleased to have the target found for them and would themselves aspire to the Target Finding Force as a reward for proficiency.

ATH/DO/16

D.D.B.Ops. now forwarded the Paper and the comments to the C-in-C who replied that, while he still retained "a fairly open mind on the subject", neither he nor his Group Commanders - whom he had again consulted - were convinced by the arguments put forward. Much as he appreciated and paid attention to the 'men who did the job', in his opinion their view was necessarily circumscribed. On the other hand, the need to select certain individuals or Units to lead an attack was not disputed and the C-in-C stated his intention of carrying out this selection on a competitive basis in future. There was already a great drive towards universal photography of bomb-aiming points at night. In each Group the accuracy of this photography by different Units would be assessed at the end of each month and the squadron or squadrons with the best results would be designated 'Target Finder' for the following month.

Ibid

D.D.B.Ops/DO.
8 May 1942.

This was admittedly a step in the right direction but, from the Air Ministry point of view, had a number of disadvantages. In the first place it entirely eliminated the establishment of a Bomber Development Unit alongside and working in close conjunction with the Target Finding Force. This had formed an essential part of the Air Ministry Plan. There were other disadvantages. Although under the C-in-Cs plan the squadrons selected each month as Raid Leaders might have a few expert crews, their effort would be vitiated by less efficient crews in the same squadron marking incorrectly and causing dispersion of effort. Even if, on occasions, marking was accurate, following crews would be so assisted in their bombing that their improved results might lead to an otherwise

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inferior squadron being placed in the lead the following month. Moreover, the development of tactical methods and technique would be severely hampered by the lack of cohesion resulting from the geographical separation of squadrons and their frequent changes of role.

C. S. 12848/41
Min. 20.

Min. 21.

Encl. 18a.

Matters had now reached a deadlock and in the opinion of the Air Staff there was little to be gained by prolonging correspondence on the subject any further. On 4 June, 1942, the C. A. S. invited the C-in-C to attend a conference at the Air Ministry in the immediate future, bringing with him one or two of his best Squadron Commanders. An Air Staff Memorandum was prepared as a basis for discussion and circulated at the highest level. This set out in full the main Air Staff arguments in favour of a Target Finding Force: viz:-

- (a) Joint routeing, briefing and timing would ensure the necessary co-ordination and concentration of the flare and incendiary dropping force over the target.
- (b) By concentrating on their special role, a technique could be developed which would not only confer an immediate and striking improvement in our ability to concentrate a decisive effort on the target but would be open to systematic improvement as a result of discussion, enthusiasm and experience.
- (c) In the event of the use of Gee being denied, we would still have a highly specialised force available to provide a spearhead to the main effort.
- (d) By equipping a limited number of aircraft in the Target Finding Force with the first samples of new devices, the full advantage of these would be obtained by the bomber force as a whole long before production would permit of general distribution.
- (e) There would at all times be available a highly skilled and co-ordinated force ready to undertake tasks of vital importance or of special difficulty.

ATH/DQ/6
12 June 1942.

The C-in-C, unfortunately, remained unimpressed. On 12 June 1942, he informed the C. A. S. that he had just held his third conference with his Group Commanders, each of whom had brought with him his best Target Finding Squadron Commander. All were "utterly opposed" to the formation of a Target Finding Force on the lines proposed by the Air Ministry. It was argued that the Command already had such a force by a process of selecting the best squadrons and best crews to lead attacks. In fact, the existing Raid Leader scheme fulfilled all the requirements of the "target finding fanatic" bar living together. It was the general opinion that there was little to be gained by the final step whereas the arguments against it were overwhelming.

Ibid.

Discussing the Air Staff contention that the success of the R. A. F. bombing offensive depended on the existence of a Target Finding Force, the C-in-C stated that the general

/view

view of the Command was that the difficulty lay not in finding but in seeing the target on the average dark night through haze and in the face of the vast searchlight glare common to all highly defended areas. The Target Finding Expert had no greater chance of 'seeing' under those conditions than anyone else.

Ibid.

While maintaining his vehement stand against the Air Ministry proposals, the C-in-C, virtually in the same breath, now proposed that selected Raid Leaders should be entitled to wear a special badge which would add a 'cachet' and make for esprit de corp. It must be remembered that this singling out of crews was the very thing he had previously decried so strongly on the grounds that it implied a corp d'elite. Clearly the C-in-C was having to modify his views.

C.S. 12848/41
Encl. 30A
14.6.42.

This indeed was the opinion of the C.A.S. who pointed out that, during the past three months, the C-in-C had progressed from complete rejection of the scheme, through a Target Finding Squadron phase to his latest Raid Leader proposals. In the view of C.A.S., no argument had been produced which constituted a serious obstacle to the final and logical step necessary to weld those expert crews into a closely knit whole. The close association involved in bringing selected crews into one Unit and locating them on one aerodrome was the essence of the problem. Without this there could be no day to day improvement of method, no insurance that plans and briefing for each operation would be similarly and clearly interpreted and acted upon by the force as a whole. On the contrary, the C-in-Cs proposals seemed to imply an admission of the need for just such a force.

Ibid.

The C.A.S. warned the C-in-C that recent Reports had clearly shown the need for a great increase in the percentage of bombs dropped on the target and there seemed little doubt that the R.A.F. night bombing was, to date, far from satisfactory. He himself was convinced that what was needed was an effective degree of illumination and incendiarism in the right place and only in the right place. This difficult task could only be done by a force which concentrated on it as a specialist role and which excluded those crews whose less discriminating use of flares and incendiaries in the vicinity of the target had recently led so many attacks astray. This did not mean packing one unit with experts at the expense of other units who had to do the same job. On the contrary, the Target Finding Force would have an entirely different and far more difficult task.

Ibid.

Although the C.A.S. took a very serious view of the whole position and was well aware that any failure on the part of Bomber Command to effect a radical improvement might well endanger the whole bombing policy, he was reluctant to impose the Air Staff Plan in the face of the C-in-Cs strong objections. A decision was therefore postponed until 15 June, 1942, when during an informal discussion, the C.A.S. was able to persuade, if not entirely convince, the C-in-C of the necessity of the proposed step.

Ibid
Min. 32.

(ii) Establishment of a Pathfinder Force.

Ibid
Encl. 36A.

Arrangements for the establishment of the Target Finding Force - now designated Pathfinder Force⁽¹⁾ were officially

/confirmed

(1) See ATH/DO to Group Commanders dated 20 June 1942.

ATH/TH/24/3/685(5) Encl. 4A. DG/S. 2776. ✓

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confirmed on 11 August, 1942. The necessary machinery had already been put in motion and the Pathfinder Force ultimately came into existence on 15 August, 1942 under the Command of Group Captain D. C. T. Bennett, D. S. O.

Ibid
Encl. 37A

The new Pathfinder Force was composed, initially, of three heavy and one medium bomber squadron located for administration on adjacent stations in No. 3 Group⁽¹⁾ viz:-

<u>Station</u>	<u>Squadron</u>	<u>Affiliated to:</u>	<u>Aircraft</u>
Wyton	83 (109) ⁽²⁾	No. 5 Group (No. 2 Group (No. 3 Group	Lancasters Mosquitoes) Wellingtons)
Warboys	156	No. 1 Group	Wellington III
Graveley	35	No. 4 Group	Halifaxes
Oakington	7	No. 3 Group	Stirlings

Ibid.

Flying Control, administration and discipline remained the responsibility of the respective Station Commanders. Group Captain Bennett was designated Operational Commander under the direct orders of the C-in-C, Bomber Command. His varied responsibilities included:-

- (a) Operations of P.F.F. squadrons.
- (b) Planning of target marking.
- (c) Training of personnel in the P.F.F.
- (d) Development of navigational and bombing aids to be used in the P.F.F.
- (e) Development of suitable means of target marking.

Ibid.

As regards provision of aircrews, it was agreed that approximately one third should be chosen from volunteers among the best pupils graduating from O.T.Us and approximately two thirds from volunteers from operational squadrons. For the purpose of selecting the latter, each P.F.F. squadron was affiliated (as shown above) to one operational Group which would be responsible for providing crews and for keeping in close touch in order to obtain help and advice from its affiliated squadron.

Ibid.

Permission had already been obtained from their respective governments for Dominion personnel to volunteer. As regards Canadians, the provision was added that a

/Canadian

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(1) A Bomber Development Unit was formed at Gransden Lodge w.e.f. 20 July, 1942, from the existing No. 1418 Flight which was disbanded on the same date. It was placed under the control of No. 3 Group for administration and H. Q. Bomber Command for operational matters.

(2) No. 109 squadron in the process of equipping with OBOE was at that time only affiliated to the Pathfinder Force although under the operational control of the Commanding Officer. It became a full P.F.F. squadron in October, 1942.

Canadian Flight should be formed with others to follow as soon as possible and that where crews had been taken from existing Canadian squadrons, they should be replaced by all-Canadian crews. The Australian Government also asked that R.A.A.F. personnel should be kept together as far as possible.

Ibid. A special establishment was approved for the Pathfinder Force which entitled qualified members to accelerated promotion to acting ranks once they had completed the required number of sorties, viz:-

Acting F/Lt. or Acting F/Sgt.	15 sorties
Acting S/Ldr. or Acting W/O.	20 sorties
Acting W/Cdr.	25 sorties

It was laid down, however, that members of aircrews should not fail to get their promotion as quickly as they would have done in normal squadrons and, where necessary, this principle was to be applied even at the expense of temporarily over-bearing the Pathfinder establishment.

Ibid. Candidates for the Pathfinder Force were required to volunteer to do 60 operational sorties of which at least 12 were completed in normal squadrons. This figure was reduced in September, 1942, to 45 sorties which were counted as equivalent to two normal tours of 30 sorties each. The obligation on operational Groups to supply a given number of aircrew personnel to support their affiliated squadrons, subsequently made necessary a further innovation. Where there were insufficient

Encl. 38A

suitable volunteers, selected personnel were posted to the Pathfinder Force for a normal tour of 30 sorties (including those done before joining P.F.F.). After completing sufficient successful sorties they were then invited to volunteer for the full Pathfinder tour of 45 sorties and on doing so became eligible to fill a P.F.F. vacancy and to receive the appropriate privileges of rank and badge. Any who failed to volunteer, merely completed their normal tour but were debarred from Pathfinder privileges.

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114/241/7/202(A)
BC/S-27724
Encl. 71A
14 Jan. 1943

C.S. 12848/41
Encl. 37A As regards O.T.U. volunteers, a slight variation in procedure was adopted. Aircrews who had completed their training were posted to Conversion Units to train on the type of aircraft it was intended they should operate. Their names were passed to the C.O. Pathfinder Force who then drew on those volunteers as required direct from the Conversion Units. On reaching the Pathfinder Force they were required to complete the requisite number of sorties before qualifying for full membership.

In all cases, apart from the necessary high standard of technical and operational efficiency, outstanding characteristics of grit, determination and reliability in pressing home an attack were obvious qualities sought after in the final selection of candidates.

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Encl. 70A and
C.S. 12848/41
Encl. 43A

The Pathfinder Force remained on this basis until 25 January, 1943, when, at the request of the C-in-C, it was divorced from No. 3 Group and re-organised on an independent basis as No. 8 (P.F.F.) Group, with its Headquarters temporarily at Wyton. Wyton, Warboys and Graveley were immediately transferred outright from No. 3 Group. Oakington remained in No. 3 Group, accommodating No. 7 (P.F.F.) squadron as a lodger unit. The new Pathfinder Group now comprised:-

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<u>Station</u>	<u>Squadron</u>	<u>Affiliated to:</u>	<u>Aircraft</u>
Wyton	83	No. 5 Group	Lancasters
(temporary Headquarters)	109	No. 2 Group	Mosquitoes
Warboys	156	No. 1 Group	Wellington III
Graveley	35	No. 4 Group	Halifaxes
-	7	No. 3 Group	Stirlings

It was the intention that No. 8 (P.F.F.) Group should, in future, expand 'pari passu' with the rest of the Command. In any event, operational experience had by now indicated that the existing force was not large enough to fulfill its functions properly.

AHB/IIH/2A/3/685 (A)
 BC/S. 2776
 Encl. 84A ✓

On 6 January, 1943, the C-in-C stated his intention of increasing it from four to six squadrons as soon as the "fifty-squadron" target had been achieved. On 28 January, 1943, the Air Ministry agreed in principle to the establishment of the two additional squadrons, one on Lancasters and one on Halifaxes. These were to form in March, 1943, in anticipation of aircraft becoming available in April. Aircrews were to be provided from the resources of Nos. 5 and 6 Groups respectively.

C. S. 12848/41
 Encl. 48A ✓

AHB/IIH/2A/7/202 (A)
 B. C/S. 27724
 Encl. 100A

(iii) Early Pathfinder Methods.

The Pathfinder Force operated for the first time on 18/19 August, 1942, against Flensburg and by the end of 1942, major bombing operations had settled down to a more or less characteristic pattern. Generally speaking, attacks were carried out in three phases: namely the finding, illuminating and marking of the target by the Pathfinders; the build-up of the attack around the aiming point by the fire-raising force; and, finally, the attack by the Main Force.

AHB/II/70/253

Ibid.

The basis of all target marking techniques evolved during this period was visual marking of the target in the light of flares. Broadly speaking, this was undertaken in three stages:-

- (i) "Finder" aircraft (used for the first time over Essen on 16/17 September) laid bundles of flares in sticks six to eight miles in length over the target area. Flares, normally dropped on E. T. A., were laid along four or five parallel lines about two miles apart and the task called for very accurate navigation and timing.
- (ii) Finder aircraft were followed by Illuminators who laid a close pattern of flares visually around the correct target.
- (iii) Immediately the target had been illuminated, 'Marker' aircraft attempted to identify it visually and, having done so, to drop markers accurately about the aiming point.

The Pathfinders were followed by the Fire-raising Force who were timed to attack immediately the markers had gone down. In theory there was then to be a gap of half-an-hour to an

/hour

hour before the arrival of the Main Force to enable an unmistakable conflagration to develop. This was not always possible in practice owing to the short hours of darkness in summer months, changing weather and other tactical problems. The method was used very satisfactorily in the attack on Lubeck on 28/29 March but was not used again until an attack on Bremen on 13/14 September. Reports of this operation varied but, in general, it appeared that this method did, in fact, allow a conflagration to develop which was of assistance to the Main Force as a 'bombing beacon'.

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1D/12/30
17 Sept. 1942

Nevertheless, Pathfinding methods during the months immediately following the formation of the Force were, of necessity, very fluid. The early operations can be regarded in the light of a "trial run" and minor changes in tactics and technique were constantly being introduced in an attempt to determine the best method of collaboration with the Main Force. The introduction of two new radar aids and the arrival of the Target Indicator bomb in the new year necessitated still further changes in method and it was not until well on into 1943 that the Pathfinder Force was able to settle down to a more or less constant form. This, however, is properly the subject of the next Narrative.

The first operational use of Oboe on 31 December/1 January marked the beginning of a new phase in P.F.F. operations. In the next section an attempt will be made to estimate the success of Pathfinding methods and their effect on the bombing effort of the Main Force during the period August - December, 1942.

(iv) Results of early P.F.F. (1) operations.

In considering the early results of the Pathfinder technique, account must be taken of a number of handicaps unavoidably imposed on the P.F.F. during the first few months of its existence. Not only were target marking methods still in their infancy, but the Pathfinder squadrons had been transferred complete with their existing crews and the process of "weeding out" or training less efficient crews was still in progress. Moreover, the formation of the Force was coincidental with the jamming of Gee and consequently, during the Period about to be reviewed, Pathfinder squadrons were without the instrumental aids to navigation and target finding which were a primary essential to the satisfactory accomplishment of their task. Finally, as will be seen from the next Section, they were also without any really efficient flares or ground markers and had to rely on existing flares for illuminating and marking the target in the air and various types of incendiaries for marking it on the ground.

ATH/Despatch
APP. B.

Despite these handicaps, a preliminary survey indicated that by the end of November, 1942, the P.F.F. had been completely successful in carrying out their planned technique on one-third of their attacks on Germany and partially successful in another third. Against Italian targets where visibility was usually

/better

(1) Except where otherwise indicated, all figures quoted in this section and in the Tables at Appendix 7 have been taken from an O. R. S. (B. C.) Memorandum No. M. 117 prepared by a section of that Branch but not necessarily representing the views of the Branch as a whole. They have been quoted as the best figures obtainable for the period under review in this section of the Narrative.

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better and Gee available, results were rather more satisfactory, the target marking technique having failed to go according to plan on only two out of nine occasions.

Between August and December, 1942, the Pathfinder Force carried out a total of 26 operations against German targets. In attempting to analyse the success of those operations, it is necessary to assess them from three separate angles. Account must be taken in the first place of the effect of weather on target finding; in the second, of the success of the Pathfinding technique; and, in the third, of the effect of that technique on the bombing effort of the Main Force.

Thus, from Table I of the analysis at Appendix 7 it will be seen that whereas on the six operations undertaken in bad weather, (23%) the P.F.F. were wholly unsuccessful in finding their target, on the nine operations carried out in good weather (35%) they failed to find it on only one occasion. Under moderate conditions, honours were fairly evenly divided, the target having been found on six and not found on five occasions. Eliminating operations undertaken in bad weather, Table II shows that the P.F.F. found and were at least partially successful in marking the target on no less than 70% of the operations undertaken in moderate or good weather, 40% of which were wholly successful. Of the remaining 30% failures the majority were due to mistaken identification. The total results achieved during this time may be summed up as follows:-

Bad weather (failures)	6	(23%)	
Moderate or good weather:			
Target found - Marking successful	8	(31%)	} 54%
" " - " partially			
successful	6	(23%)	
Target not found	6	(23%)	

From these figures it can be seen that the P.F.F. found and marked the target, at least partially successful, on 54% of all operations against Germany.

In considering the effect of the target finding technique on the Main Force effort at that time, it is obviously unnecessary to consider the occasions on which the P.F.F. failed, completely, to find the target. Tables III and IV, therefore, deal only with the 14 raids on which the target was found and marking was at least partially successful. It will be seen that an improvement on 9 out of 14 occasions (64%) was noted in the Main Force bombing concentration, or on about 35% of all raids on German targets. In other words, the percentage of night photographs plotted within three miles of the aiming point was 41% as opposed to an expectation of 25% based on the previous histories of the targets under attack. The position can be summed by as follows:-

/No. of Ops.

No. of Ops. (% of total)	(% of operations on which P.F.F. marked the target)
Bad weather - no effect 6 (23%)	-
Results improved 9 (35%)	64%
Target marked but no improvement 5 (19%)	36%
Target not found 6 (23%)	
Total	
26	100%

It will be evident from the fore-going that the Pathfinder Force did, in fact, have a marked effect on the success of night bombing operations against German targets under moderate and good conditions. That results at that time were not more spectacular may undoubtedly be attributed, in the main, to the lack of radar aids, the absence of satisfactory marking devices and the inexperience of the crews in the type of work they were now required to undertake. On the other hand, it was very soon observed that a new and entirely unforeseen source of error had crept in.

ATH/Despatch
App. B.

An examination of night photographs taken over the first seven months of Pathfinder operations indicated that, while there was undoubtedly a remarkable improvement in the concentration of the bombing effort around the centre or mean point of impact (M.P.I.) of the bomb pattern, the centre of concentration itself was becoming seriously displaced from the true aiming point. Thus, the percentage of bombs falling within three miles of the actual aiming point was by no means as high as would at first appear from the percentage falling within three miles of the Mean Point of Impact. The following figures will illustrate this statement:-

March, 1942	August, 1942
to	to
August, 1942	March, 1943
(pre-P.F.F.)	(P.F.F.)

Overall percentage of photos plotted within 3 miles of centre of concentration. (M.P.I.)	35%	50%
--	-----	-----

Overall percentages of photos plotted within 3 miles of aiming point.	32%	37%
---	-----	-----

This displacement of the centre of the bomb pattern from the true aiming point is known as the "Systematic Error" and a comparison of displacement figures for the seven months preceeding and seven months following the formation of the P.F.F. showed an alarming increase from 14% to 67%. This was in the main attributable to the fact that, whereas in the past the Main Force had been instructed to bomb on the aiming point itself, they were now required to aim at the markers dropped by the Pathfinders. Consequently, the M.P.I. of the resulting bomb pattern no longer coincided with the aiming point but was largely determined by the position of the markers. Any initial errors in placing the markers normally tended to be perpetuated by the Main Force, causing the centre of concentration to be displaced from the aiming point as illustrated above.

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This "Systematic Error" now became one of the major problems facing Bomber Command and although improvements in technique and the arrival of new radar aids and the Target Indicator bomb effected a great improvement in marking accuracy, the problem was never completely resolved.

(v) Provision of Special Weapons for the P.F.F.

From the very first, strenuous efforts were made to provide the Pathfinder Force with suitable weapons to enable it to fulfill its task. Of these, the two most immediate requirements were:-

- (a) A hooded flare with pre-set barometric fusing.
- (b) A really efficient target indicator bomb.

Ibid.

One of the basic principles of the current technique was the maximum illumination of the target and it was soon found that the existing standard flare was unsuitable for this purpose. It could not be dropped in large concentrations owing to the pronounced upward glare which not only dazzled the air-bomber but provided a background against which the aircraft were clearly silhouetted. It was thought that the fitting of hoods would increase the downward illumination by reflection, at the same time eliminating the glare so that a much greater flare concentration would be possible and the aim of 'daylight bombing' at night would be within reach. Trials with an American-type hooded flare in August, 1942, proved disappointing and some considerable time was spent in designing a model suited to P.F.F. requirements. 500 of these were ordered on 3 May, 1943, followed by a total order for 38,000 by July but production difficulties followed and the 7 inch hooded flare was not available in sufficient quantity to be of any real use until the beginning of 1944.

Fusing of the flares provided another complication. Their efficiency in illuminating the target was mainly dependent on the height of their burning and it was found that the existing No. 848 fuse was variable in its delay action. Apart from this the height at which the flare opened depended on the dropping aircraft releasing at a predetermined height. This imposed serious tactical limitations, in practice difficult to meet, and frequent complaints were received from crews of flares opening too high. The problem was eventually overcome by the use of the pre-set barometric fuse which was especially designed to give operational freedom in height to the P.F.F. By September, 1942, sufficient of these had been provisioned to meet P.F.F. requirements for all flares and target markers until the spring of 1943. The fuse was used for the first time in conjunction with the Target Indicator bomb in January, 1943.

The need for a Target Indicator bomb which would be clearly discernable on the ground and difficult to simulate had long been recognised and had been put forward as an urgent requirement by the C-in-C in March 1942. By July, 1942, production had started on a 250 lb T.I. with excellent ballistics. By means of a pre-set barometric fuse,

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29 Sept. 43.

AHB/II/70/253 ✓
18.8.42

AHB/ID/12/30 ✓
6.9.42

C.S. 16502
Encl. 75A

AHB/II/70/253
23.7.42

U. S.
Publication
"British Bombs
and Fuses"

this bomb ejected red, green and yellow⁽¹⁾ candles at a given height which fell in brilliant cascades to the ground where they formed a pattern and continued to burn until expended. Functioning up to 9000 feet or more, these cascades were clearly visible from great distances. Their main disadvantages was their short burning time (red and green candles, three minutes; yellow, five minutes), and work was started on a Mark II T.I. bomb on the same lines but with six minute candles. Unfortunately, the inevitable delays occurred and the Target Indicator bomb (Mk. I) was not used operationally until the attack on Berlin on 16/17 January, 1943. It was to prove a great success and together with Oboe and H2S, marked a new era in night bombing operations. It was found that a judicious variation in the colour combinations of the sticks, made the bomb practically impossible to simulate.

In the meantime, between August, and December 1942 the Pathfinder Force attempted ground marking using, in the first place, the 4 lb. I.B., and later, the 30 lb. and 250 lb. I.Bs. These suffered from the great disadvantage that they were very easy to simulate. Also, they were not sufficiently distinctive and soon became lost in the great mass of flares and incendiaries as an attack developed. 4000 lb. I.Bs (Pink Pansy) were also used on a few occasions with no greater success. Although very distinctive while burning, they failed to leave any permanent mark. Experiments in sky marking with coloured flares which ejected cascades of red, green, yellow and white stars were more successful but these, too, were relatively easy to copy and also suffered from the effects of wind drift.

Despite all these handicaps, there was little doubt that Pathfinding methods had effected a considerable improvement in bombing concentrations as has already been seen, and at the end of this Period, the future looked very promising. Unsatisfactory features in the original organisation of the P.F.F. were being modified as experience dictated. Moreover, there was no indication that Pathfinders were suffering undue wastage through operating in the van of the bomber force. On the contrary, Pathfinder casualties were only a fraction over 3% in September, falling to 2% in October, 2.5% in November and December and reaching a record of 1.1% in January, 1943. By that time, the T.I. bomb and the barometric fuse had been introduced and Oboe and H2S had made their first appearance. Taking all in all, the A.C.A.S. (Ops) was able to inform the C.A.S. that he looked forward confidently to "a considerable improvement in the effectiveness of our attacks (in 1943) as compared with the previous year".

/CHAPTER 10

C.S.16502
Encls. 41/45A

(1) At the request of the Command, the yellow candles were subsequently eliminated on the grounds that they were not sufficiently distinctive and were easy to simulate.

G. 169087/ZGB/1/50/30

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CHAPTER 10

TWO NEW RADAR AIDS

(i) Development of Oboe.

Despite the advances made in bombing tactics and techniques, throughout 1942, weather remained the most important single factor affecting the success of night bombing operations. Gee, while extremely successful as a navigational aid, had proved of little value as a blind device and, in the last resort, Pathfinder crews were still dependant on visual methods. The need for a device which would (a) improve the accuracy of bomb-aiming and marking and (b) enable crews to navigate to and locate a target irrespective of range and weather conditions, remained of paramount importance. As has been seen, until 1943 the Pathfinder Force was without any such aids to target finding or any suitable means of marking the target when found. By January, 1943, both these handicaps had been removed and, with the advent of Oboe, H2S and the first Target Indicator bombs, a new era in the technique of night bombing was initiated.

Throughout 1942, development work had proceeded on three radar aids to blind-bombing - namely, Oboe, H2S and GH. Of these, Oboe was the first to be used operationally, closely followed by H2S. Owing to various delays in the supply of the equipment, GH was not introduced until October, 1943, and was used operationally for the first time on 3/4 November, 1943.

ATH/Despatch
App. A

Oboe, the first of the new aids, had been developed as a result of the experience of No. 109 squadron earlier in the war in their campaign against German navigational beams used for the guidance of enemy night bombers. It had been found possible for an aircraft to fly along a beam and for its position on that beam to be calculated by measuring its distance from a second point. This principle had been elaborated in the "Trinity" operations against the battleships Scharnhorst and Gneisau at Brest during late 1941 and early 1942, but it had a number of disadvantages and the method was not considered sufficiently reliable for general adoption.

S. B. 19940/1

Meanwhile, on 18 June, 1941, a newly formed Oboe Group at T. R. E. had put forward a proposal for a method of blind-bombing using two ground stations ("cat" and "mouse") and a pulse receiver in an aircraft. In its simplest form (Oboe Mk. I) the system can be described as follows:

ATH/Despatch
and
ORS/BC/S. 53

By a system of dots and dashes indicating errors to port or starboard, the "cat" station controls the aircraft at a constant range along a track which will take it directly through the centre of the target. Meanwhile, from the signals repeated back by the aircraft equipment, the "mouse" station is able to make periodic measurements of its position and speed, hence calculating the exact point of bomb-release which is then signalled back to the aircraft.

Oboe Mark I, described above, had four main disadvantages, namely:-

/(a)

- (a) Each pair of ground stations could only handle one aircraft every 10/12 minutes. This automatically imposed serious tactical limitations on the use of the device for blind-bombing attacks.
- (b) The nature of the system required the aircraft to fly straight and level on the last ten minutes of approach to the target. Being unable to take evasive action it was thus laid open to enemy interception.
- (c) The range of Oboe was to a large extent determined by the height of the aircraft, thus automatically limiting the bomb load.
- (d) Unlike Gee, the aircraft equipment itself radiated and could be homed on by enemy aircraft.

C. S. 10169

As will be seen, the first three problems were to be overcome by a change in the tactical application of Oboe. Meanwhile, in August, 1941, development was ordered on top priority and sets were fitted into Wellingtons of No. 109 squadron for trials.

Development suffered a temporary hiatus between October, 1941, and January, 1942 when experiments were in progress in connection with the "Trinity" operations, but in February, 1942, all available effort was once again concentrated on Oboe.

Bomb dropping trials, using Wellington aircraft, were carried out during March and April and proved that the system was not only practicable but highly accurate. Fifty per cent of bombs dropped fell within a rectangle 400 yds long and 200 yds. wide.

RCM/102 17A

ORS/BC/S. 53

Ibid

On 18 June, 1942, the O. R. S. at Bomber Command put forward a recommendation that until fitting of Oboe could be undertaken on a scale large enough to make blind-bombing operations worth while, a very few Oboe-fitted aircraft could be used with effect for purposes of target location. It was suggested that Oboe aircraft loaded with Marker bombs and interspersed at ten minute intervals during an attack would be very effective in indicating the true aiming point and correcting any tendency to error on the part of the Gee-equipped Pathfinders. Not only would this overcome the tactical limitations imposed by the low handling capacity of the ground stations but it would be a means of gaining useful experience prior to the initiation of blind-bombing operations.

C. S10169
Encl. 77A

As a result of this recommendation, it was decided to use Oboe-fitted Wellingtons for trials of the new Target Indicator bombs on 2/3 July, 1942. Results were very satisfactory and it was found that a much smaller bomb load than had been anticipated would satisfy Bomber Command's immediate needs.⁽¹⁾ This, together with various tactical disadvantages associated with the Wellingtons, led to the Command putting forward an immediate requirement for trial installations of Oboe in Mosquitoes Mk. IV. It was thought that the Mosquito, with its much greater speed and height would militate against the risk

OMS/109
Encl. 33A

/of

BC/S. 27462
Encl. 11A

(1) In their recommendations to Air Ministry, Bomber Command stated that the trials had indicated that a stick of four Marker Bombs would be sufficient to mark the target for the leading incendiary-carrying aircraft.

G. 169087/ZGB/1/50/30

SECRET

Encl. 45A

of enemy interception on the straight run to the target, at the same time obtaining greater range. Air Ministry agreed to the request and it was decided that ultimately, Wellingtons should be used for training only and Mosquitoes for operations.

BC/ORB/Admin.
App. B/3
7.7.42

Meanwhile, No. 109 squadron was being reorganised. On 7 July, 1942, the RCM and Monitoring Flights were removed and arrangements put in hand to expand the Oboe Flight to a complete squadron on a two-flight basis. On 7 August the squadron moved from Stradishall to Wyton where, on 16 August, it was affiliated to the Pathfinder Force.

App. B/5
7.8.42
16.8.42

The decision to form an additional Flight of Mosquitoes had been taken on 27 July, 1942 and by 20 December, No. 109 squadron had six Oboe Mosquitoes operational. The squadron now had one Flight on Mosquitoes, one on Wellingtons and a training flight composed of four Wellingtons. A decision to re-equip the second Wellington Flight with Oboe Mosquitoes was taken at an A. C. A. S. (Ops) Meeting on 2 January, 1943.

App. B/3
BC/ORB/Admin.
20.12.42 and
App/B23
ACAS (Ops) Conf.
Serial 2/43

CMS. 109

In the meantime, two new ground stations had been erected on the East coast, giving cover over the Ruhr, with Essen as the focal point. These were operationally fit by September, 1942, but the numerous set-backs experienced during Oboe trials in the summer delayed the operational use of the equipment until the end of the year.

(ii) Operational Use of Oboe.

ORS/BC. S. 78

Oboe was used operationally for the first time on 20/21 December, 1942, when the six Oboe Mosquitoes of No. 109 squadron attacked the Power Station at Lutterade. This was primarily a calibration raid and was followed by a second on 31 December/1 January against Florennes. During December and January a number of similar small scale blind-bombing attacks were made by Oboe-controlled aircraft mostly against steel works in the Ruhr, with the primary object of completing crew-training and gaining the necessary operational experience. From these attacks it was estimated that, on an optimistic basis, the accuracy achieved was of the order of 650 yards although on a few occasions errors up to $1\frac{1}{2}$ miles were observed.

Ibid

Oboe was first used as a Pathfinder device on 31 December/1 January against Dusseldorf. Owing to the prevailing bad weather at this time, it was not possible to employ ground marking technique and the Oboe aircraft tried out a method of sky-marking using bundles of three flares, coloured red with green stars. These were used to mark the bomb release point and the Main Force were instructed to bomb the flares while flying on a pre-determined height and heading. During the first fortnight in January, 1943, eight further sky-marking operations were carried out against Essen and Duisburg. Unfortunately the only occasion when sufficient night photographic evidence was obtained was the attack on Essen on 9/10 January, 1943. An analysis of this raid showed that, while the main weight of attack had fallen about two miles S.W. of the aiming point, the percentage of aircraft bombing within three miles of the aiming point was

/three

three times greater than the best percentage ever before achieved on that target i.e. 60% as against 20%. Owing to the small number of Oboe aircraft available at that time, the Main Force was limited to between 30 and 70 aircraft. In general, it was estimated that the accuracy of the equipment was sufficient for ground-marking purposes but although a small ground-marking operation was carried out for the first time on 27/28 January, 1943, against Dusseldorf, this was marred by bad weather and a full scale trial of the technique did not take place until March, 1943.

Although it was still too soon to form an accurate estimate of the value of Oboe as a marking device, the results of the early attacks held out great promise for the future. Nevertheless the device suffered from the limitation common to Gee and, indeed, to all aids dependant on air to ground communication; namely, range. If the Pathfinder Force were to be assisted in their task of accurate marking of deep penetration targets beyond the Ruhr, an urgent requirement existed for a target finding device entirely independent of ground control. This need was to be met in 1943 by the introduction of H2S.

(iii) Development of H2S.

H2S was originally conceived as the result of the discovery that various ground features returned distinctive "echoes" to radio transmissions from aircraft. The discovery was already being exploited in ASV in 1941 in connection with the anti-U boat campaign. At that time, T.R.E. were experimenting with a new centimetre ASV for the detection of submarines surfacing at sea. In November, 1941 they undertook test flights with an entirely new model incorporating a scanner and it was found that man-made objects (i.e. built-up areas etc.) produced distinctive echoes which could be distinguished from those returned by natural features. The importance of this discovery from the point of view of the bomber offensive was obvious and experiments continued as a matter of urgency. By May, 1942, two Halifax aircraft were already undergoing trial installations of H2S prior to being passed to No. 1418 Flight (afterwards B.D.U.) for operational trials.

In the form in which it was first used operationally, H2S consisted of an R.D.F. transmitter and receiver carried in an aircraft and working on a 10 centimetre wave-band. The transmission was in the form of a narrow beam which swept continuously through a full circle thus giving an all-round "picture". The "picture" formed by echoes returned to the transmissions was presented to the operator in a Cathode Ray Tube P.P.I. (plan position indicator), on which a town showed as a blob of light of indefinite shape. In the early stages, the picture thus presented was blurred and could not be recognised as a particular town. Its identity could only be established by its geographical situation and its position in relation to other towns in view at the same time. Its presentation was subsequently improved and towns and distinctive features showed more clearly as a recognisable "shape".

On the 19 May, 1942, ACAS (Ops) held a meeting at which it was decided that the primary function of H2S under the policy agreed for its initial development, was the blind detection of built-up areas. More detailed Air Staff requirements were:

/(a)

AHB/1D3/1791
CAS Folder
1791

AHB/1H/241/10/68
BG/S. 26180
Encl. 64

AHB/1D3/1791
CAS Folder
1791
21.5.42

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- (a) that the system should be sufficiently accurate to guarantee bombs would fall within an industrial or other area selected as a target and
- (b) that the Air Staff would be satisfied, in the first instance, if the range enabled an aircraft to home on a built-up area from 15 miles at 15,000 feet.

At the same time it was agreed that, subject to there being no delay in the development and introduction of the device in a form to enable it to fulfil the primary object, details of design to enable it to be used as a navigational aid and to determine a specific area or target could be incorporated in later stages of development. Meanwhile, every effort was being made to arrive at finality in design of the equipment within the next two months.

AHB/103/1791
CAS Folder
1791

As already stated, the development of centimetre ASV for the detection of shipping at sea was proceeding simultaneously with that of H2S. A primary and highly secret feature of the equipment was the magnetron valve and high hopes were held of its ultimate success in the anti-U boat campaign. For this reason, an embargo had been placed on the use over enemy territory of any equipment incorporating the new valve.

The magnetron valve was also featured in H2S but in view of the security ban on its operational use, attempts were made during the first half of 1942 to develop the Klystron valve as an alternative. There was some evidence that the Klystron was unlikely to produce the required results, partly owing to its limited range (a maximum of 15 miles) and partly due to its inaccuracy when evasive action became necessary.

Ibid
15.7.42.

On 15 July, 1942, the Secretary of State called a meeting to reach a final decision on the matter and after some discussion it was agreed that the Klystron should be abandoned forthwith for the above reasons and development of the magnetron valve proceeded with on high priority. It was pointed out that there would be insufficient of that type to equip more than two squadrons by the end of the year but the C-in-C emphasised the value to the bomber offensive of two Pathfinder squadrons equipped with H2S at an early date for target finding and marking. It had been agreed that, ultimately, Halifax, Stirling, Lancasters and Wellington aircraft should be fitted in that order of priority.

Ibid
6.12.42

In view of the ban on the use of magnetron valves, a decision on the operational use of H2S was deferred until such time as the two squadrons were equipped when the position would be reviewed in the light of the current strategical situation.

The above decisions were subsequently confirmed at a meeting with the Prime Minister who ruled that the planned development and production of H2S should be towards the equipment of two Pathfinder squadrons by the end of the year.

/Meanwhile

AHB/103/932
CAS Folder
932

Meanwhile, a spirited bid for increase allocations of ASV had been made by Coastal Command with the result that the bomber programme suffered a delay. By the beginning of December, the supply position was as follows:-

	Nov.	Dec.	Jan.	Feb.	Mar.	
No. 7 (Stirling) Sqdn.	3	21	-	4	5	aircraft
No. 35 (Halifax) Sqdn.	12	-	-	6	5	"
No. 83 (Lancaster) Sqdn.	-	-	-	-	6	"

A.U. (42) 4th
25.11.42

A suggestion that the development of H2S had retarded that of ASV was overruled by Sir Robert Renwick who stated that far from retarding development of ASV, H2S had actually accelerated it. Apart from the H2S scanner, the two sets could be regarded as identical and were suitable for either purpose.

BC/S.26180
Encl. 47A and
B

In the meantime operational trials were progressing. The first H2S Halifax reached B.D.U. at the end of September, followed shortly afterwards by the first Stirling. By 2 December, Bomber Command were able to report that H2S, when competently operated, would fulfil the original Air Staff requirements for homing onto a built-up area of not less than one mile in diameter at a range of 15 miles at 15000 feet. A fully trained H2S navigator would be able to navigate throughout a flight under 'blind' conditions to any selected area and bomb it. It was estimated that the accuracy of such attacks under blind conditions would be comparable to the best results obtained by crews under conditions of perfect visibility. In other words, on a town the size of Birmingham, practically all bombs would fall on the built-up area, the majority within two miles of the centre despite the congested industrial area in which Birmingham was situated. On a small isolated town such as Peterborough, the majority of bombs might be expected to fall within the built-up area. Finally, it had been found that evasive action produced no appreciable effect on the accuracy of blind bombing with magnetron valve H2S.

Ibid 48B
13.12.42

Bearing in mind the difficulties hitherto experienced in attacking towns in the congested Ruhr area in anything but the best visibility, these results were extremely significant and Bomber Command pressed for permission to operate H2S as soon as Nos. 7 and 35 squadrons were equipped and the crews trained. Moreover, the C-in-C was convinced that the use of H2S, even in small numbers, by Pathfinder squadrons at an early date would immediately increase the ability of the bomber force to attack effectively important long range targets while the night hours were long enough to enable them to reach more distant objectives.

Ibid

In the light of the foregoing factors there were now a number of important decisions pending. The British Joint Communications Board in London had recently recommended to the Combined Chiefs of Staff in Washington that, until 1 March, 1943 or such prior date as unrestricted use was announced by the C.C.O.S., equipment featuring the magnetron valve should not be used over enemy territory or in circumstances involving the risk of enemy capture. If H2S were to be operated at an early date as requested by Bomber Command, permission would now have to be sought from the Combined Chiefs of Staff. It was for decision, therefore, whether the prospects of equipping, maintaining and training Nos. 7 and 35 squadrons were sufficient to warrant such a recommendation.

/On

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Ibid 54A

On 8 December, 1942, the Secretary of State called yet another meeting to discuss these points. A review of the equipment position indicated that while 12 Halifaxes would be fitted with H2S by the end of the year and 21 Stirlings in January, 1943, there would be no backing for the Halifaxes in January. After some discussion on ways and means, it was agreed that six H2S sets should be handed over and arrangements made for the equipping of a further six Halifaxes within the Command. It was also confirmed that a decision regarding the ultimate equipment of the rest of the bomber force should be deferred for re-consideration after one month's operational experience. In the meantime, H2S was to be fitted initially into aircraft of the Pathfinder Force only.

Ibid

In view of the foregoing decisions it was agreed that it would be reasonable to anticipate the operational use of H2S in January, 1943 and that authority should be obtained for a starting date of 1 January, 1943.

AHB/103/932
~~CAS Folder~~
932

COS (42) 204th
Mtg. (0)
22.12.42

The above decision led to considerable controversy during the ensuing weeks when it quickly became obvious that the interests of the Air Ministry and the Admiralty were diametrically opposed. On the one hand, the Air Ministry were convinced that the use of H2S in conjunction with the new marker bombs would have an immediate effect on the success of the bomber offensive and were anxious for its introduction as quickly as possible, particularly while the long winter nights permitted the attack of more distant targets. Moreover, a decision to postpone the use of H2S until 1 March would mean either that, for security reasons, a number of urgently needed bombers would be immobilised for many weeks or that they must be stripped of the equipment which could not then be refitted before April, 1943.

Ibid

The Admiralty, on the other hand, had put great faith in the new centimetre ASV for use in the anti-U boat campaign. It was pointed out that practically no contacts were being obtained with the old 1½ metre ASV as the enemy appeared to have adopted a listening device with which he could detect the approach of ASV aircraft. Centimetre ASV, on the other hand, was unknown to the enemy and the Admiralty viewed with alarm the prospect of the compromise of the equipment with which they hoped to achieve a greatly increased number of "kills", and were strongly opposed to the use of H2S at such an early date.

AHB/103/932
~~CAS Folder~~
932

17.12.42
COS (42)
204th Mtg. (0)
22.12.42

After a series of discussions it became evident that a deadlock had been reached and on 17 December, 1942, the Chiefs of Staff decided to lay the facts of the case before the Prime Minister for a final decision. A meeting was called on 22 December at which the Prime Minister, after hearing a full exposition of both sides of the case expressed the opinion that the early release of H2S to Bomber Command was likely to be of greater benefit to the war effort than the problematical advantages of 10 centimetre ASV to the anti-U boat campaign. It was finally agreed on a majority vote that H2S should be released for use by the Pathfinder Force in January, 1943. Authority was accordingly sought and received from the Combined Chiefs of Staff on 8 January, 1943.

AHB/103/932
~~CAS Folder~~

Cypher Signal
JSM. 675

SECRET

/Unfortunately,

Unfortunately, as a result of serious delays in the production of equipments, considerable revision of the aircraft fitting programme became necessary and the figures quoted at the S. of S. meeting on 8 December, 1942, were retarded. By 23 January, 1943, Bomber Command had only eleven H2S fitted Halifaxes and fifteen Stirlings. The revised programme provided for the reinforcement of the Halifaxes by only four more in the week ending 23 February, two more in the following week and three in each of the three succeeding weeks. No more Stirlings would be available until March, 1943. Meanwhile, the Air Ministry agreed in principle to the re-equipping of No. 156 (PFF) squadron with H2S Lancasters as soon as possible and the fitting of H2S into the two new P.F.F. squadrons due to form in March, 1943, as soon as equipping of the original four squadrons was completed.

046/TM/24/10/68
 BC/S.
 26480-
 Enc.
 84/85

Encl.
 74/86

A.T.H. (iv) Target Marking with H2S.

Despatch
 Appendix
 A.

H2S was used operationally for the first time on 30/31 January, 1943, when 13 equipped aircraft took part in an attack on Hamburg. Owing to conditions of 6-8/10ths cloud, night photographs were not obtained but five aircraft claimed to have identified the target by H2S and all crews reported that landmarks en route were easily recognisable. In particular, Stirlings whose Gee sets had been incorrectly tuned, navigated throughout by H2S.

Ibid
 Appendix
 B
 and
 ORS/BC
 S.99

The decisions to use H2S initially as a target marking device, introduced a new tactical problem. It was found that, while H2S was invaluable a navigational aid under most weather conditions, the 'picture' returned from the ground immediately below the aircraft was normally too confused for it to be used for the final selection of an aiming point. Used as a target marking device, therefore, a certain amount of scatter of markers could be expected. To overcome this difficulty, an entirely new type of marker aircraft was introduced, known as a 'backer up'. The function of the backer up was to estimate the M.P.I. of the primary T.Is dropped by a small number of H2S aircraft and then to mark it with secondary T.Is of a distinctive colour. Main force aircraft were then instructed to bomb on the secondary T.Is.

Ibid

The method adopted on the first few operations was as follows. A small number of H2S aircraft were detailed to drop primary T.Is blindly over the target at Zero hour and the remainder were dispersed at intervals throughout the attack. Backers up then marked the M.P.I. of the primary T.Is with secondary T.Is or, when conditions were good enough for illumination, marked the target visually in the light of flares.

Ibid

For various reasons, this form of attack was not very successful and, by April, 1943, more satisfactory results were being obtained by using all available H2S aircraft to open the attack with flares in addition to primary T.Is. This enabled a small number of selected backers up to identify the target visually in the light of the flares (using primary T.Is as a guide) before marking it accurately with secondary T.Is. The remainder of the backers up were dispersed at intervals throughout the attack by the Main Force to act as 'correctives' and keep the aiming point marked. By this means it was found possible with the small number of H2S aircraft then available to identify and mark the target so that 30-50% of the Main Force were able to bomb it accurately. With various minor modifications, the above method (known as the Newhaven technique) remained the standard H2S marking technique until the end of the war.

/Serviceability

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Serviceability of the equipment was poor during the first few weeks of its operational use but gradually improved. Difficulties also arose from poor definition and other technical defects and improvements to be put in hand. In general it was found that the effectiveness of H2S was considerably reduced by faulty navigation, errors in recording, misidentification and other operational weaknesses mainly resulting from inexperience in its use.

AHB/JH/2A/10/68
BC/S.26180
Encl. 102A

Nevertheless, despite initial teething troubles, by 21 February, 1943, sufficient operational experience had been obtained to establish that:

- (a) the equipment enabled specific towns to be located identified and bombed accurately, irrespective of cloud and visibility conditions in the target area.
- (b) Islands, coast lines, estuaries and built-up areas in particular isolated towns could be readily identified with the aid of H2S both by shape and relative position. Thus the problem of accurate navigation under almost any weather conditions was solved.

The C-in-C accordingly put forward an urgent requirement for the introduction of H2S as a standard item of equipment in all heavy bomber aircraft in the Command, with the exception of Lancasters fitted with 8000 lb bomb doors. He was already convinced that the introduction of the equipment into the Main Force would greatly increase the destructive power of the force as a whole while considerably reducing the restrictions hitherto imposed on operations by adverse weather.

(V) Operational Advantages of H2S

It was now obvious, and future experience was to confirm, that Bomber Command had at last got the aid for which it had been waiting.

Since, unlike Oboe and Gee, H2S was entirely independent of ground control, it could be operated at any range and by any number of aircraft simultaneously. From the navigational viewpoint alone, this was a great asset, providing a means whereby bombers could, for the first time, penetrate deep into enemy territory regardless of weather. Moreover, being an entirely independent unit it provided the maximum amount of tactical freedom under operational conditions.

BC/S.26180/
16/RDF.

An analysis of the first four H2S operations (viz: Hamburg 30/31 January, Cologne 2/3 February: Hamburg 3/4 February: Turin 4/5 February) all but the last of which were undertaken in poor weather conditions, showed that navigators were able to identify a large number of landmarks without difficulty and to obtain ranges and bearings from which to fix their position. While providing tactical freedom, H2S ensured accurate timing and track keeping and navigators reported that the shape of both natural features and built-up areas closely resembled expectations. Targets were easily identified and once seen could be kept in view and attacked from any angle desired. The average maximum range at which towns were identified was of the order of 25 miles. The greatest ranges obtained were: 35 miles (Cologne), 37 miles (Bremen), 46 miles (Paris), and 55 miles (Hamburg).

AH6/IIH/24/10/68

EC/S.26180/Sigs.

Encl. 102A

When combined with the target marking techniques developed by the Pathfinder Force, the prospective advantages to be gained from equipping the Main Force with H2S were innumerable. Not only would it reduce the risk of the Main Force being led astray by pyrotechnics fired by the enemy but it would render decoys and false markers ineffective and inaccuracies caused by the use of visual bomb sighting in the face of intense search-light glare would be eliminated. Used as a navigational aid, heavily defended areas could be avoided and the Main Force would be enabled to reach the target at the correct time so as to benefit fully from P.F.F. markers. At the same time, concentration both en route to and over the target would be improved. Finally, H2S promised a means of blind bombing with considerable accuracy when cloud conditions prohibited the use of sky or ground marking.

Although the advantages to be gained from equipping the Main Force with H2S had still to be proved by experience, there seemed little doubt that the bomber force was at last on the threshold of a new era in which it was to be freed from many of the tactical limitations - not the least of which was weather - with which it had hitherto been faced.

SECRET

CHAPTER 11.

RADIO COUNTERMEASURES IN BOMBER COMMAND.

(i) Significance of the Rising Loss Rate.

Side by side with the development of the radar aids to navigation and target finding already described, considerable effort was being devoted to the production of scientific devices having as their primary aim the reduction of the small but steady rise in the bomber loss rate which was making itself felt from March, 1942 onwards. Before going on to discuss the introduction of the first Radio Countermeasures in December, 1942, it is proposed to examine, in this section, the nature and causes of the increasing losses incurred on night operations against German targets during our period. (1)

ORS/BC
S.66

Scientific analysis of monthly losses sustained on main German, French and Italian targets (2) and minelaying operations showed that the increase in casualties after March 1942, had resulted almost entirely from the improved defences of targets inside Germany. At the same time it was noticeable that, while losses over Germany showed an overall increase, they varied in extent according to the area attacked. Thus losses rose by roughly 1% of sorties against Western Germany, by 2% against Northern Germany, and by about 3% of sorties against Southern Germany. The noticeable increase on Southern German targets, despite the comparatively light flak defences, was attributed to the considerable increase in night fighter activity in that area following the extension, early in 1942, of the controlled night fighter belt through the Charleroi district toward Paris.

ORS/BC
S.91

ORS/BC
S.66

ORS/BC
S.91

Estimates derived from a variety of sources indicated that, while losses on German targets due to flak remained throughout the year at about $1\frac{1}{2}$ - $1\frac{3}{4}$ % of sorties, losses due to enemy fighters increased from roughly 1% at the beginning of 1942, to $3\frac{1}{2}$ % in the summer, declining again to $2\frac{1}{2}$ % at the end of the year. In the Northern and Western areas the majority of casualties due to flak resulted from hits over the target; in the Southern area only about 40% of the flak casualties occurred over the target, 30% falling victim to the coastal defences.

/Early

(1) For details of "F.B." wastage on all operations by day and by night see Appendix 20.

(2) In November, 1942, when the major part of the bombing effort was directed against North Italian targets with their lighter flak defences and comparative absence of controlled night fighters, the overall loss rate fell to only 3.9% (2.6% missing), despite the long and arduous flight over the Alps.

Early in 1942, the main Searchlight Belt and other strong concentrations of searchlights hitherto used mainly to aid fighter interception were dispersed and the lights transferred to the gun defended areas. The extent to which the flak defences benefitted from this move was uncertain but it was strongly suspected that the majority of searchlights were radar controlled and there was also considerable evidence that the enemy was using 53 cm. G.L. to direct unseen A.A. fire. On the whole, visual fire was estimated to be about twice as effective as hidden fire. This dispersal of searchlights appeared to coincide with the extension of the enemy's RDF control of his night fighters, the majority of which now seemed to be operating without visible aids.

ORS/BC
S.66

An analysis of the effect of moonlight on the loss rate during 1942, showed that, in most areas (particularly when considerable cloud was present) casualties were higher in moonlight than on dark nights. A notable exception was provided by the heavily gun-defended areas of the Ruhr and Lower Rhine where bombers suffered higher losses on clear, dark nights. From this it was concluded that searchlights and visual A.A. fire were most effective under those conditions. Nevertheless, the increasing number of interceptions and attacks reported on moonlight nights and the successes achieved by enemy "cats-eye" fighters in the target areas under those conditions, led the Command to abandon the policy in force during the summer months of allowing aircrew leave during dark periods only. This policy had led to considerable administrative difficulties and by September, 1942, it was obvious that, not only was it playing into the hands of the night fighters but, with the formation of the Pathfinder Force, the development of new marking techniques and the decision to release O.T.U.s. from operational bombing, there was less need than hitherto for moonlight to enable all crews to find their targets. Taking everything into account the C-in-C decided that there was little profit and some possible loss to be obtained in putting forward the maximum effort only on bright moonlight nights. On 18 September, 1942, he instructed his Group Commanders that, in future, aircrew leave should be spread evenly throughout the month.

AHS/IN/241/3/562
BC/S-27604
Enc. 28A,
33A, and
34A.

Encl. 34A

ORS/BC
S.66

The commencement of the noticeable increase in enemy night fighter activity corresponded roughly with the replacement of the older bomber types by those in use during this period. Excluding the Manchester, Whitley and Hampden which were virtually obsolete, the invulnerability of current bomber types to attack and destruction may be placed in the following approximate order: Lancaster: Wellington IV: Wellington III: Stirling: Halifax. The comparative immunity enjoyed by the Lancaster was undoubtedly due to its superior performance, greater manoeuvrability and improved armament. At the other end of the scale the Halifax, with its inferior performance and lack of manoeuvrability suffered heavy casualties in attacks on strongly defended areas. On the other hand, in attacks against Italian targets, despite the long and arduous flight over the Alps, its loss rate was comparatively low which argued that the majority of Halifax casualties over Germany were the result of enemy action and not technical failure.

/To

G.169087/RGF/1/50/30

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To sum up, overall bomber losses which had declined during the winter of 1941 - 1942, increased slowly but steadily from March, 1942, onwards reaching a peak with 6.7% (5.8% missing) in August, 1942. Enemy defences throughout the Period consisted mainly of A.A. fire, with and without searchlight co-operation, G.C.I. night fighters and "cats-eye" fighters which took a heavy toll of aircraft over the target areas on moonlight nights. While the proportion of losses due to various causes and the proportion lost en route and over the target areas varied according to the target attacked, weather and tactical features, the rising loss rate was definitely accompanied by a corresponding increase in enemy night fighter activity as reflected in the number of interceptions and attacks reported by returning crews. This was particularly noticeable in the winter months when, from previous experience, a seasonal fall might have been expected. But this was not the case. Although a slight decrease occurred in the overall loss rate, this was mainly the result of a variation in the targets attacked and the higher proportion of the effort devoted to minelaying. As far as German targets were concerned, controlled night fighters appeared to be almost as active in December, 1942, as in the light nights of the summer months.

There was little doubt that the increased efficiency of the enemy's early warning system and RDF control of his night fighters were a primary cause of the higher losses in 1942. It constituted a very serious menace to the night bomber offensive and led directly to the development of the first of the Radio Countermeasures which will be discussed in the next Section.

(ii) Introduction of Radio-Countermeasures. (1)

BC/S. 25782/
C-in-C
22.10.41.

C.S.11472/
D. of S.
Encl. 18A

The possibility of initiating countermeasures to the enemy early warning and RDF control system had been under review since early 1941. In October, 1941, the C-in-C had drawn attention to the small but steady increase in losses sustained on night operations which, he suggested, were due to the increasing efficiency of the enemy's night defence system and particularly his method of RDF control. He urged that all countermeasures which suggested themselves should be tried and developed on the highest priority. After considerable discussion, the Air Ministry decided that jamming experiments should be postponed in favour of further intensified investigations by special observers. D. of S. accordingly advised the C-in-C that countermeasures would be provided at the earliest moment, but that the initiation of jamming experiments at that stage would unnecessarily compromise such countermeasures by premature disclosure.

/At

Note: For monthly detail of losses and interceptions of bomber aircraft on night operations see ORS/BC. Reports "S" Series.

- (1) The full story of Radio-Countermeasures in Bomber Command is given in AHB Signals Monograph "Radio Warfare" from which most of this Section has been prepared.

S.7084
Encl. 52B

Encl. 1A

S.7084 Part
II
Encl. 7A

At that time one very elementary form of countermeasure was already in use by Bomber Command. In October, 1940, a bomber pilot had reported that, when his I.F.F. set was switched on, searchlights which had been playing on him were immediately doused. All Groups were at once ordered to experiment with their I.F.F. sets in this way and at the end of a week analysis disclosed that in the majority of cases enemy searchlights had in fact been doused when I.F.F. was used. It was believed that in cases where this had occurred the searchlights were radar controlled, and that jamming had been caused by the oscillations or "squittering" of the I.F.F. sets when first switched on. In March, 1941, all units were instructed that switching on and off at five minute intervals was more effective than leaving sets on continuously and this was adopted as a regular practice. Finally, in June, 1942, the R.D.F. Board approved a simple modification proposed by Bomber Command known as the "J" switch. When this was closed, the set remained in a continuous state of oscillation but only radiated for about half a second every twelve seconds.

ORS/BC
S.59

The whole question of Radio Countermeasures in Bomber Command was re-opened in August, 1942, when the O.R.S. produced an analysis of bomber losses and the advantages to be obtained by the use of countermeasures against the enemy's radio defences. The conclusion was reached that if complete countermeasures could be introduced the total wastage could be reduced by about 60% or 30% depending on whether or not searchlights were radio controlled; moreover, if the effectiveness of flak over the target could be minimised, a considerable increase in the accuracy of attacks would be obtained. Since the number of sorties that could be flown a month depended on the ratio of production to the loss rate, it followed that if all losses due to enemy action could be eliminated, wastage would be more than halved and the operational effort doubled. While it was realised that complete immunity was unlikely of achievement, it was estimated that even a 50% reduction in losses would increase the offensive effort by more than a third. It was therefore recommended that the highest priority should be given to developing all possible countermeasures against the enemy radar: countermeasures over the target being of first importance and against G.C.I. en route second.

CS.11472
Encl. 24A

The C-in-C agreed that the time had now come when technical as well as tactical countermeasures should be adopted against the enemy defences and on 26 August, 1942, he urged the Air Ministry to provide suitable countermeasures on the first priority.

ATH/Despatch
App. E.

By this time a considerable amount of technical data regarding the enemy's use of radar had been built up and it was found that the organisation of the German night defence system then existing offered four possible targets for attack by radio countermeasures:-

- (a) The early warning system, the radar components of which were mostly Freyas situated along the coastline of Germany and occupied Europe and supplemented by further Freyas inland.
- (b) Wurzburgs operating on the 53 cm. band for G.C.I. close control of the fighters, for gun laying and possibly for searchlight control.

/(c)

SECRET

- (c) The H.F. R/T channel between ground controllers and night fighters.
- (d) Enemy A.I.

Ground and airborne Mandrel had already been developed for jamming and confusing the enemy early warning system, but although research had begun on the possible effectiveness of Window against enemy flak control and G.C.I., for various reasons this countermeasure was not introduced until July, 1943. Meanwhile it was believed that I.F.F. sets, if suitably modified, would cause some useful interference.

CS.11472
Encl. 27A

On 6 October, 1942, a Meeting presided over by S.A.S.O., Bomber Command and attended by Sir Henry Tizard, D.B.Ops., the Director of Signals, and the C.S.O., Bomber Command, was held at Headquarters, Bomber Command and the following recommendations made:-

- (i) that increased advantage should be taken of the interference caused by I.F.F. by the immediate use of sets which had been modified to "squitter" on the inter-mediate frequency of the enemy's 53 cm. radar. (Countermeasure Shiver).
- (ii) That airborne Mandrel should be installed in bomber aircraft for jamming the Freyas believed to be used in the G.C.I. operation for directing narrow beam Wurzburgs on to the aircraft in the early stages of interception.
- (iii) That ground Mandrel stations of 80 Wing and airborne Mandrel of Fighter Command should be used to reduce the range of the enemy's early warning system.

These recommendations were approved by the Air Ministry on 19 October, 1942.

ATH/Despatch
App. E and
EC/S.28388
Encl. 70A.

Countermeasure Shiver was put into operation straight away but, although popular with aircrews, there was little evidence forthcoming that it was having any appreciable effect on enemy G.C.I. As it was causing considerable interference to our own radar stations, it was decided to discontinue its use as from 19 February, 1943.

RCM/Narr.
Part II
Ch.4, para.23/24

Meanwhile fitting of Mandrel had commenced in November, 1942, and by 1st December, four aircraft in each of 36 Bomber squadrons had been equipped.

ATH/Despatch
App. E

Simultaneously, steps had been taken to destroy the vital R/T link between enemy fighters and their ground stations by modulating the T.1154 transmitter (normally carried by our own aircraft for communication purposes) to produce "noise" through a microphone situated in the aircraft. (Countermeasure Tinsel). Wireless operators were instructed to search over an allotted portion of the enemy wave-band and to transmit on the frequency of any German or hostile sounding R/T.

/As

SECRET

ATH/Despatch
App. E and
A.M. File
RCM 112
Encl. 30A.

RCM/Narr.
Part II
Ch.4, para:
27-29.

ATH/Despatch
App. E

As Mandrel and Tinsel were introduced together it was difficult to assess individual results, nor was it possible to determine how far the fall in the loss rate at that time was seasonable or the result of their introduction. There was, however, a mass of evidence that Tinsel was causing enemy fighters some considerable inconvenience. Frequent requests were heard for repetition of orders and complaints that orders were not being received. The effect of Mandrel was more difficult to estimate. On the other hand, delays in first interceptions and attacks on our bombers caused by lack of early warning; attempts by enemy radar stations to avoid jamming by changing frequency; and "Y" service reports of interference from intercepted R/T traffic all confirmed that Mandrel jamming was technically effective at least.

No countermeasure to enemy A.I. had so far been produced but late in 1942, a device known as Boozer was developed and fitted into a few aircraft of No. 7 Squadron. Strictly speaking, Boozer was not a radio countermeasure since it did not attack any of the signals or radio aids to the enemy defences. It was simply a receiver which provided a visual indication that a bomber was being plotted by ground or airborne radar. The action to be taken on receipt of the warning was purely tactical. More extensive fitting took place in 1943, and a triple-channel Boozer was developed which gave different types of warning for G.L., G.C.I. and A.I. beams. Although it was intended to make the device a universal fitting in Bomber aircraft, the practical obstacles proved too great and in September, 1944, it was finally discontinued.

While it was still too early to estimate the real effectiveness of Radio Countermeasures during this Period, there was already some evidence of success. It was never possible to produce a quantitative estimate of the exact effect of countermeasures on Bomber losses but it was significant that, as each one was introduced, it was accompanied by a sharp fall in the loss rate which gradually rose again as the enemy recovered and developed an antidote. The small beginnings in 1942, were, in fact, to develop into a jamming "war" which was to reach considerable proportions before the eventual cessation of hostilities.

SECRET

CHAPTER 12

ATTEMPTS TO INCREASE THE OPERATIONAL EFFORT

(i) Concentration, its Offensive and Defensive Importance

The importance of concentrating the bomber force both en route to and over the target has already been considered in previous Chapters. It has been seen that its tactical value both as a defensive measure against the rapidly improving enemy defence system which found a scattered force a comparatively easy target and as an offensive measure to saturate the A.R.P. organisations and effect the maximum damage was fully appreciated by the Air Ministry by the autumn of 1941. It assumed an added importance in connection with the Incendiary Plan discussed in Chapter 2, of which the salient feature was the maximum concentration of incendiaries on the target in the shortest possible time.

One of the major difficulties facing Bomber Command in 1941, was the lack of a really reliable navigational aid without which it was practically impossible to achieve the accuracy in timing and routeing necessary to the concentration of large numbers of aircraft in time and space. The problem was further complicated by the numbers of inexperienced crews taking part in operations. Under pressure from the Air Ministry, an effort was made in November, 1941, to step up concentration in time over the target from 100 aircraft per hour to 100 per half-hour but, prior to 1942, there seems to have been no serious attempt to establish at Command Headquarters the close co-ordination of timing and routeing essential to the concentration of large numbers of bombers en route. Such tactical planning as was done occurred mainly at Group, Station, and even squadron level and for the most part the force continued to operate as a collection of individual aircraft.

CS. 11484
Encl. 12A

With the introduction of Gee in March, 1942, the position was materially improved. It was now possible to route aircraft with considerable accuracy to arrive over the target area within a minute or two of a pre-arranged timing. On 19 March, 1942, the Air Ministry urged Bomber Command to re-examine the possibility of tactical concentration over defended areas en route in the light of the increased navigational facilities afforded by Gee. The D/C-in-C replied that in recent Gee operations concentrations over the target of the order of 150-200 aircraft per hour had been planned and there was evidence that a much greater degree of concentration had actually been achieved than was the case prior to the introduction of Gee. He added that the O.R.S. at Bomber Command were investigating the effect of concentration en route with a view to assessing the desirability of adopting a system of co-ordinated routeing.

Ibid.
Encl. 18A

CS. 11484
Encl. 19A

It was obvious that, once again, the question had been temporarily shelved but although the Air Ministry remained convinced of the desirability of adopting such a scheme it was decided not to press the matter at that stage. Meanwhile Gee was rapidly establishing itself as a valuable aid to navigation. By the end of May, 1942, so great an increase in navigational accuracy and timing had been obtained from its use that the Command was able to launch the first of the

Ibid.
Encl. 20A

/notable

notable "thousand" raids which will be discussed in the next Section. Operations on such a scale involved the closest tactical co-ordination at a high level and thereafter, joint routing became a normal feature of bomber operations.

(ii) The "Thousand" Plan

AHS/TH/241/3/853
BC/S. 27240 ✓
Encl. 2A

On 18 May, 1942, the C-in-C discussed with the C.A.S. his plan for despatching a force of no less than one thousand bombers against an important industrial target in the Ruhr with the object of wiping it out completely in one or at the most two nights. In considering this proposal it must be remembered that, at that time, Bomber Command had a front line strength of not more than 600 heavy and medium aircraft of which a considerable number were frequently non-operational for technical or re-equipment purposes. During May, 1942, availability of medium and heavy bombers with crews averaged only 346 aircraft. On the face of it, the gap between the 300 odd available front line aircraft and the proposed force of 1,000 bombers seemed quite insurmountable but the C-in-C proposed to close it by mobilising every available and suitable aircraft in the Command including those in O.T.U.s. and Conversion Flights. This in itself was a revolutionary step but he maintained that, apart from the blow to the German industrial economy, an operation on such an unprecedented scale would both hearten our allies the Russians and further depress the morale of the German people. At the same time, it would provide valuable data of the effect of large concentrations of aircraft on the enemy night fighter defences and A.R.P. organisations.

9bid ✓
Encl. 3A

This plan was initiated at a critical period in the night bomber offensive. A good deal of criticism of the bombing effort was being voiced not only in Army and Navy circles but in Parliament, and, more generally, among the public. This criticism was arousing growing concern among the members of the Air Staff who realised that it could not be fully met by promises of what would be achieved in the future, nor yet from evidence of any decisive results achieved in the past. The bomber effort had been curtailed in winter months by the closing in of the weather, the policy of conservation imposed by the Prime Minister and the diversion of roughly 40% of the effort against the German warships at Brest. By February, 1942, the strategic situation was becoming critical and it was felt that unless some really decisive damage could be inflicted on the German war economy in the immediate future, the favourable opportunity for heavy incendiary attacks afforded by the severe weather conditions would have passed without any real hindrance to the enemy's preparations for a spring offensive.

The seriousness of the situation was put to the C-in-C who, in his turn, contended that the bomber force at his disposal was still too small to effect the decisive results called for by the Air Ministry. It seems likely that, in conceiving the "thousand" plan, the C-in-C hoped to provide an answer to the critics and, at the same time, give added weight to his argument for an immediate expansion of the front line strength of Bomber Command to a size more fitted to the tasks required of it.

Despite its revolutionary nature and the fact that it involved the operational use of large numbers of training aircraft, the scheme received the warm approval of the Prime Minister and on 19 May, 1942, the C-in-C was authorised to go ahead with his arrangements.

AHS/TH/241/3/853
BC/S. 27240 ✓
Encl. 2A

SECRET

Ibid.
Encl. 3A ✓

On a preliminary estimate, the C-in-C hoped to raise approximately 700 aircraft from within Bomber Command. The deficit he proposed to make good by "canvassing" suitable aircraft from other Commands. On 20 May, 1942, he wrote to all Bomber Command A.Os.C. and the A.Os.C-in-C, Coastal, Flying Training and Army Co-operation Command outlining the plan and enlisting their support. The response from all quarters was immediate and enthusiastic but, as will be seen, of the 1,046 aircraft ultimately despatched against Cologne on the night of the 30/31 May, 1942, all but four (Flying Training Command) were provided from within Bomber Command's own resources.

946/II/241/3/853
BC/S. 27246
Encl. 33A ✓

In view of the large number of training aircraft taking part, good weather and full moon were essential to the success of the operation which was scheduled for the most suitable night between 27/28 May, and 31 May/1 June, 1942. Alternative plans were laid for the attack of either Hamburg or Cologne in the event of weather proving unfavourable in either the first or second area.

946/II/39/1/3(A)
ORS/BC
Final Night
Raid Reports.
No. 7A ✓

The entire force was prepared and standing by from 26 May and on the night of 30/31 May, 1942, 1,046⁽¹⁾ aircraft took off for Cologne. Thirty-four aircraft of No. 2 Group assisted by 16 aircraft of Army Co-operation Command also set out to bomb enemy aerodromes in the target area and Fighter Command co-operated with intruder operations over the route. Altogether, Bomber Command operated no fewer than 1,076⁽¹⁾ sorties on that night for a total loss of 40 (3.8%) aircraft. Full details of the attack will be found in their appropriate place in Part III of this Narrative. Statistics of the effort and wastage involved are at Appendix 8. From the latter it will be noted that Bomber O.T.Us. operated a total of 367 aircraft. (35.2% of the total Command sorties.) This fact is significant and will be discussed later.

Ibid.

Subsequent analysis showed that the attack was extremely successful, the amount of useful damage done far exceeding that achieved on any previous raid by Bomber Command. Secret reports stated that the local authorities were quite unable to cope with the situation and emergency measures broke down completely.

Ibid.

The effect of the large concentration of aircraft on the enemy defences was rather less marked than had been expected. Statistics showed that the percentage missing rate was slightly higher than the average on that target⁽²⁾. On the other hand the average missing rate for attacks on Western Germany (under similar conditions of moon and no cloud) for the period June, 1941 - March, 1942, was 4.8% so that the current losses were below normal for that area.

/While

- (1) The following comparison is of interest:-
- | | |
|---|--------------------------------------|
| Heaviest attack on Cologne to date | 1st March, 1941
(131 a/c) |
| Heaviest attack on any single target | 7th April, 1941
(228 a/c on Kiel) |
| Largest force despatched in any one night | 8th May, 1941
(340 a/c) |

- (2)
- | | |
|-----------------------------|-----------------------------|
| 30/31st May, 1942 | 3.8% (total sorties, 1,046) |
| August, 1941 to April, 1942 | 3.5% (total sorties, 1,364) |

SECRET

Ibid.

While there was no indication that flak defences outside the target area were below normal at any time, returning aircraft reported that over the target the A.A. guns, working in close conjunction with cones of searchlights and night fighters, seemed to become extremely weak and confused after the first three quarters of an hour. There was no evidence that the large numbers of aircraft involved prevented the enemy's location devices from selecting and following single targets throughout the attack. On the other hand, the majority of aircraft seen shot down or heavily engaged by flak were held in searchlight cones and it was thought possible that some of them had been picked out quite fortuitously and followed visually. Losses sustained by the first two waves of attacking aircraft averaged 4.5% but on the third wave which consisted entirely of heavy bombers and in which the concentration was highest, they dropped to 1.9%. This suggested (a) that the defences were becoming saturated and (b) that four-engine bombers were less vulnerable to attacks by enemy fighters. Taking into account the fact that, despite our Intruder operations, enemy night fighter activity was considerably above normal and that conditions favoured attack by "cats-eye" fighters, a very much higher loss rate than was actually experienced might have been expected.

There was no doubt that the operation was extremely successful and the following conclusions may be drawn from the results:-

- (i) Provided sufficient resources were available, the widespread destruction of German industrial cities was a realisable aim.
- (ii) Heavy concentration of aircraft tended to minimise losses since the enemy location devices tracking single targets could only account for a small proportion of the force involved. As against this, the operation of heavy concentrations of aircraft in conditions of bright moonlight was known to be particularly favourable to interception by enemy cats-eye fighters.
- (iii) Four-engine bombers (to which the Command was then re-equipping) were less vulnerable to attack by night fighters than their predecessors the old medium bombers.
- (iv) A heavy weight of attack could and did completely disrupt local administrative organisations as they then existed.

While the success of the raid on Cologne had proved the C-in-C's point that, given the aircraft, Bomber Command could do the job, attacks on the "thousand" scale although twice repeated - Essen on 1/2, and Bremen on 25/26 June - clearly could not be maintained or even approached with the existing front line strength of the Command. The additional effort could only be found from within the training organization and the O.T.Us. continued from time to time to augment the Main Force attacks on German industrial targets until the end of September, 1942. The extremely controversial nature of this procedure will be discussed in the next Section⁽¹⁾.

/(iii)

(1) For full details of its effect on the training organisation reference should be made to the Air Historical Branch Narrative on "Training".

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(iii) Use of O.T.U.s. on Bombing Operations

AHB/103/890

GAS Folder

890

29.7.42

The unprecedented use of O.T.U.s. on bombing operations between May and September, 1942, was regarded by the Air Staff not as an isolated question but as part of a comprehensive plan for the conduct of the bomber offensive: the aim being to achieve the maximum concentration against major German industrial targets whenever weather conditions permitted. The success of the Cologne raid had finally confirmed the Air Ministry's suspicions that the greatest effort hitherto achieved by Bomber Command against any single important industrial target (i.e. 200-odd aircraft) had been too small either to saturate the enemy defences or to inflict any appreciable damage. On the other hand, the 600 aircraft now estimated as the minimum required for saturation purposes could not be found from the existing front line strength of the Command. "Maximum concentration" on the scale envisaged (600-1,000 aircraft) could only be achieved by the use of large numbers of O.T.U. aircraft and the acceptance of a possible dislocation of the training organisation.

D.G.O. Folder

1E

27.6.42

It was strongly felt in some quarters that while the participation of O.T.U.s. in the Cologne raid had been justified on the grounds that it showed what could be done with adequate means, their continued use must inevitably affect the training output at the same time retarding the expansion of operational squadrons. In a Minute to the A.M.S.O. on 27 June, 1942, the Director General of Organisation argued that O.T.U. capacity was designed to make good wastage in operational squadrons and to build up new squadrons. It was not designed to replace operational wastage in the O.T.U.s. themselves, nor did the approved expansion programme take into account the replacement of operational casualties in crews and aircraft at O.T.U.s. He claimed that the output of trained aircrews would be seriously affected by O.T.U.s. becoming largely non-productive during the period of preparation for and recovery from an operation and by the sudden decrease in Instructors arising from operational losses. All this, he argued, would inevitably retard the expansion of the operational squadrons.

Ibid

20.6.42

and

30.6.42

The C-in-C, on the other hand, supported by his Training Commanders, was convinced that any possible disadvantages resulting from the use of O.T.U.s. on operations would be more than outweighed by the increased destructive power of the force as a whole and the added stimulus given to pupils by their participation in major attacks of that nature. In a letter to C.A.S. on 20th June, he had pointed out that, no doubt as a result of their increased enthusiasm, No. 91 (O.T.U.) Group had already made up the ground lost by participation in the "thousand" plan. No. 92 Group, also, although in a more difficult position owing to their O.T.U.s. being younger, had in fact made up all the training lost except night flying in which they had been handicapped by the short nights and bad weather prevailing since the thousand plan. Although the C-in-C agreed that the main disadvantage lay in the increased wastage in O.T.U. aircraft, he argued that even this was compensated for by the added keeness and efficiency of the maintenance personnel which resulted in a higher serviceability rate. All things considered, he was convinced that:-

"The intangible advantages of using O.T.U.s. in operations far outweighed the tangible losses."

/With

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Ibid.
30.6.42

With this view the C.A.S. and the majority of the Air Staff concurred and, at a meeting held to discuss the matter on 30 June, 1942, it was generally agreed that the policy of making limited use of O.T.U.s. to augment the main bombing effort should continue for a time until its effects on expansion could be assessed. During the discussion, the C-in-C stated that while he agreed that too many Instructors had been list in the first "thousand" raid, he hoped, in future, to use very few, drawing mainly on pupils nearing the end of their training. He also hoped to reduce the time lost in preparing for an operation by a new arrangement whereby a force of 700-800 aircraft could be assembled at 12 hours notice⁽¹⁾. Finally, the C-in-C agreed to consider a suggestion by C.A.S. that he should allot himself a definite monthly ration of O.T.U. crews and wastage. Thus if the wastage all occurred on the first raid in a month no more O.T.U. crews would be used on operations in that month and the O.T.U. losses would thus be strictly limited.

AHB/II/39/1/3(A)
ORS/BC
Final Night
Raid Reports
Vol. I
AHB/II/H/84
A.M.W.B.
Manual of B.C.
Operations
1942.

Altogether, between May and September, 1942, the O.T.U.s. participated in seven major operations against German targets, involving a total of 1,668 sorties for a loss (missing only) of 107 (6.4%) aircraft⁽²⁾. A further 390 sorties were flown by Conversion Flights and Units for the loss of 26 aircraft and, in all, 1,777.5 tons of bombs were dropped by training aircraft during that period for a total of 2,058 sorties.

ORS/BC
S. 70

An analysis of the operations⁽²⁾ showed that the O.T.U.s. had added materially to the success of the attacks carried out in good weather but in cases where the target had not been well marked by the operational Groups, they had made no substantial contribution. A particular example of this was the raid on Essen on 3-8/10ths cloud on 16/17 September, 1942. Very few operational aircraft reached the target area and probably none of the O.T.U. aircraft. Similarly in the attacks on Bremen (25/26 June) and Dusseldorf (10/11 September) there was little evidence that the O.T.U.s. had added materially to the success of the operations. In the latter, night photographs showed that O.T.U.s. had contributed largely to the considerable scatter found to the west of the target. Apart from being uneconomical, such failures were extremely bad for the morale of the O.T.U. crews and it was concluded that they should only be employed when there was a firm forecast of good weather. It was found, also, that the additional effectiveness of an attack due to the inclusion of O.T.U.s. tended to increase considerably as the total number of aircraft taking part increased and at the same time there was an appreciable diminution in losses. From these two facts it was considered advisable that the O.T.U.s. should only operate when a large force (approximately 500 aircraft) could be found from the operational squadrons.

ATH/Despatch
Part V

CS.10488
Encl. 29A

The heavy and medium aircraft available with crews daily averaged only 326 in August and in September fell to 287. To raise a force of 600 aircraft necessary for saturation involved the use of between 200/300 O.T.U. aircraft and even this did not permit the launching of attacks on the thousand scale or confer the ability to make the maximum use of the few fine

/nights

(1) See Section (iv) of this Chapter.

(2) See Appendix 8

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nights available in a month. In August, the C-in-C had warned the Air Ministry that a force of 800/900 aircraft necessary to inflict serious damage on the major German industrial towns could not be raised without interfering seriously with the training organisation. Such interference, if persisted in, would postpone indefinitely all prospects of expansion.

AHB/TIH/241/3/562
BC/S. 27604
Vol. I
Encl. 36A

Ibid.
Encl. 38A

Encl. 38A

After discussing the position verbally with the C.A.S. at the end of September, the C-in-C decided against any further use of the O.T.U.s. on operations until he could dispose sufficient strength to ensure the saturation of the enemy's defences and enable them proportionately to increase the effectiveness of the attacks to an extent sufficient to balance the wastage and loss in training output incurred. He estimated that an effort of the order of 600 sorties was the minimum total justifying the employment of O.T.U.s. He was confirmed in this decision by the inauguration of the "50-squadron" plan in September, which materially altered the situation. The plan to augment the operational effort of the Command by the inclusion of O.T.U. crews had been based on the assumption that no new squadrons would be formed until existing squadrons, O.T.U.s. and Conversion Units had been brought up to full strength. The added burden thrown on the training organisation by the new expansion scheme left little or no margin for operational effort and on 27 November, 1942, the C-in-C advised Air Ministry that apart from sudden emergencies or exceptional opportunities he did not intend to make any operational use of O.T.U.s. and Conversion Units until squadrons in the accelerated expansion scheme as well as O.T.U.s. and Conversion Units as then authorised had been brought up to full strength. Once that had been accomplished it might be advantageous to re-employ training aircraft to augment the hitting power of the Command against Germany. In point of fact, training aircraft were not again employed on operations during this Period after the attack on Essen on 16/17 September, 1942.

(iv) The Increased Scale of Effort

It has been seen that the "thousand" plan had proved to the satisfaction of both the Air Staff and the C-in-C, Bomber Command that attacks on a very heavy scale could and did achieve the main aim of inflicting widespread destruction on major industrial targets while keeping losses down in proportion to the increased number of sorties operated. It was equally clear that the scale of effort previously achieved by Bomber Command against single targets (200/300 aircraft) had been insufficient to achieve either of those objectives.

AHB/TIH/241/3/562
BC/S. 27604
Encl. 12A

On 12 July, 1942, the C-in-C advised Air Ministry that he proposed to standardise a system of using the largest possible force against suitable targets in Germany on fine nights. Based on the existing resources of the Command the number of sorties for those operations would vary between 700 and 1,000 and would entail employment of aircraft and crews from Conversion Units and Flights and from O.T.U.s. On the other hand, the scale of bombing effort that could be maintained was necessarily dependant on the number of crew and aircraft replacements available each month. Allowing for

/the

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the operational use of training aircraft, the maximum number of crews available was estimated at approximately 200 per month. The average number of crews missing on operations during the previous four months (March-June, 1942) had been 4% and allowing a further 1% for sickness, postings etc., the C-in-C estimated that a monthly crew replacement of 200 would enable 4,000 bombing sorties to be undertaken per month. Assuming that an average of 800 aircraft could be found for every fine night, he estimated that the monthly limit of 4,000 sorties would enable five such operations to be undertaken. The remaining nights would be devoted to small scale diversionary attacks and routine mining. He also proposed to lay approximately 1,000 mines per month, which would require a further 350 sorties from the operational Groups. On this basis, the new operational effort would be distributed as follows:-

Ibid.

32 Operational Squadrons, total I.E. 512 a/c

100% of I.E. by 5 ops: = 2560 sorties per month.

Conversion Units and Flights, current I.E. 142 a/c

50% of I.E. by 5 ops. = 355 sorties per month.

O.T.Us., current I.E. (less Whitleys) 573 a/c

50% of I.E. by 4 ops. = 1,144 sorties per month.

Ibid.
Encl. 16B

Allowing for a further 350 sorties per month from operational squadrons for minelaying, the distribution of effort between operational and training aircraft per month worked out at approximately:-

5.7 sorties per I.E. aircraft in operational squadrons.

2.0 sorties per I.E. aircraft in O.T.Us.

2.5 sorties per I.E. aircraft in Conversion Units, and
Flights.

Ibid,
Encl. 16B

Planning for the new scale of effort had been based on the conclusions drawn from the "thousand" raids that operations on such a scale in any but good weather were uneconomical and that attacks in moonlight were more successful than those undertaken in the dark. Since the number of fine nights in a month varied between three and seven, it was obvious that only occasionally would those occur during the moon period. They would be scattered throughout the month and the main problem, therefore, was to evolve a scheme whereby the maximum advantage could be taken of those occasions without involving a long "standby". On the previous raids, orders for the assembly and preparation of the force had been issued some days in advance with the result that the entire force had been kept standing by for several nights in succession waiting for suitable weather. This was clearly uneconomical, particularly from the O.T.U. standpoint, and the C-in-C now proposed a new system whereby at any given time, one of three "states of readiness" would be in existence, as follows:-

BLACK. In force when good weather was not expected within the next 24 hours. Operations would be limited to mine-laying, and small diversionary raids.

WHITE

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WHITE. Coming into force at 1800/1900 hours on a forecast of fine weather the following night. All Groups would stand by for a major operation (approximately 775 aircraft in a non-moon period, 875 in a moon period.) This would normally be confirmed at 0900 hours the following morning but if weather deteriorated the contingent of training aircraft would be cancelled.

EMERGENCY. This would only come into force when some sudden emergency (probably Naval) required the whole or a substantial part of the whole force to take part at short notice in special operations.

Ibid.
Encl. 16B

Wastage (missing, Cat. B and Cat. E) rates for the new scale of effort were calculated on the basis of average wastage incurred over the first three "thousand" raids i.e.:-

Heavies: 4.1 per hundred sorties
Mediums: 2.9 per hundred sorties
O.T.Us.: 6.3 per hundred sorties.

On that basis, monthly wastage for the new scale of effort could be estimated as follows:-

Operational Squadrons.

2,560 sorties at 4.1 per 100 105 aircraft

Conversion Flights.

355 sorties at 4.1 per 100 15 aircraft

O.T.Us.

1,144 sorties at 6.3 per 100 72 aircraft

TOTAL F.B. WASTAGE 192 aircraft

Compared with the old wastage rates this was a definite saving of aircraft. Wastage per 100 sorties over the past twelve months had averaged 6.75 heavies and 5.0 mediums. It was calculated that the number of sorties now envisaged if spread over a whole month at the rate of effort and wastage of the past year instead of compressed into four or five heavy attacks would result in a monthly wastage of 189 heavy and 60 medium aircraft; i.e. a total F.B. wastage of 249 aircraft. The new plan would therefore drop the same load of bombs for a loss of 192 aircraft as opposed to 249.

Ibid.
Encl. 12A

From the above figures it will have been noted that wastage rates were calculated on the assumption that 50% of the operational training and conversion aircraft and 100% of the operational squadrons would be employed on big raids five times in a month. In forwarding his proposals to the Air Ministry on 12 July, 1942, the C-in-C requested that the establishment of squadrons and O.T.Us. and Conversion Units and Flights be amended to meet the new requirements so that all units would be in a position to put forward the maximum

/effort

effort at short notice without undue interference with training. Finally he strongly recommended that no new squadrons be formed until existing squadrons and the O.T.U.s and Conversion Flights as then authorised had been brought up to full strength - a state which, he claimed, had never been achieved since the outbreak of war.

(v) Criticism of the Bomber Offensive

In spite of specific warnings by the Prime Minister to Parliament and the public that "thousand" raids could not be regarded as the normal effort until our forces had become much larger, by July, 1942, there was already a growing tendency both in official circles and outside to regard anything smaller as mere chicken feed. Bomber Command's inability to maintain attacks on that scale with existing resources was once again leading to criticism that the bombing offensive was "tailing off."

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On 18 July, 1942, the C-in-C wrote to the Prime Minister protesting against this tendency to regard "thousand" raids alone as worthy of attention and to disregard the "hard and dangerous bread and butter work" carried out by the Command in the bad weather periods. Outlining the new scheme for an intensified effort which he had already submitted to the Air Ministry, the C-in-C pointed out that the allotted sortie ration of 4,000 - 5,000 per month (depending on casualties) would enable Bomber Command to "keep the pot boiling" with such attacks as those on Danzig, Wilhelmshaven and the Lubeck submarine yards; mine at approximately 1,000 mines per month: meet ad hoc calls and, in the best weather each month, to put in three to five major attacks consisting of from 600 - 1,000 sorties depending on moon and crew leave factors. On this basis he estimated that the monthly lay-out of sorties would be approximately as follows:-

Mining	350 sorties.
Day and small night raids	1,750 sorties.
Ad hoc calls	250 sorties.
	2,350

This would leave between 1,650 and 2,680 sorties per month (depending on casualties) to exploit on "thousand plan" attacks. In addition, a system had been instituted of using passing out O.T.U. crews on their final tests on anti-submarine sweeps in the Bay of Biscay.

The C-in-C pointed out that already (i.e. by 18 July), despite the poor weather encountered, the Command had achieved nearly 2,000 sorties that month and broken the back of the mining target with 800 mines. It was now necessary to await the fine weather patch to put on the big attacks. During the existing short night period, the Command was limited to the Ruhr, Bremen and Hamburg for the thousand raids and further limitations as between those targets was enforced by weather which was seldom fine in more than one area. He anticipated that, by the end of August, the longer nights would widen the selection. Meanwhile constant effort was required to build up the bomber force against the continuous depredations in crews and aircraft to other Commands at home and overseas.

Ibid.

Appealing for the Prime Minister's support against the frequent criticism levelled at Bomber Command the C-in-C pointed out that:

"The Army fights half a dozen battles a year. The Navy half a dozen a war. But poor Bomber Command. Every night that the weather gives us a breather, even though

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our monthly sortie ration is always attained, every night that for such reasons we fail to stage and win a major battle, the critics rise in their wrath and accuse us of doing nothing yet again."

(vi) Relation between Planned and Actual Effort and Wastage, July - September, 1942.

AWB/TH/241/3/562
BC/S. 27604
Encls. 27A
and 38A

In considering these plans for an intensified effort, it must be remembered that they were only intended to cover operations during the summer and early autumn of 1942; the primary aim being to overcome, to some extent, the deficiency in front line aircraft and enable attacks of "saturation" weight to be made on major German industrial centres. The relation between the planned and actual effort and wastage during the three months July - September when the plan was in existence is clearly shown in the Table at Appendix 9. From this it will be seen that the actual effort was spread out over a larger number of attacks than the planned figure of 5 per month and averaged some 12 major bombing operations per month. Sorties by operational squadrons averaged 2426 per month as against the planned figure of 2915 but O.T.U.s. averaged only 247 sorties as against the planned 1,144 per month. In fact O.T.U.s. only operated on four more occasions and the heaviest attack against any single target between July and September was on the night of 31 July/1 August when 630 aircraft attacked Dusseldorf.

ORS/BC
S. 70

Wastage during this period, too, was much higher than estimated, operational squadrons and Conversion Units and Flights averaging 6.7 and O.T.U.s. 10.2 per 100 sorties per month. Altogether, between July and September, losses averaged 185 aircraft per month for 2,672 sorties flown as opposed to the planned figure of 192 for 4,059 sorties flown.

ORS/BC
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This failure to maintain the intensified effort planned was largely accounted for by the poor weather conditions prevailing which remained consistently bad throughout the three months under review. More than half the nights on which the Command operated in each month were only fit for minor attacks of less than 100 aircraft, minelaying and leaflet dropping. Although every effort was made to put the "good" nights to the best use, conditions in the main continued unsuitable for attacks on the thousand scale. Moreover, the number of heavy and medium aircraft available with crews during this period averaged only 323 per month and in September actually dropped to 287. Thus attacks with even the 600 aircraft required for saturation could not be mounted without heavy inroads on the O.T.U.s. and Conversion Flights, which were themselves suffering from a high casualty rate. The combination of these and other factors made an intensified effort on the scale originally planned quite impracticable. Although the monthly ration was expended in July with 4,265 sorties, only one heavy attack was made (Dusseldorf 31 July/1 August) and in August the number of sorties flown dropped to 2,820 (2,455 by night), the lowest figure since March.

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ANG/WH/24/3/662.

EC/S-27604

Encls. 28A, 30A. discount owing to the difficulties it was experiencing in maintaining a sufficient number of crews trained to a satisfactory level. This was the result of a number of factors including the following:-

- (a) High casualty rate of Whitleys earlier in the year.
- (b) The withdrawal of squadrons to Army Co-operation Command at full strength (a requirement involving three squadrons to make two).
- (c) Withdrawal of two squadrons to the Middle East at full strength in experienced crews (virtually draining four squadrons).
- (d) An unusually high casualty rate.

Ibid.

For some time No. 4 Group had been operating at a restricted rate and between 25 June and 31 July, had taken no part in "thousand plan" raids. Notwithstanding this respite, on 12 August, operational crews in the Group were down to less than 50% of establishment and with only 31 experienced operational crews it was becoming consequently difficult to bring on the new crews while the source of Conversion Flight Instructors had almost dried up. On 16 August, 1942, the C-in-C advised Air Ministry that No. 4 Group squadrons could be brought up to strength by the end of October only if the Group were withdrawn from operations until the end of the month, the whole of the output from the Conversion Units and Flights reserved for its own squadrons and wastage kept down to 30 crews in each of the next two months. After the attack on Mainz on 11/12 August, the Group enjoyed a long period of operational inactivity until 28/29th when it took part in the attack on Saarbrücken. In all it completed only 156 sorties during August.

With the inauguration of the 50-squadron expansion scheme in September, 1942, all attempts to operate the force on a "Grand National" scale (i.e. a maximum effort including training aircraft) were discontinued for the time being.

(vii) Weather and the Operational Effort

As has been seen, weather was largely responsible for the failure to achieve the intensified effort planned for July, August and September. In fact, with the exception of April, when excellent conditions enabled the Command to reach a new record with 3,752 sorties by night, weather throughout the whole of the year was almost consistently poor particularly at home bases and no relief was afforded by the summer months.

Nevertheless, the frequent criticism of the bombing offensive and the urgent need to intensify the operational effort led the C-in-C to press attacks whenever conditions showed signs of lifting. Thus, in June, conditions at home bases improved and, despite indifferent weather over Germany, the Command achieved a peak effort for this period with 4,997 sorties (4,788 by night), 6,474 tons of bombs (9.6% of total tonnage) being dropped on Germany alone. From July onwards, conditions progressively deteriorated and it was evident from recent experience that since weather had such a profound effect on the success of operations it was uneconomical and largely ineffective to undertake bombing operations in poor or doubtful conditions - the more so since Gee was soon to be rendered ineffective over most of Germany. Moreover, in the absence

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of a reliable blind-bombing device, clear weather over the target area was particularly essential to the success of large scale attacks. From July onwards operations were planned in accordance with these principles and by September, the inauguration of the 50-squadron expansion plan and the setting in of winter weather led to the abandoning of all attempts to operate on the intensified scale. The only alleviation to the generally poor conditions now experienced occurred in November when, despite typical fog, rain and drizzle at home bases, crews found clear weather and good visibility over all their Italian targets.

The following Table will provide an indication of the extent of the operational effort during the 337 nights in this Period⁽¹⁾:-

AHB/IIH/84
AMWR.

~~Manual of
Bombing
operations~~

	<u>No. of Nights</u>
Operations entirely prevented.	100
Mining and/or leaflets only.	81
Bombing Operations.	156
Total No. of nights operated.	237
No. of nights involving:-	
0 - 49 sorties	78
50 - 149 "	69
150 - 299 "	73
300 - 499 "	13
500 and over	4

AHB/IIH/241/3 /670 ✓
BC/S. 23742/1

Although weather was to remain the greatest single factor limiting the operational effort of Bomber Command throughout the war, the introduction of Gee, the formation of the Pathfinder Force, improved Flying Control and landing facilities and, last but not least, the introduction of Oboe and H2S represented great strides made during this Period towards limiting its effect. This will be more readily appreciated when it is realised that in February, 1943, despite usual winter conditions, the Command operated a total of 5,150 sorties; an achievement which the C-in-C attributed directly to the new navigational aids which had made operations possible over a wide range of weather conditions in the target area.

(viii) Problems of Flying Control (2)

The increased effort and greater concentrations planned during 1942 brought in their train the problem of control and safe landing of the growing numbers of bomber aircraft thronging the night sky over home bases after an operation. Reference has already been made to the rising loss rate in 1942 and the introduction of Radio Countermeasures to minimise the lethal effect of the enemy defences. But there was another aspect of the problem. From the Tables at Appendix 20 it will be seen that roughly 13% of the operational losses and 22% of the total operational wastage resulted from causes

/other

(1) For monthly details see Appendix 18.

(2) For full details see the "History of Flying Control in Bomber Command."

other than enemy action. It was early realised that much of this high casualty rate could be reduced by the proper organisation of Flying Control and landing facilities at home bases and in March, 1942, two important decisions were taken which were to have a far reaching effect on the skill, efficiency and safety with which the ever increasing volume of night traffic in Bomber Command could be handled.

Immediately prior to 1942, Flying Control Officers, although established at the majority of R.A.F. stations, were still officially only "distress" specialists, responsible for the safety of aircraft in difficulties but having nothing to do with the routine control of normal air traffic. This was the responsibility of various officers selected by Station Commanders but untrained in the task assigned to them. Following the switch-over from day to night bombing, many Commanding Officers, faced with the problem of landing an increasing number of night bombers in semi-dark conditions and with no proper organisation to cope with the situation, adopted the irregular procedure of handing over the local control of air traffic to the Flying Control Officers at their Stations. By the end of 1941 this "misemployment" was almost universal, but had not yet received official recognition.

The situation was now really serious. The growing number of bombers being operated, the switch-over to heavy bomber types and the tactical requirement for heavy concentrations of aircraft over the target brought in their train a two-fold problem. Not only was the density of traffic in the night sky around the bases far in excess of anything previously experienced, but the need to divert large numbers of those aircraft to other airfields where weather conditions were more propitious and land them safely was in itself a problem of the first magnitude.

In the early years of the war it had been the practice not to despatch aircraft on operations unless there was a reasonable certainty of their being able to land at their own bases on return. Such diversions as occurred were last-minute arrangements made locally by each airfield for such of its own aircraft as could not possibly be landed there. By 1941, however, it was beginning to be realised that diversions, from being a state of "distress" only, must be considered as an essential part of operational procedure if weather was not to prove an entirely prohibitive factor in the full use of the bomber force. In the absence of any co-ordinated control of air traffic or effective organisation, this resulted in aircraft manned by weary crews being kept hanging about in the vicinity of aerodromes waiting permission to land or being passed from one airfield to another in search of safe weather conditions with increasing danger to aircraft and crews.

By the autumn of 1941, the Air Ministry had awakened to the danger of the situation and in November of that year a Central Flying Control Organisation was set up at Headquarters Bomber Command to form an inter-Command nerve centre exercising a co-ordinating control over all diversions; to assist Groups in arranging internal diversions; and to arrange for the use of alternative aerodromes in an emergency or at short notice. While individual Groups remained responsible for the diversion of aircraft between their own Stations, from that time onwards, the diversions of aircraft between one Group and another or to aerodromes outside the Command became the responsibility of Central Flying Control acting in consultation with the Meteorological Service⁽¹⁾.

/Co-ordination

(1) See Section (ix) of this Chapter.

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Co-ordination had at last been achieved but the problem was only half solved. Left to themselves, individual stations had evolved their own local control systems and although many Groups, realising the danger, had produced a standard procedure for use by their own airfields, these varied widely. The problem of handling large numbers of strange aircraft diverted from one Group to another and manned by crews unfamiliar with local landing procedure remained.

In March, 1942, the Air Ministry, again roused to action by the increasing number of flying accidents not the result of enemy action, called a Conference to investigate the situation. Two very important recommendations resulted which were subsequently approved at a Conference of all Commands with the Director-General of Aircraft Safety on 17 April, 1942, viz:

(a) That a staff of trained Flying Control Officers should be established at every airfield in the country who would be entirely responsible to the Station Commander for the local control and safety of aircraft using the airfield.

(b) that a standard form of local control should be instituted at all airfields in the country in order to eliminate the large number of crashes occurring daily under the heading "aerodrome accidents".

Based on the common denominator of the best points already in use by individual Groups, the new Standard Procedure was evolved and issued on 24 June, 1942, for trial. By February, 1943, the various kinks had been ironed out and comments and suggestions reviewed. The final "Regulations for the local control of Aircraft" were issued by Air Ministry on 9 April, 1943, and, although subsequently subjected to frequent deviations to meet local requirements, these provided a broad working basis for handling the steadily increasing volume of air traffic with a degree of safety and efficiency which would otherwise not have been possible.

Two other important developments also occurred in this period. With the introduction of concrete runways, it had become possible to replace the old paraffin flares and portable lamps with permanent lighting fixtures operated by a Master Switch from the Control Tower. In 1941, these installations had followed the Drem system originated by Fighter Command but experience had shown that while this was a great improvement, it was not entirely suitable to the technique of landing bomber aircraft, in particular heavy types. Work was begun on a Mark II Airfield Lighting system more in line with Bomber Command's requirements, and by July, 1942, the first installations were being fitted at Oakington. The system was subsequently installed at each newly constructed bomber aerodrome while, very slowly, those with the old Mark IA system were converted to the new type.

A further innovation was the use of searchlights to assist returning aircraft in locating their airfields. Two or three searchlights were used to form a cone over the centre of the aerodrome illuminating the cloud base. This

not only shed a glow of light through the cloud but also over the airfield and the cone itself could be seen from many miles away. Operated by R.A.F. personnel under the code-name Sandra this remained a most valuable part of the Flying Control technique until the end of the war.

Despite many internal difficulties and disputes, the new Flying Control Organization had begun to find its feet and was making a really important contribution to the work of the Command. It is of interest to note the marked and steady decrease in the damage rate (not attributable to enemy action) which fell from 44 per 10,000 flying hours in 1942 to 23 in 1943 and 15 in 1944.

(ix) The Meteorological Service

Finally a mention must be made here of the Meteorological Service in Bomber Command. A general description of its organisation and functions from which the following has been taken is included at Appendix J of the C-in-C's despatch.

The whole meteorological system in the R.A.F. was centred at the Central Forecast Stations at Dunstable where all data was received, sorted and broadcast over the teleprinter network to Commands, Groups and Stations. Since weather systems affecting this country and Western Europe most often come from the Atlantic, it was imperative to know what was happening over the sea to the west of the country when planning bomber operations. In addition to routine met. flights over that area, ships especially equipped for making and transmitting weather observations were stationed in the Atlantic so far as was possible. Observations were also made at the majority of R.A.F. stations in this country. Within Bomber Command the meteorological network extended from Command down to Group and Station level and was co-ordinated at Routine Conferences at which the Command Headquarters and all Groups were linked together simultaneously by telephone. From February, 1942, onwards a representative of the staff at Dunstable was also included in these Conferences so that the Command should have the benefit of their advice and any data received at Dunstable too late for broadcasting to Groups.

These Routine telephone conferences were held daily in the afternoon in the summer and both at mid-day and in the afternoon in winter. Additional Conferences were held as necessary. After the "Chairman of the Day" had summarised the results of the discussion and obtained agreement on it, this summary formed the basis of the advice given to the Air Staff at Command and Groups.

Initial planning of a night operation was normally made on meteorological advice given to the C-in-C in the Operations Room at 0900 hours. The met. situation was again reviewed by the Air Staff at Command and Groups following each Met. conference and plans altered as necessary. Meteorological Officers at Stations were advised by their Senior Group Met. Officer for every operation. Within this framework and in the light of synoptic charts prepared at stations, the crews were briefed on weather conditions to be expected en route and at bases.

One of the major difficulties in preparing accurate forecasts was the obtaining of weather information from enemy territory. All aircrews had been trained to make and record observations in flight and interrogation by Meteorological Officers at Stations

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became an established part of the interrogation of returning crews. This proved a valuable source of information but as the scope and intensity of the offensive increased, the need for further and more detailed observation became a matter of extreme urgency. Under pressure from Bomber Command, Air Ministry approval was eventually given to the formation in January, 1943, of No. 1409 Met. Flight at Bircham Newton. Known as the "Pampa" Flight, it was used in two ways: (i) prior to the selection of targets to obtain a broad survey of conditions over enemy territory in terms of cloud distribution, and (ii) to survey conditions over those areas which would assist the Meteorologist in forecasting cloud en route and at targets after their selection had been made. A compromise had of course to be reached between the best reconnaissance route meteorologically and what was desirable to avoid defended areas and to ensure that the proposed target was not made obvious to the enemy. These Flights, which reached a very high standard of accuracy, were made in every kind of weather when a take-off was at all possible and proved invaluable to the preparation of more accurate forecasts.

Among the many responsibilities of the Meteorological Officers in Bomber Command, diversion of aircraft was a major item. Frequently unforeseen variations in weather at home bases occurred after the start of an operation and where this necessitated the diversion of aircraft between stations in one Group, arrangements were made by the Group Flying Control Officer acting in close consultation with the Group Meteorological Officer who had expert knowledge of local conditions. On the other hand, diversions of aircraft to Groups other than their own were the responsibility of Central Flying Control at Command Headquarters. To this and a close liaison was maintained between Flying Control and the Meteorological Office where hourly charts of observations made over a close network of stations throughout the British Isles were maintained for this purpose. From these charts and an examination of the general synoptic situation and in consultation with Group Meteorological Officers as necessary, the Meteorological Staff at Command Headquarters were able to maintain an accurate hour to hour picture of conditions at all airfields in the country throughout the period of the operation and until the last aircraft had been safely landed.

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CHAPTER 13

SUMMARY AND CONCLUSIONS TO PART II

At this point and before examining the actual course of the bombing offensive against Germany and Occupied Europe during this period, it may be helped to review very briefly the main tactical and technical advances described above.

Probably the most important of these in its far reaching effect on bombing tactics and technique was the introduction of Gee, the first of the radar aids to navigation, which was to have a profound influence on bombing operations in 1942. Although Gee was fully effective for only six months, this influence was to be apparent long after it had ceased to be of any practical use further afield than the enemy coast line.

Analysis had shown that the bombing offensive against Germany in 1941 had failed for two reasons: inaccurate navigation and misidentification of the target. It was fully appreciated that one of the many difficulties experienced by the bomber force at that time was in seeing and correctly identifying its objectives in the bad weather and poor visibility frequently pertaining over Western Germany, particularly in the Ruhr area while compass, sextant and astro-navigation were wholly inadequate under prevailing conditions to get aircraft accurately and on time to their destination in Germany. In such circumstances it was virtually impossible for the force to attain the concentration en route or over the target which, it was beginning to be realised, was essential both as a protection against the increasing efficiency of the enemy defence system and to inflict really decisive damage on an objective. Moreover, prior to 1942, there was little or no attempt at co-ordinated planning or routing of bombing operations and the force virtually operated as a collection of individual aircraft.

Thus, at the beginning of 1942, three things were urgently needed if a policy of area bombing of large industrial cities in Germany was to be successful: in the first place concentration of effort in time and space, in order to saturate the enemy's defences and to inflict decisive damage on the target; in the second, a system of co-ordinated planning and routing at a high level to enable the required concentration to be achieved, to route aircraft as far as possible to avoid the heavily defended zones and to weld the force into a single coherent weapon capable of being used with deadly effect against any and every objective as required by current strategic considerations. Finally, if the first two objects were to be attained, the force must be provided with suitable aids to enable it to overcome its difficulties and navigate to and bomb its objectives accurately irrespective of weather.

Gee, the first of the new aids to come into active service, had been conceived as a navigational device although it was predicted, over-confidently as it turned out, that it would be sufficiently accurate to be used as a bombing aid. In order to make the best use of the limited number of aircraft equipped with the device in the early stages of its introduction, it was decided to place them in the van of the force to lead non-equipped aircraft to the target area. This led to the first serious attempts at co-ordinated planning of operations at

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Command Headquarters which was subsequently to become a feature of all major attacks. Once over the target, it was necessary for the leading bombers to illuminate and mark the target for the main force. This in turn led to the development of the flare and incendiary techniques either or a combination of both of which formed the basis of all subsequent marking methods throughout 1942. Flares were used to find and illuminate the area after which incendiary bombs were dropped in order to start an unmistakable conflagration which could be clearly recognised by following aircraft. In this connection it is important to distinguish between the use of incendiaries as a "bombing beacon" by the fire-raising force and their use as major weapons of destruction against suitable targets when carried by main force aircraft.

The improvement in navigational accuracy and timing which resulted from Gee led to a marked increase in concentration both en route to and over the target, the latter rising before the end of the year to a rate of well over 400 aircraft an hour.

But Gee had failed as a blind-bombing device and, once in the target area, crews were dependant on visual recognition of their objective. Night precision bombing was still a thing of the future and was not to become a really practical proposition until the introduction of Oboe at the end of the year. Other limitations from which Gee suffered in common with all radar aids dependant on air to ground communication was range which averaged about 350 miles from Daventry and liability to enemy jamming. These problems were at least partly overcome by H2S which became operational in January, 1943, but both Oboe and H2S were introduced into service too late for an assessment of their value to be made in this Volume.

Nevertheless, by the time that the effectiveness of Gee was reduced by the initiation of enemy jamming in August, advances had been made in the evolution of bombing tactics and technique which were to stand the force in good stead during the remainder of the year and until the new aids were available. Moreover, experience with Gee-equipped aircraft operating in the van of the force had finally won the C-in-C over to the Air Ministry view that since, in the absence of a reliable bombing device, the success of an operation depended in the last resort on the ability of leading crews to find and mark the target accurately by means of visual identification it followed that improved results would be obtained by banding those above-average crews together into a single specialised unit. Thus in August, 1942 and coincidental with the initiation of enemy jamming, the Pathfinder Force came into being. Although handicapped by lack of navigational aids and suitable target marker bombs which inevitably restricted its efficiency in poor weather, nevertheless under moderate or good conditions a steady improvement in Pathfinder technique had an immediate and marked effect on the accuracy and concentration of main force bombing during the remainder of the year.

Side by side with these advances in bombing technique, new tactics were being developed. Not only were the majority of operations being planned at a Command instead of Group or even squadron level, but the navigational accuracy afforded by Gee had led to a system of co-ordinated routing of the force as a whole in an attempt to avoid the more heavily defended zones. At long last tactical planning was enabling the bomber force to achieve that cohesion which had been wanting in the earlier years of the war.

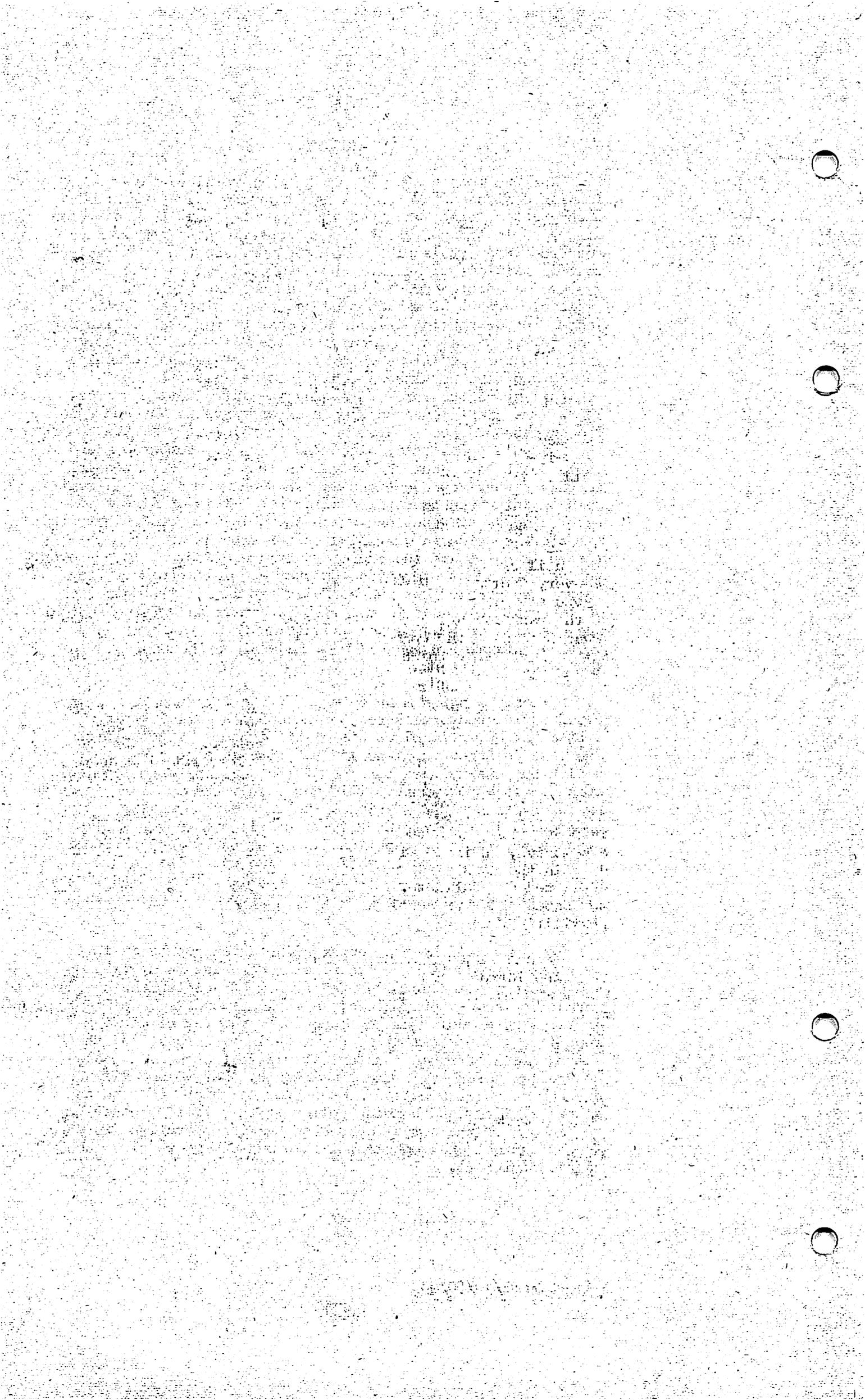
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Nor was this all. It was quickly realised that to inflict serious damage on a large industrial area required a much greater weight and concentration of effort than had been attempted in the past or had been possible with the limited resources then available. This brought about a new development in tactical planning. From March, 1942 onwards, a system was adopted of despatching on any one night the whole available effort of the Command against a single objective instead of dispersing it over a number of targets as hitherto. Even so, it was soon apparent that the 2/300 aircraft normally available for operations in 1942 was insufficient to achieve really decisive results and this, coupled with the new flexibility of the force following the introduction of Gee, led to the great thousand bomber experiments in May and June. The success of these operations was sufficiently marked to prove the C-in-C's point that, given the aircraft, Bomber Command could do the job but operations on that scale were possible on only a very few occasions and then only by using all suitable training and conversion aircraft. This in itself was a revolutionary step but one which the C-in-C in common with the Air Staff considered justified on the grounds of the morale of the pupil crews and the increased damage effect. In any event, the very fact that operations on such a scale could be conceived and carried out successfully was itself the criterion of the rapid advances in the administrative and flying control organisation of the Command as well as in operational and tactical planning which had been made since the beginning of the year.

Finally mention must be made of the introduction of the first radio countermeasures to the enemy's early warning system and RDF control of his night fighters. Despite the increase in concentrations in 1942, the loss rate had shown a slow but steady rise throughout the year and from available evidence it appeared that this was mainly due to the enemy's use of radar control of his defences. Countermeasures were introduced in the autumn of 1942 and although never wholly conclusive, their application did appear to coincide with a drop in the loss rate from time to time until the enemy developed an antidote. Indeed, this "war in the ether" was to assume major proportions before the eventual cessation of hostilities.

To sum up, the most outstanding developments in 1942 were the introduction of the first radar aids to navigation and bombing; the adoption of a system of joint planning and routing of bomber operations; a marked increase in concentration in time and space; the development of new target marking techniques; the formation of a Pathfinder Force; and the introduction of radio countermeasures to the enemy's radar controlled defences. The remainder of this Volume will be devoted to an examination of the changes which occurred in global strategy and bombing policy at this time together with an account of the actual course of bombing operations in which these tactical and technical developments were to play such a significant part.



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PART III

THE STRATEGIC BOMBING OFFENSIVE

CHAPTER 14

ALLIED STRATEGY IN 1942 (1)

(i) Introduction

The Japanese attack on Pearl Harbour which finally brought the United States of America into the war in December, 1941, led to a profound change in the whole war situation. The resources of the Far East had passed under the control of a new enemy. Those resources covered many of Germany's deficiencies and, conversely, Germany herself could supply many of Japan's needs. Each would be greatly strengthened by contact with the other. The importance of preventing that contact being established either by the opening of regular sea or land communications or by blockade running was self-evident. At the same time, Vichy France had also assumed greater significance because Metropolitan France and Vichy Colonial possessions such as French North and West Africa and Madagascar formed a link between the two enemy worlds. Moreover, the strain imposed on the Allied Navies by the entry of Japan into the war which was now virtually world-wide would be greatly increased by any hostile action on the part of the French fleet.

On the other hand, Britain was no longer fighting alone; first Russia and then America had been forced into the war against the Axis by the pressure of external events and, what was more important, the vast resources of the United States in manpower and materials had been irrevocably harnessed to the Allied cause. The campaign in Russia had greatly reduced the German military threat to adjacent neutrals and had placed a heavy strain on the resources of the Reich. In consequence, the Occupied Countries had taken on an added significance in the German economic system and their possible defection was a great source of potential danger to it.

The problem before the Allies in their strategic planning was therefore threefold:-

- (a) How best to exploit by air or ground attack the increased strain on the enemy's economy.
- (b) How best to give Russia every assistance in withstanding the German Invader.
- (c) What proportion of the total effort must be devoted to events in the Pacific and to maintaining the main sea-lines of communication the threat to which was virtually world wide.

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- (1) A full account of Allied discussions on and planning for a Second Front in 1942 and 1943, together with the Administrative preparations, will be found in A.H.B. Narrative "The Liberation of North West Europe." Vol. II.

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The claims of the war at sea and the threat to the strategic bomber offensive which they entailed will be discussed in a later Chapter.⁽¹⁾ The story of Allied strategy in 1942 is mainly that of a search for a suitable offensive and planning and preparations for a Second Front. The issue was considerably confused by the President's desire to see American troops in action against Germany in 1942, the British conviction of the impracticability of such a step and their mutual anxiety to help the hard-pressed Russians by containing German resources away from her eastern front. The steps which led via proposals for an Allied invasion of the Continent in 1943 (Operation Round-up) and a possible emergency landing in 1942 (Operation Sledgehammer) to the adoption of a plan for a joint campaign in French North West Africa (Operation Torch) and, finally, to the momentous decisions at the Casablanca Conference in January 1943, will be discussed as briefly as possible in this Chapter. They form an essential background to the proper understanding of the Strategic-Bomber Offensive in 1942.

(ii) The Washington Conference

R.A.F. Narr.
The Liberation
of N.W. Europe"
Vol. II. P. 20/21.

As from December 1941 the vast resources of the United States were pledged to the Allied cause. Thereafter, global strategy was decided at periodic meetings between the Prime Minister and President Roosevelt and their respective political and military advisers. In January 1942, a Combined Chiefs of Staff Committee was set up in Washington whose function it was to control major strategy and the related questions of broad war requirements and the allocation of resources as between theatres. They in turn were served by Combined Staffs responsible for planning and advising on specific aspects of the war machinery. To the C.C.S. in Washington, the British and American Chiefs of Staff on their respective sides of the Atlantic, put up problems and proposals on the conduct of the war for consideration.

This, very broadly, was the machinery for planning and co-ordinating Allied Strategy in 1942. At the Washington Conference in December 1941/January 1942, it had been agreed between the Prime Minister, the President and their respective staffs that, notwithstanding the situation in the Pacific, Germany remained the prime enemy and only the minimum force necessary for safeguarding vital interests in other theatres should be diverted from operations designed to undermine German resistance in 1942. Once that was broken, it was argued, the defeat of Italy and Japan would follow. In a short but extremely important paper defining the general agreements reached at the Conference on Anglo/American strategy, it was stated that this general aim would be achieved by:-

- (a) An ever increasing air bombardment of Germany.
- (b) Giving all possible assistance to Russia.
- (c) Tightening the blockade.
- (d) Organising subversive movements and fostering the spirit of revolt in the Occupied Countries.

At the same time it was agreed that essential communications must be maintained and the main sea routes safeguarded at all costs.

/This

(1) Chapter 20.

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This much was clear. The exact line which should be taken with regard to military action was less easily determined. Already in America as in British popular opinion was clamouring for a Second Front while the undoubtedly critical situation in Russia and the imperative need to prevent a breakdown on the eastern front was a matter of vital concern to both the War Leaders. To this end, proposals centred round a cross-Channel invasion with the object of forcing the enemy to divert his main effort from the Eastern to the Western. Both the American and British Staffs were in favour of a large-scale invasion of the Continent in 1943 under the code-name Roundup. The President on the other hand, concerned about German progress in the east, pressed for a smaller diversionary landing in 1942 (Sledgehammer) should the Russians show signs of collapse or, on the other hand, German resistance begin to crumble as a result of reverses in Russia.

(iii) Round-up and Sledgehammer

British planning for Round-up had actually begun in November, 1941, before the Americans entered the War. The task was entrusted to the C.-in-C. Home Forces who reported that shortage of landing craft and trained troops would hold up any such large scale operation for some time. The Joint Planning Staff after considering his report replied that Britain should be prepared to undertake such an operation by Spring, 1943, with the object of establishing a permanent foothold on the Continent. Should Germany show signs of crumbling, it might be necessary to make a hasty return to the Continent in 1942. There were therefore two distinct and separate operations to be planned.

J.P.(42) 124

11.2.42.

R.A.F. Narr:
"The Liberation
of N.W. Europe"
Vol. II
P. 25-30.

J.S.M. 104
3.3.42.

Discussions on the smaller of the two operations began in America at the highest level when the C.C.S. in consultation with the President, considered a proposal that a joint land and air operation to establish a bridgehead on the Continent would produce an air battle which would waste the G.A.F. and relieve the Russians. This proposition was made known to the Air Ministry on 3 March, 1942. It was examined at some length but it was finally agreed that any attempt to maintain a permanent foothold with existing resources and prior to a decisive break in German morale would be unsuccessful, wasteful and prejudicial to the success of Round-up. The possibility of a diversionary operation in the Pas de Calais area with the object of making Germany continuously employ her air forces in active operations, and to cause protracted air fighting in an area advantageous to our own forces was then examined but by April, 1942, no conclusions had been reached. By that time the Russians were already falling back before the fury of the German Spring Offensive and the question of immediate assistance became of paramount importance.

(iv) The Marshall Plan

R.A.F. Narr:
"The Liberation
of N.W. Europe"
Vol. II. P. 33.

In that month General Marshall and Mr. Harry Hopkins came to London with the Memorandum on Offensive Operations in Western Europe which subsequently became known as the Marshall Plan. Apart from its intrinsic value as a Plan, this Memorandum was particularly welcome to the British Government as it clearly indicated that the American Government (despite opposition from Admiral King and General McArthur) had

/accepted

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accepted the British view already approved in principle at the Washington Conference that the main effort against the Axis, should, in the first instance, be directed against Germany rather than in the Pacific.

Ibid.P.33-34

The Marshall Plan was based on the American conviction that it was essential to invade France at an early date in order to relieve Russia and prevent all Europe from becoming a part of the Axis system. The Outline Plan required that all preparations for a major Allied Offensive be completed by 1 April, 1943. At the same time the Americans advocated immediate preparations for a more limited operation in 1942, should the situation in Russia become desperate or should Germany become critically weakened in the interim.

Ibid.P.36-40
and
D.O.(42) 10th
meeting on
14.4.42.

British reactions to the plan for a major offensive were most favourable, with one important reservation: namely, that concentration of joint forces in this country must not be to the neglect of the Indian Ocean. Nothing must be done which might so weaken us in that area as to enable Japan and Germany to effect a junction. The C.I.G.S. was in doubt, however, as to the proposed operations in 1942 on the grounds that, should Russia weaken, Germany could easily deal with any force the Allies could land at that stage and its loss would be highly dangerous and prejudicial. This was indeed the general view which emerged from subsequent C.O.S. and Defence Committee discussions. Still, all were agreed that it was vital to keep Russia in the field and that Western Europe was the most suitable theatre for a major offensive. Plans for Round-up were to be concerted at once but Sledgehammer must depend on the situation in Russia. If she was being beaten the Allies might be compelled to make the attempt to draw off German Forces from the Eastern Front. If she succeeded in holding the enemy, they should try a limited operation possibly before September, 1942, in an attempt to detach German Air Forces from the East.⁽¹⁾

C.O.S.(42)97(0)
10.4.42.

(v) Sledgehammer Abandoned

R.A.F. Narr.
"The Liberation
of N.W. Europe"
Vol.II. P.74-
75.

W.P.(42) 219.

Planning for both operations now went ahead but by the end of April the Chiefs of Staff and the Combined Commanders were agreed that Sledgehammer was not "a sound proposition of war." Three weeks later M. Molotov visited London to press for a Second Front. In the interview on 22 May, Mr. Churchill outlined Anglo-American strategy and emphasised the British view that before attempting a landing it was essential first to bring on air battles and destroy the German Air Power. M. Molotov then crossed to America where he found opinion rather more sympathetic. Once again the Prime Minister and Chiefs of Staff were forced to re-examine their views at some length to convince the United States that any such invasion in 1942, would be an unjustified sacrifice.

/On

C.O.S.(42)103(0)
(Final)
18. 4.42.

(1) The Chiefs of Staff also agreed that, in furtherance of the general aim, a series of raiding operations should be carried out during the summer of 1942 against enemy occupied territory in order to contain German forces in the west. This policy was to be coupled with an active air offensive over North West Europe, the C-in-C Fighter Command in consultation with the C-in-C Bomber Command being charged with the task of inflicting the greatest possible wastage on the German Air Force in the West. (See also Ch.16 Section (X) and Chapter 22 Section (ii))

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W.M.(42)73rd
Meeting
11.6.42.

On 11 June, 1942, the War Cabinet endorsed recommendations made by the Prime Minister that, while preparations should go forward, Sledgehammer must depend not on a Russian failure but on Russian successes and consequent German demoralisation. They laid down the principles that there should be no landing on the Continent in 1942 unless the Allies were prepared to stay there and that there should be no substantial landings in France unless the Germans were demoralised by failure in Russia.

CCS. 27 &
28th Meetings
on 19 & 20
June 1942 &
COS.(42)189(0)
29.6.42.

The Americans were far from convinced, however. In June Mr. Churchill again visited Washington and at a Meeting at the White House on 21 June, he and the President agreed that could a sound plan be devised and the difficulties be overcome neither country would hesitate to put it into operation. If despite every effort success seemed problematical, landings should be made in French North Africa (Gymnast/Torch) as an alternative.(1)

P.M. Personal
Telegram
T, 967/2
8. 7. 42

Further discussions in this country only confirmed the original view and on 8 July, 1942, the Prime Minister was constrained to telegraph the President that "No responsible British General, Admiral or Air Marshal is prepared to recommend Sledgehammer - Gymnast is by far the best chance of effecting relief to the Russian Front in 1942 - here is the true Second Front in 1942"

(vi) Operation Torch

C.C.S. 23rd
Meeting
22.7.42. and
C.C.S. 94
24. 7. 42.

The British decision created consternation in the United States and General Marshall, Mr. Harry Hopkins and Admiral King came to London to consult. After a series of Meetings culminating in a Conference at No. 10 Downing Street on 22 July, they finally agreed to abandon Sledgehammer in favour of operations in North Africa. This was confirmed by the President on 31st July, 1942, who ruled that Torch was to be accepted as the main objective for 1942, and was to be mounted without delay.

JSM. 326 and
W.M.(42)
101 Torch
Annex. 329
31. 7. 42.

All effort was now concentrated on planning for Torch with Round-up on second priority. Operations in North West Africa were finally launched on 8 November, 1942, and although planning for Round-up continued intermittently, it soon became clear that no real direction could be given to the Planners until the implications of Torch had been appreciated and a new review made of a possible threat of invasion in this country. As a result of operations in North Africa a serious postponement to the Bolero(2) build-up had to be accepted and it was obvious that the

/Allies

(1) The importance of acquiring alternative Naval and Air bases in North West Africa had long been recognised by the British. Since November, 1940, several attempts had been made to enlist the support of General Weygand (French Delegate General in North Africa) who remained conciliatory but non-committal. A force (Code-name Gymnast) was actually standing by for such a landing in 1941, but the political situation in France grew uneasy and finally, with the removal of the General from the position of Delegate General, the matter was temporarily dropped.

(For further details see A.H.B. Narrative on Operation Torch).

(2) Bolero was the code-name of the build-up of United States Forces in the United Kingdom in preparation for Operation Round-up.

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Allies would not be able to maintain two major combined operations simultaneously. As one was already under way, further discussions on Round-up seemed pointless. No further decision as to the future direction of Allied strategy was made therefore until the Casablanca Conference in January, 1943.

(vii) Effect on the Bomber Offensive

It was against this somewhat indefinite background that the Bomber Offensive in 1942 was being waged. It has been seen that, in the British view, a successful landing on the Continent was dependent on a break in German morale. In pursuance of this policy, the bomber offensive in 1942 had as its primary aim the weakening, by continuous attacks on a heavy scale, of the German will and ability to continue the war. This was to be achieved by striking at the German war machine through the civilian population and particularly the industrial workers.

As the Russians began to fall back before the fury of the German spring offensive this overall aim gained added and immediate importance through the need to give all possible assistance to our hard-pressed Allies. It was hoped that in the face of a continuous and increasing scale of attack the enemy would be forced to divert men and materials to the defence of Germany which would otherwise have been available for the campaign against Russia. At the same time, by giving priority to the attack of aircraft industries and by Circus and other operation designed to induce the enemy fighter's to combat, everything possible was done to reduce the strength of the G.A.F. and relieve the pressure on Russia.

By the autumn of 1942, the prospects of an invasion of the Continent on the grand scale in 1943 began to recede and attention turned once again to the possibility of crushing German resistance by a great combined bomber offensive from the United Kingdom. The changes in Allied strategy at that time and their effect on the conduct of the bomber offensive from the United Kingdom will be discussed in a later Chapter.⁽¹⁾ In the meantime an examination must be made of strategic bombing policy at the beginning of this period and the various reasons which led to the decision to adopt enemy civilian morale as a primary objective for offensive operations.

(1) See Chapters 21 and 22.

SECRET

CHAPTER 15

STRATEGIC BOMBING POLICY

(i) Introduction.

One of the most important outcomes of the Washington Conference (December, 1941/January, 1942) was the acceptance by the American Chiefs of Staff of the British view that despite the situation in the Pacific, Germany was the prime enemy and that only the minimum effort required to safeguard vital interests in other spheres should be diverted from operations designed to undermine German resistance in 1942. At the same time it was acknowledged that the vital sea lines of communication must be safeguarded at all costs and this was to prove a very large thorn in the side of the strategic bomber offensive. More will be said about this later.

At the beginning of 1942, an "ever increasing air bombardment" of Germany was accepted by the Allies as an essential preliminary to the contemplated re-entry into the Continent of Europe and also as the only immediately offensive weapon which could be brought to bear on Germany in support of Russia. These then were the two main aims of the bombing offensive and the problem immediately facing the Air Staff was how best to implement that policy having regard to the limited capabilities of the bomber force at that time and the necessity for making the fullest use of Gee which was just about to come into service.

Nevertheless, area bombing and morale are the keynotes of this period and before examining the terms of the new strategic bombing Directive, it will be advisable to trace the main stages by which enemy civilian morale became accepted as a primary objective for offensive bombing.

(ii) Emphasis on Moral⁽¹⁾

As early as July, 1941, the British Chiefs of Staff had already accepted that the direct attack of enemy civilian morale would prove a profitable offensive strategy once Bomber Command had developed the weight and concentration necessary to make such attacks decisive. This view had been included in a statement of future strategy submitted to the Prime Minister before the Atlantic Conference in August, 1941 which was used by the British representatives as a brief for their discussions with the United States Chiefs of Staff. In this statement, the British Chiefs of Staff had declared their conviction that it was in bombing on a scale hitherto undreamed of that the new weapon was to be found on which would principally depend the destruction of German economic life and morale. They had allotted first priority to the heavy bomber in production programmes because:-

/"Our

(1) For further details of the early controversy over morale bombing see Volume III Part II Chapters 1 - 4.

"Our policy at present is to concentrate upon targets which affect both the German transportation system and civilian morale. As our forces increase, we intend to pass to a planned attack on German civilian morale with the intensity and continuity which are essential if a final break is to be produced.

COS(41)231(o)
Annex 1
16 Oct. 1941.

It was evident at the time that this statement of policy came as an unwelcome surprise to the American Chiefs of Staff who, in their official reply in October, 1941, expressed their misgivings at the "undue importance" which the British were attaching to the probability of success solely through the employment of a bombing offensive. Nor were they able to accept that bombing offensives should be directed against general civilian morale as opposed to specific and concrete objectives having a direct relation to German military power.

P.M.
M.970/1
7 Oct. 1941

Even the Prime Minister was concerned at the "unbounded confidence" which was being shown in that form of attack. While himself in favour of continued intensification of the air effort against Germany he was realistic enough to accept that:

"he is an unwise man who thinks there is any certain method of winning the war."

COS(41)505

Nevertheless, the British Chiefs of Staff remained convinced of the potential value of the bomber force as a war winning weapon and, in November, 1941 reaffirmed their policy. They expressed grave concern at the failure of the American Chiefs of Staff to appreciate the importance of the bomber offensive which, in their opinion, could not be over-emphasised. While they appreciated that German civilian morale could not be broken with the existing strength of Bomber Command, they planned such a vast increase in the size of the force as would, when all the new developments in prospect had matured, enable it to achieve decisive results.

Although "ever increasing air bombardment" was subsequently accepted by both parties at the Washington Conference as one of the methods designed to break German resistance, the controversy over morale was by no means over and it might be helpful to examine very briefly the main steps which had led to its adoption by the Air Staff as a suitable objective for a major bombing offensive.

AHB/II/70/149(E)
~~AHB/70/149(E)~~ *encl. 22*
D.B. Ops.
~~Fielder Bomber~~
~~Policy and~~
~~Plans. Vol. 5~~
Paper on
~~"British Bombing~~
~~Policy" 26.11.41~~

Prior to 1941 it had been generally accepted that, quite apart from humanitarian motives, the attack of purely military objectives was the right war-winning policy.⁽¹⁾ Although the

/importance

(1) This view may well have been coloured by the pre-war anxiety to avoid provoking the Germans into delivering a "knock-out blow" at a time when the British could not strike back immediately owing to their failure to achieve air parity. This had been a counsel of necessity in the pre-war years which had culminated in the British doctrine of legal and illegal bombing. The relevant Chapters of Volume 1 of this series must be borne in mind therefore when considering the arguments subsequently put forward in favour of morale bombing. The German adoption of "blitz" methods against Great Britain in 1940/41 had clearly released His Majesty's Government from any obligation to adhere to the various declarations they had made condemning such methods as contrary to the principles of International Law and notably the Hague Rules. Indeed the Air Staff had held themselves as technically freed from their obligations in this respect as early as 16 October, 1939 "owing to German action in Poland". Thereafter, they admitted that expediency should be the sole consideration.

S.46368/Vol.1.
Encl.14A.

SECRET

importance of a decline in morale was not underestimated, it was believed that direct attack on the civilian population was likely to strengthen rather than weaken the determination of a people made angry by bombing. This was borne out by the reactions in this country to the Battle of Britain.

Ibid

The Germans, on the other hand, while publicly proclaiming their adherence to the principle of attacking nothing but military objectives, had undoubtedly undertaken "blitz" bombing for moral effect.⁽¹⁾ As a result, the Air Staff inferred that they had in the past been too prone to measure the stamina of the German people by that of our own and in doing so had failed to recognise that by deliberately adopting a "policy of frightfulness" the German High Command had made an exactly similar mistake about British morale, at the same time disclosing their own particular weakness. This view was further supported by reports from ground sources and P.O.W. interrogations which, although undoubtedly unreliable and possibly stemming from German propaganda designed to induce over-confidence in this country, could not be entirely disregarded. A Paper on Morale Bombing produced by the Inter-Services Research Bureau in April 1942 analysed the sources of those reports and concluded that while their veracity was certainly open to question, the German people after going through a period of strain had many reasons for depression but were probably relieved by the assurance of German propaganda that the worst was over and that the Spring Offensive would see a successful conclusion to the war with Russia. On those grounds alone, it was presumed that a sudden resumption of bombing on a severe scale would be particularly opportune and;

ARB/RET/906
2.4.42

"by bringing home to the maximum number of German civilians the utmost horrors of war it would provide a thorough and complete solution to the problem of countering the strengthening and unifying influence exerted upon the Home Front by the German preoccupation with the horrors which would follow defeat and accompanying vengeance".

Clearly, from a post-war standpoint much of this was wishful thinking but there seems no doubt that from the middle of 1941 onwards there was considerable preoccupation at all levels with the policy of the defeat of Germany by an all-out attack on the morale of the civilian population. This had been embodied in the Chiefs of Staff statement that:

/"as

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C.O.S.(41
155 (0)
31.7.41

"as our forces increase, we intend to pass to a planned attack on civilian morale with the intensity and continuity which are essential if a final breakdown is to be produced".

AHB/II/70//
149(E)

Such a clear statement of policy at a high level was undoubtedly timely from the tactical point of view, coming as it did when analyses of the results of British bombing of German military targets in 1941 had shown it to be almost completely ineffective. It has already been seen ⁽¹⁾ that, side by side with those analyses, an examination was in progress of the effects of German bombing on this country. This had shown that the indirect or incidental damage resulting from bombs falling in a large industrial area such as Coventry or Birmingham (through the general dislocation of industrial life arising from damage to dwelling houses, shops, utility services and transportation, from resultant absenteeism and, in fact, from interference with all that went to make up the general activity of the community) had resulted in far more dislocation to industry and reduction in output than the direct damage to the plants themselves. As a result of those combined findings, the Air Staff concluded that, in view of the known limitations of the bomber force, and its inability at that time to find and hit precise targets, it might well be more economical and effective to attack the enemy war effort and, simultaneously, his will or ability to continue the war by focusing on the workers themselves rather than on the factories or plant where they worked.

It is necessary, however, to draw attention to the fact that at that time there appeared to be a certain looseness in the interpretation of the term "morale".⁽²⁾ On the one hand it denoted the attack on a wide and heavy scale of the civilian population of Germany regardless of, or at least with only secondary consideration to, the intrinsic economic value of objectives; on the other, the more limited but economically effective attack of the heavily built-up areas of major industrial towns with the aim of dislocating the lives of the industrial workers and thereby reducing their output to a level which would seriously affect and ultimately bring about the collapse of the German war economy as a whole.

JP (41) 444
14.6.41
para. 7

In an earlier "aide memoire" on Future Strategy produced in June 1941, emphasis was laid on the war of economy and morale as a war on two fronts, each equally important and in some ways interdependent in that economic distress would produce lowered morale while loss of spirit would increase economic strain; independent in that men might lose the will to fight while the means still existed or, conversely, that the resources might come to an end while courage remained high. It is not so clear from the re-statement of future strategy produced by the Chiefs of Staff for the Atlantic Conference in July 1941, on which side the emphasis would lie. It is true that they stated their intention of passing, when the forces were available, to a planned attack on civilian morale on such a scale as to bring about a complete collapse. But they also stated their belief that if those methods were

/applied

(1) Chapter 6

(2) In this connection it is worth noting that when preparing their post-war reports the B.B.S.U. found it necessary to state their own definition of the term "morale". Reference C.D. 1034.

AHB/II/79/5

SECRET

applied on a vast scale, the German war economy and the will of the people to resist would be so destroyed and the fighting value and mobility of the armed forces so reduced that a direct attack would once more become possible. It is quite clear, however, that the Chiefs of Staff had accepted that such a policy could not be fully implemented until, either through American assistance or American intervention, the scale of the bombing offensive could be very greatly increased.

In any event, there is no doubt that, towards the end of 1941 and in the early months of 1942, the emphasis in the Air Staff at least, was definitely on the anticipated results from a war on German economy and morale jointly rather than on civilian morale pure and simple.

During the latter end of 1941 and early 1942, everything was concentrated on assessing the extent of the bombing effort required to produce the necessary degree of dislocation in the German industrial economy. The only definitive method by which that could be determined was by an examination of the results of attacks on towns in this country comparable with those believed to be of the same decisive importance to the war effort in Germany. An Index of Activity was accordingly prepared embracing the general industrial and psychological aspects of the effect of air raids since it was assumed that nervous strain, loss of working hours through fatigue and lack of food, warmth and comfort would all have their repercussions on the level of industrial activity.

AHB/II/70/168
Paper on
"Development
and Employment
of the
Heavy Bomber
Force"
22.9.41

Ibid.

Taking the attack on Coventry on 14/15 November, 1940 as a yardstick, and after sifting and correlating all the available evidence from that and other attacks on this country, it was accepted as a basis for calculation that the tonnage dropped on that raid was on the scale of one ton per 800 of the population. The following morning the "activity" of the city was down to 37% of normal and recovery took about 35 days. From that it was estimated that had a second attack been delivered within 30 days of the first, the town's "Index of Activity" would have revived to only 90% of normal. The obvious inference was that activity would become progressively lower with each attack provided insufficient time was allowed to elapse between each to enable complete recovery to normal. Accordingly, it was assumed that after a series of attacks on a similar scale over a period of six months, the activity of the town would have been so reduced as to be beyond all hope of recovery. At the same time it was unquestioned that the reduction of any given town to impotence could best be achieved by six attacks on the Coventry scale on successive nights. Against that, the number of towns which could be so treated would be strictly limited while the remainder would be free to work at full pressure. The reduction of a large number of towns to the same level of activity during one month might therefore be calculated to have a more widespread effect as each would be facing the same struggle to regain normal activity and they would, therefore, be unable to assist each other. Since neither of those courses was likely to be tactically possible, a compromise was suggested whereby attacks would be made at as frequent intervals as possible, in one month, on a group of towns suitably situated to help each other and dealing in the same way with other similar groups in subsequent months.

Ibid

At the request of the C.A.S. a Paper was prepared by the Director of Bomber Operations in October 1941, outlining the above theories and assessing, on that basis, the size of the force required, the tonnage to be dropped and the number of towns to be so attacked to achieve the required dislocation of the enemy economy. The Paper was passed to the Prime Minister on 25 October, 1941.

Ibid
25.9.41

This was the background of opinion against which planning for a new offensive was taking place towards the end of 1941. As D.B.Ops. had pointed out in a minute to V.C.A.S., the above Paper could only be regarded as tentative and indicative of the general aim. Everything depended on the rate of expansion in Bomber Command during 1942 and 1943, the availability of heavy bombers and the effectiveness of the new radar devices shortly due to come into service.

In particular, much hinged on the range and accuracy of Gee, and the suitability of the towns within that range for the large scale incendiary attacks which, as has been seen, were already being planned for the full exploitation of that device. It is of interest, however, that nearly six months later, in March 1942, Lord Cherwell in a minute to the Prime Minister put forward quite independently what he called "a simple method of estimating what we could do by bombing Germany". Assessing what could be done with a given weight of effort against the built-up areas of 58 German towns he wrote:

"Investigation seems to show that having one's house demolished is most damaging to morale. People seem to mind it more than having their friends or even relatives killed. At Hull signs of strain were evident though only one-tenth of the houses were demolished. On the above figures we could do ten times as much harm to each of the 58 principal German towns. There seems little doubt that this would break the spirit of the people".

He adds (and this is important in its implication that the idea of area attack for moral effect only had not yet been abandoned) that his assessment did not take into account the indirect effects on industrial output arising from interference with normal life.

Ibid
31.3.42

This minute was passed to the S. of S. for Air and the C.A.S. by the Prime Minister with the terse comment:

"What do you say to this?"

There is no doubt that in principle Lord Cherwell's estimates of what could be done by bombing built-up areas were on very much the same lines as the conclusions reached in the earlier D.B. Ops. Paper, although his statistical estimates were less detailed and varied in certain instances. After consultation, the S. of S. replied to Mr. Churchill that both he and the C.A.S. found Lord Cherwell's calculations simple, clear and convincing; that the start which had been made in recent attacks on the Ruhr, Cologne and Lubeck was promising and that they saw no reason to doubt that within eighteen months and with American help, the degree of destruction which Lord Cherwell had suggested as possible could in fact be achieved.

Ibid
6.4.42

/S. of S.

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S. of S. seized the opportunity to emphasise, however, that to do so it was necessary not only to get the bombers, employ them to the full, keep down wastage and improve navigational accuracy, but to resist any unavoidable diversion of effort from Germany.

But all this was still in the future and, as will be seen later, the controversy over Bombing Policy and the attack on morale continued to rage during 1942. The immediate problem facing the Air Staff at the beginning of the year was to evolve a bombing policy which would enable Gee to be exploited to the full during the limited life expected for it.

It has been seen that the numerical expansion of the bomber force in 1942 was severely curtailed by the Arnold/Towers/Portal Agreement and the need to divert a large proportion of the available effort to other Commands and other theatres. Nevertheless, at the end of 1941, the future looked extremely promising. Heavy bombers were at last beginning to come off the production line; new aerodromes were being developed and facilities at existing aerodromes improved; the aircrew training programme was under revision and heavier bombs were in production. Above all, the new radar aids to navigation and target finding were on their way and a start had been made towards evolving suitable bombing tactics and technique for the exploitation of Gee. Taking everything into consideration, the Air Staff were convinced that in 1942, the direct attack on the morale of the civilian population of Germany and particularly the industrial workers would become a realisable aim.

(iii) Arguments for a Renewed Offensive against Germany.

WM (41)
111th
conclusions
11 Nov. 1941.

Meanwhile during the winter of 1941/42 the Bomber Offensive was seriously curtailed by the policy of "conservation" imposed by the War Cabinet in an attempt to reduce Bomber Command's heavy losses and build up the force for a Spring Offensive. As a result, operations were not being attempted in doubtful weather and even on the occasional fine nights only comparatively small forces were despatched. Moreover, a considerable proportion of even that limited effort was being diverted from Germany in an attempt to hit the extremely small and difficult targets presented by the battleships Scharnhorst and Gneisenau at Brest.

DO (42) 14
9 Feb. 1942

By February, 1942, the Air Staff were becoming increasingly uneasy at this enforced restriction of the bombing effort. They were convinced that both tactically and strategically the time was ripe for a resumption of a full scale offensive against Germany itself. After discussion by the Chiefs of Staff the main Air Staff arguments were set out in a memorandum by the Secretary of State for Air and circulated to the Defence Committee on 9 February, 1942. This, in effect, did no more than urge, for the following reasons, a lifting of the conservation ban imposed on a bombing policy already approved by the Chiefs of Staff:

- (a) the time of year with its severe weather and sharp frosts would present the Germans with the most difficult conditions in which to fight the concentrated incendiary attacks which it was planned to launch with the aid of Gee.

- (b) Heavy air attacks on important industrial areas in Germany would both hearten our Allies the Russians and further depress the morale of the German people which, there was good reason to believe, was already weakened by reverses on the Eastern Front.
- (c) Gee, the first of the long awaited radar aids, was about to come into service and it was imperative to put it to the fullest use during the comparatively short time in which it was expected to enjoy operational freedom. (i.e. before the enemy evolved an antidote.)

Ibid

Gee was undoubtedly the deciding factor and the turning point of the argument. The S. of S. pointed out that since its estimated range was such that it could not be employed to the best advantage more than 350 miles from England and as it was not yet operative further west than Havre, it followed that the areas in which it would be most effective were North West Germany and particularly the Ruhr and Rhineland. After careful analysis of the vital targets within range, the Air Staff had concluded that the best method of exploiting Gee to the full would be first by launching concentrated incendiary attacks on principal industrial areas in the Ruhr and Rhineland; and secondly, when really favourable conditions existed, by attacking selected precise objectives of the most decisive economic character. Above all, it was considered essential that the full force of the bomber effort should be directed on this offensive if the maximum value was to be obtained from the new technique; the attack of selected targets being maintained over a period of several nights when weather and other conditions permitted.

Ibid

In effect, the adoption of this policy meant the curtailment of the attacks on Brest. S. of S. explained that, while the Air Staff fully realised the extreme importance of those attacks, experience had shown that there was little value in continuing to divert a large effort against that objective since the target area was invariably obscured by smoke in a very short time after the arrival of the first aircraft. Nor were daylight attacks considered justifiable since the chance of securing direct hits on one of the battleships was remote and the casualties certain to be very heavy.

He recommended that the heavy bomber force should therefore be employed without restriction until further notice on the attack of industrial areas and selected precise targets in Germany while operations against the warships at Brest should take the form of a light but sustained scale of attack with relatively few heavy bombers.

(iv) Counter-claims of Defence.

It was not to be expected that proposals to throw the whole weight of the bomber force into an offensive war against Germany would go entirely unchallenged. During the past months, an ever increasing percentage of effort had been devoted to defensive operations, notable against the German warships at Brest, which had absorbed almost 40% of the total Command effort. Although the escape of the Naval Units in February, 1942, released Bomber Command from this heavy commitment, the claims of Defence were to remain a persistent threat to the successful attack of Germany itself throughout 1942.

/The

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W.W. -1
(Final)

The war at sea was approaching a critical stage. Both the President and the Prime Minister were seriously concerned at the threat to Allied shipping and the vital importance of keeping open the sea communications had formed one of the articles of the Paper on Grand Strategy produced by the Combined Chiefs of Staff at the Washington Conference.

COS (42)88(0)
5th April, 1942

Up to the end of 1941, the main threat to sea communications had been in the Atlantic where, consequent upon the entry of the United States into the War, the Axis powers had redoubled their efforts. The entry of Japan into the war as an Axis partner and the consequent need for increasing vigilance in the East had extended the threat which was now virtually world wide. The Admiralty's immediate and vital needs were for extended day and night patrols in the Bay of Biscay and increased reconnaissance in the Indian Ocean.

D.O. (42) 15
14 Feb. 1942.

Commenting on the Secretary of State for Air's plea for lifting of the "conservation" ban, the First Sea Lord observed that he raised no objection to the proposed bombing policy provided that certain immediate Naval requirements for long-range G.R. aircraft were met. He was careful to emphasise that these requirements were purely short-term and constituted only a part of the Admiralty's final air requirements for the war at sea.

C.A.S. Folder
1746

In effect the First Sea Lord's demands involved the withdrawal of six Wellington squadrons from Bomber Command (two for reconnaissance duties in the Indian Ocean and four to Coastal Command for daylight patrols in the Bay of Biscay) plus a further two and a half Wellington squadrons equipped with A.S.V. to be formed in Coastal Command at the expense of Bomber Command for night patrols in the Bay of Biscay.

Ibid

Apart from the five Wellington III squadrons equipped with Gee, Bomber Command at that time had only 14½ Wellington squadrons at 16 I.E. The Naval proposals, if accepted, would divert roughly half the available "backers-up" for the Gee force. This was clearly unacceptable to the Air Staff.

Ibid

The Battle of Defence versus Offence was about to be joined at a high level. In the eyes of the Air Staff it was fundamentally a clear-cut strategic issue; either the resources of Bomber Command were to be dispersed in an attempt to contribute defensively to sea communications over vast areas or they were to be concentrated tactically in order to bring the greatest possible weight to bear in an offensive against selected targets, so that while making the necessary minimum provision for security, the principles of concentration and economy of forces would be maintained by attacking enemy resources at their origin.

Ibid

The Air Staff naturally took the latter view, maintaining that the diversion of bomber aircraft to tasks for which they were not primarily designed (i.e. the attack over immense areas of targets uncertain, fleeting and difficult to hit) was not only uneconomical but represented a very serious menace to offensive strategy.

/Nevertheless

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Nevertheless, the situation was undoubtedly a difficult one. Japanese successes in the South-west Pacific made it imperative to increase immediately the general reconnaissance resources in the Indian Ocean. As the Secretary of State for Air made clear, this could not be done from Bomber Command as non-A.S.V. aircraft were of little or no use for the job. Far East requirements could thus only be met at the expense of Coastal Command while at the same time, the enemy submarine threat in the Atlantic was such that any withdrawals from Coastal Command must simultaneously be made good by one means or another, and with the least possible delay.

This was the subject of much anxious discussion between the Air and Naval Staffs during February and March. The Prime Minister, to whom the opposing claims were constantly referred, found himself in a dilemma. While only too well aware of the consequences if the minimum needs of defence could not be met, Mr. Churchill was equally anxious for an immediate intensification of the bombing offensive against Germany. The loss of six squadrons from Bomber Command just as that offensive was about to be launched would be a heavy blow.

There was one possible solution. On 29 March, Mr. Churchill telegraphed the President urging him to expedite the despatch of the first U.S. Bomber Groups schedules to arrive in this country in July. He frankly stated his unwillingness to withdraw six squadrons from Bomber Command at a time when:-

"the weather is improving when the Germans are drawing away flak from their cities for their offensive against Russia when you (the President) are keen about our bombing U-boat nests when oil targets are specially attractive."

Even 100 U.S. aircraft working from the United Kingdom before the end of May would list the air offensive to the proper scale, urged the Prime Minister, and enable the six squadrons to be spared to Biscay Patrols. "Never" he added "was there so much good work to be done and so few to do it".

Unhappily, the Americans had their own delays and difficulties and this impassioned appeal could not be met. After further discussions the Chiefs of Staff agreed to meet the Admiralty demands for four Wellington squadrons for day patrols in the Bay of Biscay by the transfer of two Whitley (1) and two Wellington (2) Ic squadrons from Bomber Command. This was to be regarded as a temporary loan until Coastal Command's depleted strength could be built up. The two squadrons required for night patrols in the Bay were to be found by raising the output of Wellingtons Mark III (Coastal) at the expense of Wellingtons Mark Ic (Bomber).

In the meantime arrangements had been made to compensate Coastal Command at least in part for the withdrawal of squadrons overseas by the transfer of No. 58 Whitley squadrons (re-equipped with A.S.V.) and Nos. 144 and 455 Hampden squadrons.

Thus by the end of April, no fewer than seven bomber squadrons had been or were being withdrawn from Bomber Command (3) for duty in Coastal Command and, on paper at least, the immediate requirements set out by the First Sea Lord had been more or less

/satisfied

- (1) Nos: 51 and 57 squadrons.
- (2) Nos: 304 and 311 squadrons.
- (3) See Appendix 4.

DO(42)24
8.3.42

P.M.
Personal
Telegram
T.493/2
29.3.42

S.6457
95A
13.4.42
AHB/1D3/1746
CAS Felder
1746
18.4.42

S.6457
86A
1.4.41 and
93A
12.4.42

SECRET

satisfied. The wider issues at stake, namely air co-operation with the Army and Navy together with plans made to combat the growing menace of enemy submarine warfare will be discussed in later Chapters. (1)

(v) Planning for the New Directive.

A.H.B./II/
70/272(b)

While discussions on general bombing strategy were in progress, planning for the new Directive to Bomber Command had already begun. On 1 January, 1942, the Director of Bomber Operations had minuted his Deputy that "our primary task now is to produce a plan for the employment of Gee." Summarising the operational aspect he stated that, until evidence was forthcoming of the accuracy of Gee, it was necessary to plan for area targets and have in reserve specific targets of great importance. In view of the reported low state of morale in Germany at that time and the uncertainty as to how long Gee would be available before jamming began, he believed it advisable to concentrate solely on morale bombing from the moment Gee was introduced. The choice of targets should therefore be governed by the following conditions:-

- (a) They should offer the maximum chances of disorganising life in the most important industrial areas.
- (b) They should be as far as possible within Gee cover
- (c) They should involve the smallest possible penetration into enemy territory.
- (d) They should offer good prospects for incendiary attack.
- (e) They should be large enough to embrace inaccurate bombs.

The main aim should be the complete destruction of towns carefully selected so that their production when stopped would have the greatest effect on the German war effort as a whole quite apart from the widespread moral effects which destruction on that scale would produce. He inclined towards the attack of such targets as Cologne, Essen, Dusseldorf or Duisberg with Hamburg, Bremen, Wilhelmshaven and Emden in that order as diversionary targets to spread the defences and take advantage of weather variations.

It is of considerable interest to note how, in that Minute, the Director of Bomber Operations completely foreshadowed the actual form which the February Directive was eventually to take.

/In

(1) Chapters 20 and 21. See also Annex 1.

M.E.W.
Z.336
8.1.42

In those tentative proposals, no account had as yet been taken of the economic values of the targets concerned. A week later, a Paper was produced by M.E.W. on priorities for bombing attacks among economic targets in German Europe. (1) It was stated that the main aim of bombing attacks at that time should be the maximum interference, directly or indirectly, with the maintenance and re-equipment of the German armed forces. If direct attack on specific industrial targets was practicable, the biggest results on German war production would be obtained by attacking electric power targets or objectives from one or more of the following industrial groups:

- (a) Synthetic rubber plants (and, as alternative targets, tyre factories).
- (b) Factories manufacturing specialised components for the armaments and engineering industry.
- (c) Oil and substitute fuel targets.
- (d) Alumina plants.
- (e) Soda Ash plants.

It was appreciated, however, that the choice between those objectives could only be made in the light of tactical and operational considerations which M.E.W. were not qualified to assess.

Ibid

Apart from direct attack on industrial targets, it was stated that industrial output could be reduced by attacking selected built-up areas, in which event it would probably not be possible to deal effectively with areas including more than a very limited proportion of the total German population. The choice would therefore lie between concentrating attack on a number of small towns, or a very few cities or urban areas. Whichever were adopted, objectives should, from the economic point of view, be chosen to include the maximum number of industrial targets of high priority.

D.B.Ops.
Folder
Operational
Policy
(Area
Attack)
7.2.42

In a subsequent analysis furnished by Mr. Lawrence of M.E.W., it was stated that, on economic grounds, there was no target to compare with the Ruhr for area attack. It was without parallel as a heavy industry centre and was of absolutely vital importance to the German war effort despite attempts to develop alternative capacity elsewhere. In addition, the Ruhr and Rhineland area provided targets greatly superior to those afforded by other industrial centres owing to the continuous urban development. He calculated that a bomb dropped at random in the Ruhr had "an even chance of hitting some work of man". Within those considerations, area targets in the Ruhr and Rhineland were placed in the following priority:

- | | | |
|----------------------------|---------------|--------------|
| 1. Essen | 4. Dortmund | 7. Wuppertal |
| 2. Duisberg | 5. Dusseldorf | |
| 3. Bochum or Gelsenkirchem | 6. Cologne | |

That the selection of targets for inclusion in the new Bombing Directive was based primarily on the principles already indicated in D.B.Ops. Minute quoted above is clear from subsequent

/Air

A.H.B./
IIG/86/6A
Encl: 54

- (1) At a Target Committee Meeting on 15 January, 1942, D.B.Ops. referred to this "most valuable paper" and stated that the targets were now being graded from an operational point of view so that a more definite list could be sent to Bomber Command

SECRET

A.H.B./
II/70/272(B)
10.5.42

Air Staff Papers and from a later Minute from D.B. Ops. to the Personal Staff Officer to the V.C.A.S. in which he reiterated that within the aim of attacking the morale of the enemy civilian population in general and the industrial workers in particular and having regard to their relative economic importance, the industrial areas selected for attack were chosen from among the principal towns and cities in Western Germany where the primary industries were concentrated with large built-up areas around them. In addition, targets selected had to be viewed from the standpoint of their suitability for attack with Gee and, as a result, the list of additional precise targets was limited to a very small number chosen not only for their primary economic value but for their favourable geographic location. For those reasons, as will be seen, the soda ash plants recommended by M.E.W. on 5th priority were excluded from the Directive in favour of the principal synthetic rubber plants, power stations, oil plants and component factories of the aircraft industry, the majority of which came high in the M.E.W. list on the grounds of their intrinsic economic value and all of which were comparatively favourable, on tactical grounds, for attack.

S.46368/III
Mins. 5 & 6

There is one further point which must be mentioned here, namely the place of oil in strategic priorities. The question of bombing oil targets had already been raised by the Director of Plans in a Minute to D.C.A.S. on 4 February in which he drew attention to the Secretary of State's views in favour of oil as a primary objective for the bombing offensive: The matter was referred to C.A.S. who, in view of the fact that the total synthetic output from the ten plants within Gee range was equivalent to only 7.6% of the total Axis oil supply, did not consider that their attack as major objectives would be profitable at that time. This view was supported by a M.E.W. statement that the economic value of attacking synthetic oil plants in Germany would be greatly reduced unless and until attacks could be made on the Roumanian output in the neighbourhood of Ploesti. It would appear, therefore, that the inclusion of the synthetic oil plants in Germany as precise targets in the new Directive was mainly for operational reasons as experimental targets for Gee rather than on economic grounds. In any event, the argument in favour of oil was to be raised again in the autumn and will be further examined in a later Chapter. (1)

Ibid
Min 6 and
D.B.Ops. Folder
Operational
Policy (Area
Attack) 7.2.42

(vi) The February Directive

Meanwhile, the relaxation of the "conservation" ban urged by the Secretary of State for Air in his Memorandum (D.O.(42)14) had been approved. On 14 February, 1942, the Prime Minister minuted S. of S. and C.A.S. as follows:-

/"The

(1) Chapter 21 Section (xi)

SECRET

AHB.

I.D.4/376
47A
14 Feb. 1942

"The Brest question has settled itself. (1) I am entirely in favour of the resumption of full bombing of Germany subject to our not incurring heavy losses owing to bad weather and enemy resistance combined."

S.46368/III
11A
14 Feb. 1942

The same day (14 February) a new strategic Directive was sent to the C.-in-C., Bomber Command (2) This stated that the policy of "conservation" imposed in November, 1941 was to be relaxed and the maximum effort possible (having regard to weather and other hazards) employed against Germany during the six months in which Gee was expected to enjoy uninterrupted operational freedom - and particularly during the first few weeks of its use.

Ibid

The C.-in-C. was to regard as his primary objective (3) the morale of the enemy civilian population and particularly the industrial workers.

Ibid

Within this aim and having regard to the anticipated range of Gee, targets chosen for attack fell into four categories. Four heavily congested industrial towns in the Ruhr and Rhineland - Essen, Duisberg, Düsseldorf and Cologne - were selected as primary targets and the important naval towns of Bremen, Wilhelmshaven and Emden in the Northern Coastal area as alternative targets within Gee range. Apart from their character as industrial and "morale" targets, all were key points in the German rail/water transportation system the disruption of which could be calculated to have a widespread effect on the German war machine.

Ibid

A further list of important alternative area targets beyond Gee range was included for attack when conditions were particularly favourable or when experience had shown the accuracy and powers of concentration obtainable with Gee. The towns chosen were Hamburg (naval and general shipbuilding), Kiel (naval dockyards), Lubeck (Baltic port and industrial and general armament centre) and Rostock (Heinkel factories) in Northern Germany; Berlin (general industries), Kassel (locomotive industries) and Hanover (rubber manufacture) in Central Germany; and in the South, Frankfurt (chemical and general engineering), Mannheim (transportation, chemical and general engineering), Schweinfurt (ball-bearings) and Stuttgart (general, electrical and precision engineering).

Ibid

Finally, when experience with Gee had shown that under favourable conditions such attacks were possible, operations were to be carried out against important precision targets within and beyond Gee range. These included a number of oil targets and four important power stations in Germany.

Ibid

In every instance, the cardinal principle governing the use of Gee was to be:-

"the complete concentration on one target until the effort estimated to be required for its destruction had been achieved".

Ibid

Apart from the primary offensive on the above lines, Bomber Command already had several other commitments (4) which must be met from time to time, namely:-

/(i)

(1) On 11/12 February, 1942, the German Battleships Scharnhort and Gneisenau left their moorings at Brest and, despite every precaution, escaped. (See Bomber Narrative, Vol: III, Pages 156-163)

(2) Appendix 10

(3) Narrators underling.

(4) These will be discussed in subsequent chapters.

SECRET

- (i) Attacks on factories in France as already directed; but these were now to be made only when conditions were particularly favourable in that area and at the same time unsuitable for concentrated bombing of German targets within the current Directive.
- (ii) No. 2 Group operations in accordance with the Directive issued in November, 1941.
- (iii) Periodical support for Combined Operations.

Ibid

As before, the Air Ministry emphasised that every effort would be made to confine bombing operations to the primary offensive against morale but that certain diversionary attacks might be called for from time to time on objectives of immediate strategic importance. Objectives of that nature envisaged by the Air Ministry included naval units and submarine building yards and bases, particularly when they could be attacked without missing good opportunities for bombing primary targets.

AHB / ID4/376
Encl: 49B
15 Feb. 1942

In view of later controversy over the C-in-C's "interpretation" of his Directive, the following Minute from the Chief of the Air Staff the D.C.A.S. on 15 February, 1942, is highly significant:-

"I suppose it is quite clear (i.e. to the C.-in-C. that aiming points are to be the built-up areas, NOT for instance the dockyards or aircraft factories where these are mentioned."

Ibid
Encl: 49A
16 Feb. 1942

To this the D.C.A.S. replied that he had confirmed with Bomber Command by telephone that the aiming points selected in the area targets listed were to be the most congested and heavily built-up districts (1) and NOT dockyards or factories.

(vii) Summary of Strategic Intentions.

Thus during the greater part of 1942, the two main aims of the strategic bomber offensive were:-

- (a) to destroy Germany's will and capacity to make war as an essential preliminary to an Allied Second Front.
- (b) to relieve the pressure of the German Army and Air Force on the Russians.

Both these objects were in accordance with Anglo/American agreed strategy but the way in which they could be achieved and the selection of targets for attack was dictated by the limited range of Gee and the known capabilities of the bomber force at that time.

To achieve the long term aim, that is the destruction of German power to resist an Allied land invasion in the future, it was planned to make a concerted attack on the larger centres of German population. Thus a policy of area bombing was adopted in place of the older idea of attacking precise targets which experience had shown could not be done

/effectively

(1) Narrator's underling

effectively under existing circumstances. The main bombing effort was therefore to be directed initially against the larger cities in Western Germany which were reasonably easy to find and involved small penetration; but it was clearly intended that the precise attack of targets of particular economic importance should be resumed as soon as advances in technique and experience justified them.

The second and more immediate aim of assisting the Russians would, it was calculated, be advanced indirectly by the plans for area attack for moral effect. It was hoped that heavy, concentrated attacks on the Western Front would force the G.A.F. into defensive action thus increasing their wastage, casualties and fuel consumption while every German fighter pinned down in the west meant one less to harass our Allies. At the same time, the enemy would be forced to "freeze" men and materials and to expend fuel and ammunition in the defence of Germany itself which would otherwise be available for use on the eastern front. Apart from these more general considerations, it was hoped that the offensive would have an adverse effect on German armaments production and communications which would be of direct assistance to the Russians.

Within these general strategic aims, the targets selected for attack in the February Directive were governed by a number of more detailed considerations:

- (a) Their general and specific economic importance as assessed by the M.E.W..
- (b) Their morale value (i.e. the degree of congestion of the built-up areas within those towns).
- (c) Their accessibility having regard to the limited range of Gee.
- (d) The degree of vulnerability of the targets within range to heavy incendiary attack.
- (e) The degree of penetration required and the ease with which they could be located by average crews.
- (f) Their value as diversionary targets in spreading the enemy's defences and enabling advantage to be taken of the variations in weather conditions over Western and Northern Germany.

S E C R E T

CHAPTER 16

EARLY ATTACKS ON GERMAN INDUSTRY AND MORALE (MARCH - MAY 1942)

(i) Introductory

The February Directive left no doubt as to the aim of the bomber offensive. For the first time on record the full weight of Bomber Command was to be directed in a deliberate assault not on military objectives but against the civilian population of Germany: against the most heavily built-up and densely populated areas in the country; against the homes of industrial workers; against their shops and water and electricity supplies; against anything and everything which could be expected to disrupt the lives of the ordinary men and women of Germany, thereby lowering their morale and reducing their working capacity to the point where the economic basis of German military power would be fatally weakened.

To be effective, attacks on area targets of that nature called for a much greater degree of concentration than had so far been achieved by Bomber Command. Much depended on the effectiveness of the new radar aid and great expectations were held of the improvement in navigation and target finding which would result from its use. The new Directive in fact sprang from and was to a large extent dependent for its implementation on the introduction of Gee. Also, it has been seen, the initial selection of targets for attack was largely governed by (a) the range of Gee and (b) the extent of congestion of important industrial areas within that range.

It will be remembered that Gee was officially released on 15 February 1942 for operational use as soon as there was a reasonable certainty of at least a short spell of good weather⁽¹⁾. Unfortunately, the bad weather which had restricted operations during February continued and it was not until the first week in March that it showed signs of lifting.

At that time (i.e. March/1942) Bomber Command had, on the average, 68 heavy and 301 medium aircraft available with crews. During the next three months, the medium strength declined steadily owing to the transfer of seven squadrons to Coastal Command and the re-equipment of many others to heavy types. By June 1942 average availability of medium bombers with crews was only 181 aircraft. On the other hand, the heavy bombers had shown a corresponding increase and the Command then had approximately 141 effective. The Period was to see also the disappearance of the Whitley from the operational scene, leaving a front line of Lancasters, Halifaxes, Stirlings, Manchesters (due to complete their last operation on 25/26 June) and Wellingtons. The number of aircraft equipped with Gee also showed a steady increase on the (approximately) 150 available at the beginning of March. Finally, the Period saw the introduction and first operational use of the new 8,000 lb bomb.⁽²⁾ / The

(1) See Chapter 8, Section (i).

(2) This bomb could only be carried by Lancasters with specially modified bomb doors. Only 28 were dropped in the whole of 1942 but thereafter numbers increased considerably, 19 being dropped in January 1943 alone.

The effects of those changes and developments were that the bomb-lift of the force slowly increased as more and more heavy aircraft came forward from the production line while, at the same time, the Command entered on a new era in the method and technique of bombing.

(ii) March - The Offensive Opens

The offensive against morale proper opened on the night of 8/9 March 1942 with the first of a long series of heavy attacks on Essen. Not only was Essen the great armament centre of the Reich and an important link in the German transportation system but, situated in the heart of the heavily built-up industrial centre of the Ruhr, it was also an ideal morale target. Bomber Command's orders were to make it the first objective for attack with Gee and, thereafter, to continue to attack it until it was to all intents and purposes completely destroyed. Thus it was that in the four months March to June, 1942 no less than 15 major attacks were directed against the town of Essen - 10 more than any other target.

Attacks on Essen started with three raids in quick succession on the 8/9, 9/10 and 10/11 March respectively. The Shaker technique used on those and subsequent operations has been described in detail elsewhere.⁽¹⁾ The target was to be illuminated by flares dropped "blind" on Gee fixes. The following incendiary force were then to identify the target positively in the light of the flares before dropping their incendiary bombs with a view to starting large fires which would act as a beacon for the main force.⁽²⁾

The aiming point chosen for the first attack was the main square in the centre of the old town - in other words, the most congested area of Essen. 168 of the 211 aircraft despatched claimed to have attacked the target area in good weather apart from the inevitable industrial haze. Crews reported large fires in parts of the town. One particularly large one was believed to be in the Krupps Works and another in the Marshalling Yards; others were reported to the south but of the 43 successful photographs returned none showed the actual target although 12 were plotted within five miles of the aiming point. It was evident that the main weight of the attack had fallen on the southern outskirts of Essen and that a number of bombs were dropped in built-up areas near Hamborn, Duisberg and Oberhausen. This was in general accounted for by the fact that while the initial flares had been released over the target, many of the incendiaries were dropped after the flares were extinguished and were dispersed over a wide area causing scattered fires which misled the main force. The German communique for the night stated that no damage had occurred to military objectives but that the civilian population suffered greatly. German Police records reported 3000 incendiaries and 127 H.E.s in the Essen area. They also reported appreciable damage to machines and buildings in an engineering works, railway lines destroyed and considerable damage to houses, 415 people being rendered homeless as a result of the attack.

/ The

- (1) See Chapter 8, Section (ii).
- (2) Variations of the technique were used on all attacks on Essen, Cologne and Lubeck during March and, as a result of experience thus gained, the Command was able to issue revised instructions on Shaker technique at the beginning of April.

AHB/
15/39/1/3(A)

ORS/BC
Night Raid
Report
No. 22 ✓

BC/ORB
App. A.319

A.H. B/6
Translations

AHB/II/39/1/3(a)

ORS/BC
Night Raid
Report No. 23 ✓

The following night Essen itself again escaped any serious damage. Of the 43 successful photographs obtained none showed ground detail within five miles of the target. On the other hand photographs plotted fell into two distinct groups centred on Hamborn and Duisberg and it was evident that the main weight of the attack had been drawn off against those two targets where considerable damage had resulted; particularly to the important Thyssen Steel Works at Hamborn in mistake for Krupps. This second misdirection of effort was probably due to the fact that a Stirling aircraft hit by flak early in the raid jettisoned its incendiaries over Hamborn. Following aircraft unable to see the target through haze and smoke bombed the resultant fires and a major attack developed in that area.

Ibid
No. 24 ✓

The third attack of this series on 10/11 March was carried out in conditions of 7-10/10ths cloud and thick ground haze making pinpointing impossible. Of the 22 photographs taken, only one was plotted at Essen but as that crew reported considerable activity in the vicinity it was thought probable that other aircraft had attacked near the primary target. This is supported by German Police Records which reported considerable damage to buildings in Essen. But the attack could scarcely be considered a success and was mainly notable as the first bombing operation by Lancasters, two taking part from No. 5 Group with unobserved results.

AHB/6
Translations

BC/ORB
App. A. 321

The Command was now entering on the non-moon period and it is worth recording that both of the last two attacks mentioned were undertaken in dark conditions. Prior to the introduction of Gee it had never been thought worth while to attack the Ruhr in anything but bright moonlight but it was hoped that with the aid of the new device conditions for visual identification of a target would no longer be necessary.

AHB/
IIG 1/42

Weather which had shown signs of deterioration on 10/11 now began to close in but advantage was taken of an improvement on the 12/13 to launch an attack on Kiel which, by virtue of its situation on water, was suitable for attack on a moonless night. Not only was Kiel the principal base of the German Fleet with a large naval dockyard, armament and fuel stores, shipbuilding yards and equipment factories but it was also an important transportation target. The Kiel canal formed a link between the Baltic and the North Sea for ships of all sizes and an appreciable proportion of Germany's imports of iron ore from Sweden were shipped to the Ruhr via that route.

AHB/II/39/1/3(a)

ORS/BC
Night Raid
Report.
No. 25 ✓

One of the two main industrial areas in Kiel included three great shipbuilding yards of which the Deutsche Works was chosen as the target for the night's operation. Conditions at bases were unsuitable for landing large numbers of aircraft but 53 of the 68 Wellingtons of Nos. 1 and 3 Groups despatched claimed to have attacked the target in good visibility and despite intense flak and searchlight activity a raid developed under dark conditions which was estimated as being at least as successful as any hitherto carried out in bright moonlight. Altogether 23 photographs were taken all but one of which were plotted within three miles of the shipyards. Although 14 crews reported seeing / their

AHB/6
Translations

their bombs burst in the docks, the photographs did not confirm this but there was no doubt that the nearby built-up area had been successfully attacked. German records for that night are rather more illuminating. Apart from 280 houses damaged, it was stated that 21 H.Es fell on the Deutsche Works, a hit being made on the central administrative building, and others on a transformer plant, a foundry and the accommodation ship Hamburg. Other minor damage in the dock districts was also reported.

This was the first operation by Bomber Command on one of the alternative area targets in Germany outside the range of Gee. On this occasion the Shaker technique was not used but Gee was employed as a navigational aid and the success of the operation showed that as such it was extremely effective, much greater concentrations being developed over the target as a result of more accurate navigation and timing.

AHB/11/39/1/3(A)
ORS/BC
Night Raid
Report
No.25 ✓

By comparison, an attack on Emden (within Gee range) on the same night was less encouraging. The task had been given to No.4 Group as being suitable for its shorter range and number of inexperienced crews. 8-10/10ths cloud and some haze was experienced which made identification difficult and although a number of crews claimed to have seen it through breaks in the cloud and one fire was reported, no photographs were plotted within five miles of the target. Police records confirm the apparent failure of the operation, reporting that all incendiaries fell in open country, 10 H.Es only landing in the town where some damage was done to houses. A comparison of this attack with the one on Kiel in clear conditions plainly indicated that Gee was proving less successful as a blind bombing device than had been expected and that where the target could not be identified visually, attacks tended to be dispersed.

AHB/6
Translations

AHB/11/39/1/3(A)
ORS/BC
Night Raid
Report
No.26 ✓

The following night (13/14), the weather forecast for Western Germany was favourable and the Command again turned its attention to the primary target area. Since there was still no period of moonlight which could be used, it was decided to attack Cologne which was not only a high priority target but, being comparatively isolated and situated on the Rhine, was more suitable for bombing under dark conditions than the heavily congested and haze covered Ruhr. Night photographs taken on this operation showed a large fire raging in the northern half of the city, two others in built-up areas in the S.E. and N.W. and a fourth in the Deutz Marshalling Yards and its surrounding buildings on the east bank of the Rhine. Subsequent daylight reconnaissance disclosed areas of very considerable damage including the Franz Clouth Rubber Factory, Chemical Works and the Nippe Marshalling Yards. Police records reported 1691 cases of damage to houses and Churches and 237 fires. A report from a "reliable source" subsequently added four serious incidents of railway damage causing suspension of traffic; a textile factory destroyed and the Deutz Motor Works hit. The same report stated that the next morning fires were still burning and were not under control until the afternoon. Another source reported that Labour Corps personnel from Kassel and Frankfurt had had to be brought into Cologne to assist in clearing the debris caused by this attack. Although the latter reports must be treated with reserve, they serve to indicate some of the effects of what was undoubtedly the most successful raid on Cologne to date.

AHB/6
Translations
~~AMWR~~ AHB/11/39/1/3(A)
~~Men. of DC~~
~~Ops. 1942~~

Weather now closed in completely and for the next eleven nights conditions at home bases or over target areas were such

/that

S E C R E T

AHS/II/39/1/3(A)
ORS/BC
Night Raid
Reports
No. 30 ✓

that operations were either entirely prohibited or restricted to the smallest scale. It was not until the end of the month that weather improved sufficiently to allow a choice of areas in the Ruhr and Rhineland. Once again Essen, the highest priority target, was chosen for attack on 25/26 and 26/27 March and once again very little was achieved despite reasonably good conditions. Night photographs of 25/26th showed that the raid was largely diverted by a hitherto unsuspected decoy in the Rheinberg district. Claims to have identified either the Krupps works or the town of Essen were unsubstantiated by night photographs although some damage was known to have been inflicted on the built-up areas at Oberhausen, Duisberg and Hamborn. The failure of this operation was mainly accounted for by the wide scatter of the initial flares and the consequent failure of the incendiary force to identify the target and fire it as a beacon for the main force.

Ibid
No. 31 ✓

Nor was the attack on the following night any more successful. Although many crews claimed to have seen and bombed the target and reported fires burning all over the town, the limited photographic evidence did not substantiate those claims and gave no indication as to where the main weight of the attack had fallen.

Ibid
No. 30 ✓

The method of attack on both nights was similar to that used on the earlier raids. The flare force were to release their flares on Gee fixes while picked crews were instructed to drop red flares over the target when and if it was unmistakably identified. The Gee-equipped incendiary force were then to approach along a given lattice line, identifying the target visually by means of the flares and starting fires which would be bombed on by the main striking force. From crew reports it is clear that on the first night flares were scattered over a wide area instead of being concentrated over the target and there were complaints that some had been dropped too high, their reflection on the haze obscuring the ground and making pinpointing impossible. Similar difficulties occurred on the following night when crews reported that too many flares were used which tended to a blinding effect on a bright moonlight night and, taken in conjunction with searchlight activity, made visual identification of the target difficult. These technical problems subsequently led to much continuous experiment in flare dropping technique and the eventual production of the hooded flares which have been described in another Chapter of this Volume. (1)

The month's operations against German targets were brought to a close with the highly successful incendiary attack on Lubeck on 28/29 March 1942. This was undoubtedly one of the most outstanding raids of the whole year and, in the face of growing criticism of the bomber offensive, was frequently quoted, together with subsequent attacks on Rostock and Kiel, as an example of what had already been achieved and what the Germans might expect from the R.A.F. in the future. Before examining this attack in detail, some account must be given of the growth of large-scale incendiarism in 1942.

/(iii)

(1) Chapter 9, Section (v)

S E C R E T

(iii) Revival of the Incendiary Plan

It has been seen (1) that there was, in the latter half of 1941, a growing belief among members of the Air Staff in the efficacy of the incendiary bomb as a major weapon of attack against area targets in Germany; particularly if used in conjunction with Gee. The whole essence of the plan as then envisaged was the concentration of the maximum number of incendiaries on the target area in the shortest possible time in order to saturate the fire-fighting organisations in the initial stages of the attack and to start a conflagration which would develop to such proportions that it would act as a beacon to the main force and be almost impossible to simulate with decoys. It was estimated that saturation could be achieved by an initial fire-raising force dropping a minimum of 30,000 incendiary bombs on the target within the first twenty minutes of the attack: where tactically possible, having regard to weather and other considerations, a gap of 45 minutes should then ensue before the arrival of the main force to enable the initial fires to reach unmistakable proportions. All aircraft would carry maximum incendiary loads, any spare stowage space being given to 500lb and 250lb G.P. bombs in order to discourage the fire-fighting and relief organisations and increase the spread of fires by draught from blasted walls and windows.

CS.46368/II
123A
BC/S.25828
Min. 4 and
Encl. 7A

On 27 October 1941, Bomber Command had been instructed to institute a full scale trial of the planned technique in the next moon period. The Air Ministry plan of attack was accordingly embodied in an Operational Instruction to Groups (2) with one important amendment. In the view of the Command, the proposed gap between the fire-raising party and the main force might well have the opposite effect to that required, by giving the enemy fire-fighting organisations time to get the initial fires under control or even to put them out altogether. To overcome this difficulty it was decided to insert an "intermediate" force following hard on the tail of the fire-raisers and dropping H.E. bombs for the purpose of discouraging ARP activities in the interval before the arrival of the main force.

Ibid
Encl. 23A
and
Mins. 16 & 17

At that stage the plan "froze". A number of factors including the policy of "conservation" of the bomber force, poor weather and the diversion of a large part of the effort against Brest all combined to delay the operational try-out and by March 1942, it looked like being shelved indefinitely as a result of the issue of the new Bombing Directive.

Meanwhile the Planners had continued to amass evidence of the effect of incendiary raids on this Country and when this period opens there was already a very strong feeling that, to obtain the best possible results from incendiarism, immediate advantage must be taken of the severe weather on the Continent which afforded the enemy the worst conditions for fighting major conflagrations. On 21 March 1942, the C-in-C, Bomber Command was again ordered to employ the planned technique on the first favourable opportunity in the course of attacks against primary objectives in the Ruhr as laid down in the current Directive. This brought the earlier instructions within the framework of existing bombing policy as governed by the use of Gee.

CS.46368/III
15A

/(iv)

- (1) Chapter 6. Note: It is important to distinguish between the use of incendiaries by the fire-raising force as part of the "Shaker" marking technique and their carriage by the main force as destructive weapons.
- (2) Codename "Unison".

SECRET

(iv) Incendiary Weapons

Ibid

In addition to the 4lb. incendiary bomb, 30lb and 250lb. bombs were now becoming available in quantity. The Air Ministry were anxious for operational tests to determine whether the lesser numbers of the latter which could be carried in maximum loads would be outweighed by their better ballistics, greater spread of incendiary material and the fact that it was anticipated that the fires raised by them in the initial stages of an attack would not be able to be dealt with other than by professional fire-fighters. The 250lb bomb was subsequently withdrawn from service at the end of April when it was found that, on impact, it tended to break up in such a way that only partial ignition was obtained. Both the 30lb and 250lb bomb produced volumes of black fumes which provided an effective smoke screen against following aircraft and on 15 July Groups were instructed that aircraft loaded with the 30 lb I.B. were to be timed to attack after those carrying 4lb. I.Bs.

AHB/II/70/164 ✓
24.4.42
and
BC/S.22240/2
57A

AHB/II/70/164 ✓
27.4.1942
and
BC/S.22240/2
68A

Throughout 1942 the ordinary 4lb. incendiary bomb when dropped in sufficient quantities proved the most effective incendiary weapon available, particularly when coupled with the new 4lb. X.I.B., which was introduced into the service in May 1942. This bomb combined incendiary properties with a lethal explosion after either a two or four minute delay. It was expected that, when introduced into a normal incendiary load, it would deter any but the most courageous man or woman from taking immediate action with the result that the effect of saturation would be achieved much more quickly and with a much smaller expenditure of normal incendiary bombs than hitherto. On 12 May the Air Ministry advised Bomber Command that long term provisioning of the new bomb had been based on an output of 6 per cent of the overall requirements in 4lb. I.Bs and that from 24 May they would be delivered at the rate of approximately 4000 per week. Owing to the limited supplies it was suggested that the maximum use should be made of them by the fire raising parties and, in order to impress on the German population the lethal properties of the bomb, a high proportion of the order of 15-20 per cent should be used in the initial phase of the first attack on each city. This percentage could be reduced when knowledge and fear of the bomb became more general.

AHB/II/70/241/3/634
BC/S.22240/2
58A

AHB/II/70/272(B)

But all this was still in the future. In March 1942, the C.-in-C., was still far from convinced of the value of large scale incendiarism and held firmly to his belief in the moral and destructive value of H.Es. Nevertheless, on 28/29 March 1942, advantage was taken of unexpectedly good weather conditions to launch a heavy incendiary raid on Lubeck. The repercussions from this attack were to be so widespread that it is worth examining in some detail.

(v) Incendiary Attack on Lubeck

The choice of Lubeck, a town of commercial, industrial and naval importance and one of the alternative priority targets outside Gee range, as the objective for this experimental attack was dictated by two considerations. In the first place, it was highly inflammable being, as the C.-in-C., later described it, "more like a fire-lighter than a human habitation"; in the second, lying roughly beyond

AHB/II/70/272(B)

/and

AHB/II/24/3/479.
BC/S.26581
Enc. 1A

AHB
II/70/168 ✓
S. of S/DO
23.5.42.

and between the two important targets of Kiel and Hamburg, it had never been attacked by more than an occasional odd aircraft and its defences were accordingly very light in comparison with the more usual German targets. It was expected that the absence of serious opposition would enable the bomber force to achieve a heavy concentration over the target area. Quite apart from tactical considerations, the attack of Lubeck at that time formed an integral part of the planned bomber offensive which aimed at destroying the capacity of Germany to make war and relieving the pressure of the German Air Force and Armies on the Russians. With the Baltic ice beginning to break up, Lubeck was a port vital to the enemy for the supply of its armies in North Russia, Finland and Norway and for the Swedish iron ore traffic. It was also a training centre for submarine crews, an industrial city and a warehousing centre for military stores.

BC. ORB
App. B1866

The general plan of attack was very similar to that described above. Phase One (Z - Z plus 15) consisted of the normal Gee-equipped flare-carrying aircraft closely followed in Phase Two by 40 Gee aircraft of the fire-raising force (Z plus 2 to Z plus 15) and an "intermediate" force of 20 Wellingtons carrying H.Es (Z plus 10 - Z plus 20). Owing to the unusual freedom in time resulting from excellent weather at bases, it was possible to allow an interval of 40 minutes before the arrival of Phase Three aircraft of the main force (Z plus 60 - Z plus 140), 85 of which were detailed to carry H.Es., including as many 4000lb. bombs as possible and the remainder maximum incendiary loads.

AHB/II/39/1/3(A)

ORS
Night Raid
Report
No. 33 ✓

191 of the 234 aircraft despatched claimed to have attacked the target which consisted of the mediaeval island town and a large machine-tool works situated 500 yards to the north of it. In bright moonlight with no cloud and excellent visibility the attack was pressed home from a comparatively low level and night photographs fully supported crews' claims of successes, showing the town completely ablaze. Over 303 tons of bombs including 144 tons of incendiaries were dropped in this, the heaviest incendiary raid to date. Main Force aircraft were guided to the target by the glare of the fires which in some cases was seen from 100 miles away. Daylight reconnaissance on 12 April disclosed that Lubeck had been damaged on a scale comparable with the most heavily blitzed areas in this country. It was estimated that approximately 200 acres or 40 per cent of the built-up area of the inner town had been devastated (chiefly by fire) while further large areas of heavy damage were seen in the suburbs to the west and south. Incidents included the Central Electric Power Station which was destroyed, four factories either destroyed or very heavily damaged and between five and ten more damaged. Damage also occurred to the main railway station workshops and a number of warehouses which were either destroyed or damaged. The Cathedral, Reichsbank and Market Hall were destroyed and other buildings of interest damaged, while the most severe 4000lb. incident yet witnessed occurred in the suburbs of Marli where total destruction covered one acre and severe damage extended over roughly 5½ acres. German Records of this attack state that 1,918 buildings were completely destroyed, 5,928 damaged and 15,707 people rendered homeless. Independent reports of the effects of the attack were numerous. It was subsequently learnt from trade sources that a complete embargo had been imposed on the despatch of goods via Lubeck for 21 days after the raid. Other sources stated that the army had had to be called in to supply food, clothing and medicines.

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Operations
1942

/As

S E C R E T

AHB/12/30/1/3(A)
ORS Night
Raid Report
No. 33 ✓

As expected, opposition at Lubeck was comparatively light but flak was reported as intense en route, particularly near Hamburg and Kiel. From independent observations by returning crews it was estimated that at least half of the 13 missing aircraft had fallen victim to flak - principally en route to and from the target. Enemy night fighters were also unusually active in bright moonlight and no less than 15 attacks were reported. It was believed that at least three of our bombers were destroyed as a result.

While the proportion of incendiary and H.E. bombs (47.5% to 52.5%) used in this attack was nothing like as high as that envisaged in the 100 per cent Unison plan, it was a marked advance on any previous effort by Bomber Command and represented an important milestone in the development of bombing tactics. Although the indisputable success of the operation dispelled any lingering doubts there may have been in the minds of the Air Staff as to the destructive value of heavy incendiary attacks, it was to be some weeks before the C.-in-C. was finally convinced. Nevertheless, as will be seen, the proportion of incendiary to H.E. in bomb loads showed a slow but steady increase from that date until it reached a peak of 64.2 per cent in June 1942. More will be said about this later in the Chapter.

(vi) Operations in April

The full moon at the beginning of April made it undesirable to concentrate on targets which had to be approached through the heavily defended zones while high winds put the more distant target areas out of range. The opportunity was taken to attack the important Ford Matford Works in occupied France on the first two nights of the month but although raids were twice laid on for Stuttgart they had to be cancelled and it was not until 5/6 April that operations against major German towns were resumed with a raid on Cologne.

BC/ORB
App. B1877
and AHB/12/30/1/3(A)
ORS/BC
Night Raid
Report
No. 39 ✓

The method of attack adopted was similar to previous Gee operations except that 40 per cent of the fire-raising force consisted of non-Gee aircraft of the main force carrying maximum incendiary loads while the remainder of the main force attacked approximately 30 minutes later with H.Es. In addition, 40 selected Wellingtons of No. 1 Group were given the Humboldt Deutz Works as a special aiming point for a precision attack with H.Es in the first wave. (1) Although it was expected that skies would be almost clear over Cologne, much cloud with very few gaps was encountered and this appears to have been responsible for the comparative ineffectiveness of the raid. 211 of the 263 aircraft despatched claimed to have reached and attacked the target area but the few photographs obtained did not indicate much success. Although Police Records reported three railway lines cut and damage to many houses, most of the latter was only slight.

AHB/6
Translations

/Similar

(1) It should be noted that precision bombing is already coming to the fore again. In future it was to be the practice on the majority of such area raids to direct a small number of selected crews to the precise attack of particular objectives.

S E C R E T

AHB/II/39/1/3(A)

ORS/BC
Night Raid
Report
No. 40 ✓

Similar technique was adopted for an attack the following night on Essen which had been selected as a target because it was expected that the direction of a very high wind which limited the range of operations would also keep the target area moderately free from smoke. Once again weather forecasts broke down and gave no indication of the very severe icing and storms encountered en route to the target. Only 40 of the 157 aircraft despatched reached Essen where they found 8/10ths cloud. No results were observed and the photographs taken with bombing did not indicate much success.

Ibid ✓
No. 41 and
BC/ORB
App. B 1881

Two nights later, all the available effort was sent to Hamburg which had not been attacked since the middle of January. Once again the force was divided. The Blohm and Vess shipyards were chosen as a special target for 50 picked aircraft attacking with H.E. while the remainder were given the centre of the old town of Hamburg as the aiming point for an attack with a bomb load composed of 2/3rd incendiary to 1/3rd H.E. including the maximum number of 4,000 lb. bombs.

The heavy attack planned was frustrated by severe icing and electrical storms en route and inferior weather over the target. Although 188 of the 272 aircraft despatched reported reaching the presumed Hamburg area, few crews could see their target and the majority were forced to drop their bombs through dense cloud.

AHB/II/39/1/3(A)

ORS/BC
Night Raid
Report
No. 42 ✓

On the 10/11th a forecast of good weather again tempted the choice of Essen as a target for all available aircraft but once more the promise of very good conditions in the target area was not fulfilled. While some aircraft claiming to have attacked found little cloud and identified the river and Krupps Works, many were unable to see any ground detail and bombed either on E.T.A., Gee fixes or the position of fires and green flares. Many fires were seen but owing to the lack of photographic evidence it was impossible to estimate the results achieved.

Ibid ✓
No. 42 ✓

Technically at least, the third and last attack of the month on Essen on the 12/13th was much more successful. The general plan of attack was similar to the two previous operations with a proportion of the main force carrying maximum incendiary loads and attacking with the Gee-equipped fire raising party in the first wave. The flare period was increased from 30 to 45 minutes and by specifying in advance the lattice co-ordinates of the point of release a much greater concentration of flares was obtained over the target than on any previous raid on Essen. Most of the incendiary aircraft reported that flares were very useful both as a guide and illuminant and that, during the 35 minutes while they lasted, ground detail could be clearly seen. Unfortunately the incendiary bombs caused only scattered fires none of which was large enough to act as an unmistakable guide for later arrivals. Although a few aircraft claimed hits at the South end of Krupps Works, photographs indicated that the attack was scattered over the Ruhr area much of it falling on Schwelm 20 miles to the south east. This was the last attack on Essen until the thousand raid on 1/2 June which will be discussed in the next Chapter.

It will have been observed that, apart from technical errors, the lack of success achieved on many of these early operations was directly due to the poor weather conditions encountered en route to or over the target areas which, in the / case

Ibid
No. 45 ✓

case of the Ruhr, were intensified by persistent industrial haze. Two raids on Dortmund on the 14/15 and 15/16 April were no exception to the rule. Although not included in the existing Directive, this important centre of war industries and communications had been chosen for attack because, owing to the prevailing wind, it was the town in the Ruhr least likely to be obscured by smoke. Although 130 aircraft claimed to have attacked the target area and many fires were reported, from the considerable amount of photographic evidence obtained it appeared that the attack was scattered and at least a proportion of it had fallen in open country. Nor was the second raid any more successful. Severe icing was encountered en route and dense cloud over the target. The majority of the 27 aircraft claiming to have reached the area saw nothing and bombed blind. Daylight reconnaissance on 16 April showed that damage was confined to a few incidents. A group of factories on the east side of the town was seen to be extensively damaged while some damage had occurred to warehouses and the docks area but as no previous photographic cover had been obtained since June, 1941, this could not be definitely attributed to the recent attacks.

Ibid
No. 46 ✓

An attack on Hamburg two nights later appears to have met with no better success despite good conditions. Bomb loads for this operation were $\frac{3}{4}$ incendiary to $\frac{1}{4}$ H.E., but although 107 aircraft claimed to have identified and attacked the town, subsequent daylight reconnaissance provided no evidence of fresh damage. A repeat attack the following night had to be cancelled owing to bad weather.

Ibid
No. 48 ✓
and
App. B.1891

Two more attacks were made on Cologne in this month. Details of the blind bombing raid on 22/23 have been given elsewhere (1) but on the night of the 27/28 April a comparatively small force of 92 aircraft succeeded in carrying out one of the most effective raids to date. Owing to the bright moonlight, flares were not used on this Shaker operation but 47 Gee aircraft and 20 Stirlings of the main force attacked in the first wave with maximum loads of 4 lb. incendiary bombs, closely followed by the remainder of the force carrying H.Es. Daylight reconnaissance the following day confirmed reports of huge fires in the centre of the town where four large areas consisting mainly of commercial and residential buildings and including a large block of government buildings had been devastated. Subsequent cover revealed that two large shops in the south west of the Citroen Motor works had been gutted and a corner of a large shop in the Humbold Deutz Motor Works and domestic property in the vicinity either destroyed by fire or damaged. Intelligence sources reported that the administrative buildings of the German railways, known from photographs to have been seriously damaged, had been rendered completely useless. It was stated that the destruction of records had caused more serious dislocation of traffic than if an important railway junction had been similarly affected.

AHB/II/39/1/3(2)
ORS/BC
Night Raid
Report
No. 55 ✓

AHB/IIH/84
AMWP Manual
of Bomber Command
Ops. 1942

The success of this operation and the four attacks on Rostock between 23 and 27 April which will be discussed in the next Section, went a long way towards compensating for

/the

(1) Chapter 8. Section (iv).

AMB/II/39/1/3(A)

ORS/BC
Night Raid
Report
No. 56 ✓

the comparative failure of earlier raids in April. The month's offensive against German targets was rounded off on 28/29th by an attack on Kiel with a comparatively small force of 88 aircraft. Once again the bomb load was 2/3rd incendiary to 1/3rd H.E. and in bright moonlight and good visibility 56 aircraft claimed to have attacked the target where the numerous fires started were reported to be well concentrated. Night photographs confirmed that a number of aircraft had reached Kiel and identified the dockyards and fires were seen burning in the Kleiner Kiel. Although subsequent daylight reconnaissance revealed only a few new points of damage, those were considered significant. Two bays of the angle and plate shaping sheds in the Germania Yards were destroyed by a direct hit and the two main shops of a wire cable factory completely gutted by fire.

(vii) Incendiary Attacks on Rostock

The choice of Rostock as the target for the night of 23/24 April was, as usual, partly dictated by weather which, with bright moonlight and good visibility, afforded excellent conditions for target identification on that and the three following nights. Not only was Rostock one of the greater German Baltic Ports with important submarine building yards but it also housed the large Heinkel aircraft assembly plant at Marienehe which was given as a special target to selected crews of No. 5 Group on each of the four operations.

All four main force attacks were heavy incendiary raids, aircraft carrying 2/3rd incendiary to 1/3rd H.E. on each occasion with the exception of 25/26th when incendiary loads were reduced slightly to 50 per cent. Although large fires and important incidents occurred on each night there seems little doubt that the major part of the very considerable damage done to the town in this series of operations occurred on 25/26th and 26/27th. On 25/26th fires were reported as much more concentrated than on the previous raids and, as the attack progressed, four of them assumed major proportions. 110 aircraft reached and bombed the town and night photographs indicated that the raid had been very successful and far better concentrated than before. This was confirmed by daylight reconnaissance.

BC/ORB
App. B.1898-
1901 and
ORS/BC
Night Raid
Reports
Nos. 51 - 54

AMB/II/39/1/3(A)

Ibid

The undoubted success of this attack was repeated the following (and last) night, a particularly determined effort being made against the Heinkel factory by 55 aircraft of No. 5 Group, 46 of which claimed to have bombed their target. Although the main force was smaller than on previous nights, only 52 aircraft of Nos. 1 and 4 Groups being involved, there was little doubt as to the efficacy of the operation. Every one of the 52 night photographs taken with bombing was of the target, including 13 of the Heinkel factory. Daylight reconnaissance on 27 April fully confirmed that the four raids, taken as a whole, had caused complete devastation of a large part of the residential town and its public buildings and substantial damage to the Heinkel Factory and other military objectives. Damage in the centre of the town was seen to be particularly heavy and over 70 per cent of the old town had been devastated. There were three other fairly large areas of devastation and many smaller areas and points of damage. Important buildings destroyed included the Law Courts and the Head Post and Telegraph Offices. While only slight damage had been inflicted on the Neptune shipbuilding yard, two other warehouses and the large storage depot near the Town Quay were destroyed together with practically the whole of the extensive storage facilities to the east of the town which were gutted by fire. Fire had also extensively damaged the central

/railway

S E C R E T

railway station and the Friedrich Franz passenger and goods station, and a number of single points of damage occurred to tracks and roads. At the Heinkel Works, a stick of heavy bombs had fallen diagonally across the main assembly hangar while other damage included the assembly shop for prototypes, part of the machine shop and the store for chemical products. Two sub-factories near the Neptune Yards and the gas works were also damaged.

AHB/TH/84
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Intelligence Reports from "reliable sources" also gave the following overall picture of the effects of the raids:-

- (a) Complete stoppage of war supplies to Denmark via Rostock-Warnemunde and the train ferry thence to Gjedser.
- (b) About one third of the Heinkel Works destroyed or suffering varying degrees of damage.
- (c) Over 45 large bombers completed, or nearly so, destroyed or damaged beyond repair.
- (d) For 18 days after the attacks, no gas, water or electricity in the town.
- (e) Total casualties killed or severely wounded roughly 6,000 including 400 persons killed in a single shelter which collapsed.
- (f) Morale very bad and police forced to interfere to prevent panic spreading.

Although these reports had to be accepted with reserve, they served to confirm the general evidence of night photographs and daylight reconnaissances that the attacks had been completely successful in achieving their object. Nor was there any longer any doubt in the minds of the Air Staff as to the effectiveness of incendiary attacks if carried out on a heavy enough scale. This latter point, however, was still controversial and must be examined in more detail in the next Section.

(viii) Further Argument over Incendiarism

The success of the Rostock raids finally brought the argument over incendiarism to a head. Since March, the Air Staff had been unremitting in their efforts to enthuse the C.-in-C. with their policy for heavy incendiary attacks on German cities. On 21 March, D.B. Ops. had written personally to the C.-in-C., reminding him of a Meeting he had held when D.C.A.S. at Air Ministry on 6 December 1941 at which reference had been made to the devastation caused by a recent incendiary raid on Southampton. In the Minutes it was recorded that:-

AHB/II/70/
272(b)

"before the Meeting dispersed.....(it) agreed that in any operations of a similar type which we undertook in Germany. (e.g. the Ruhr) we should also use incendiaries extensively".

D.B. Ops. stated his belief that the C.-in-C., had misinterpreted the Papers which had since been sent to him

/ in

S E C R E T

in support of the Air Ministry policy as applying only to specially selected targets on the experimental Unison principle. He explained that since the December Meeting, every factor and feature of the scheme had been carefully studied after sifting and correlating all the available evidence. The Air Ministry had now reached the unqualified conclusion that incendiaryism was by far the most effective form of attack against any German town or city provided only that the attack was so concentrated in time, weight and space in the initial stages as to saturate and overwhelm the defences.

AHB
II/70/164 ✓
ATH/DO/16
11 April 42
ATH/DO to
V.C.A.S.
AHB/II/70/
272(B)
10.5.42
AHB/
II/70/164 ✓
26.4.42

While the C.-in-C. agreed in general with the need to increase the proportion of incendiaries in bomb loads, he remained firmly opposed to the 100% scale envisaged by the Air Ministry. His stated intention was to "Kill and terrify the Boche" and he was convinced of the vast moral and destructive power of H.E.(1) Thus, although in the highly successful single attack on Lubeck the Command had just about achieved the 50,000 lbs. of incendiaries believed by the Air Ministry to be the minimum for complete saturation, in the four attacks on Rostock in April the total weight of incendiaries dropped on any one night nowhere approached that figure. D.B.Ops. informed the V.C.A.S. that he was convinced that had the Command carried the same number of incendiaries to Rostock on the first attack as they had to Lubeck, there would have been no need for repeat attacks except possible on a small scale for moral effect.

AHB/II/70/
272(B)
10.5.42

Once again the question was referred to the C.-in-C., who replied that Lubeck, built more like a firelighter than a human habitation, was entirely exceptional and could not be compared with any other German town. He claimed that he had "long been aware" that to "Lubeck" Rostock or any other town would mean returning two, three or even four consecutive nights. Photographs had, in fact, shown that taking comparative sizes into account, the four attacks on Rostock had actually out "Lubecked" Lubeck. He added that he had "feared all along that the incendiary properties of Lubeck would tend to disappointed reaction by the bloodthirsty on subsequent occasions on other towns".

Ibid

This view was so much at variance with Air Ministry opinion that A.I.3(c) were again consulted. Following their Report, D.B. Ops. who had earlier expressed his dissatisfaction with a system of "groping our way piecemeal to higher numbers" and so dissipating the effort, informed V.C.A.S. that he and his Staff were still convinced that there remained a very strong case for trying out large-scale incendiary attacks on bigger and more important industrial towns such as Cologne.

Ibid

While re-iterating his disagreement with the Air Ministry 100 per cent. policy, the C.-in-C., had put forward the view that, where bigger towns or towns less vulnerable to fire were concerned the answer was to increase the weight of attack and not to change the proportions of the bomb loads. Since the limited size of the bomber force made that impossible he was forced to return night after night until the required effect had been secured. He added, however, - and this was an important concession - that the ideal bomb load would probably be 2/3rd I.B. to 1/3rd H.E. (mainly big blast). With this latter point

/ D.B.Ops.

(1) As will be seen, he was later to modify this view.

S E C R E T

D.B. Ops. stated his entire agreement in principle but argued that since, in practice, the number of aircraft available on any one night was strictly limited, the full effect of an incendiary attack could only be achieved by dropping the maximum number of potential "points of fire" after the defences had been saturated. For example, greater destruction would be obtained on a city such as Cologne by dropping 100,000 incendiary bombs in one night than 25,000 on four consecutive nights. In the latter case it might take 20,000 to saturate the defences leaving only a small proportion to develop into major fires.

Ibid

In effect, the moral value of H.E. was never questioned. The only real point at issue was the Air Ministry's contention that so long as the size of the bomber force was limited, an incendiary attack when projected should be on the maximum scale using in the region of 200,000 I.B.'s and employing H.E.s only as a deterrent. When the target was unsuitable for incendiary attack or the force available was considerably below the maximum effort the limited incendiary resources should be conserved and H.E.'s employed instead.

(ix) Increase in Incendiary Loads

Despite the C.-in-C.s outspoken objections to 100 per cent. incendiary, the gradual increase in the percentage of I.B.'s in bombloads which had begun in April 1942, showed a marked rise from May onwards, reaching a peak of 64.2 per cent. of the total night bomb expenditure in June.(1)

The high proportion of incendiaries to H.E. which is noticeable in Executive Orders for the majority of major attacks on German targets in May reached a climax in the three "Thousand Plan" raids on Cologne, Bremen and Essen; in each case all aircraft being ordered to carry maximum incendiary loads made up with heavy blast. An examination of a zone map of Cologne marking the areas of major damage after the raid on 30/31 May showed that most of the damage had been caused by fire and, as expected, the City Centre (Zone I) had suffered more severely in proportion to its area. On 16 June Sqn.Ldr. Dewdney of A.I.3(c) wrote to D.P. Ops. as follows:-

A.H.B. (II/70/164 ✓)

"It is now clear however (and this is of the greatest importance) that the inner residential zone (Zone 2a) where most of the population lives can be very vulnerable to a sufficiently heavy I.B. attack. As a result we now know that it is within our power to unhouse the population of the German cities within our reach to a much greater extent than they have ever achieved over here".

BC/ORB
Appendices 'B'

ATH/DO/34a
21.9.42

The outstanding success of the attack on Cologne in fact marked a turning point in the controversy over incendiary. From June onwards, bomb loads ordered for attacks on Germany were almost invariably in the proportion 2/3rd I.B. to 1/3 H.E., of which the latter were mostly big blast. That those orders were not always carried out is clear from a demi-official letter from the C.-in-C., to his Group Commanders in September in which he expressed his displeasure that instructions repeatedly issued from

/ Command

(1) Monthly details are given at Appendix 14.

Command Headquarters as to the proportions to be carried were being deliberately and frequently ignored. He explained that, as a result of the "vast amount of irrefutable evidence" that the major proportion of raid damage was done by 4lb and 30lb I.B's, it had been decided that even at the expense of carrying slightly uneconomical loads, bomb loads should be made up in the proportions 2/3rd I.B. to 1/3rd big blast or as near that proportion as could be obtained with reasonable economy. In future those proportions were not to be departed from without specific orders or a temporary shortage of the requisite bombs. He added that blast bombs were intended solely for the purpose of creating alarm and despondency, the incendiaries being relied upon to do the devastation. (1)

Although the policy was now firmly established, in practice the Command was forced to fall back to a 50-50 proportion owing to the uneconomical stowage of incendiary bombs in certain types of aircraft, particularly the Lancaster and Halifax. To enable all types to carry economical loads, it was decided in September to introduce the term "maximum economical incendiary loads". This would vary for different types of aircraft, viz:-

Wellington	9 S.B.C. (2) of I.B's
Stirling	24 S.B.C. of I.B's
Halifax	12 S.B.C. of I.B's plus 3 x 1000 lb GP.
Lancaster	12 S.B.C. of I.B's plus 1 x 4000 lb HC.

Where the loads had to be reduced on account of range, the reduction when applicable was to be at the expense of the H.E. rather than the incendiary load. When full "incendiary loads" were required for a specific reason, the term "100 per cent incendiary load" would be used. In that event, the Wellington and Stirling would remain the same but Lancasters and Halifaxes would carry 14 and 15 S.B.C. of incendiary bombs respectively.

An immediate result of the greatly increased use of incendiary bombs in June was an unexpected shortage of 4 lb bombs and on 15 July, Groups were instructed that when incendiary loads were ordered they were to be made up of 50 per cent maximum economic 4 lb I.B's and 50 per cent maximum economic 30 lb I.B's., the latter to be used in the later stages of the attack. It was not until November that, owing partly to an improvement in supplies and partly to economies effected by the inclusion of the 4 lb lethal incendiary, the restrictions were removed and Groups were instructed to concentrate on 4 lb I.B's using the 30 lb bomb only when ordered or when required by the nature of the target. The 4 lb X.I.B. was also becoming more plentiful at that time and, since 12 August, had been included at the rate of 6 per cent of the normal 4 lb incendiary load.

Despite the many difficulties and divergences of opinion which had to be hammered out, the policy of heavy incendiary attack was steadily followed during the latter half of 1942 and on 17 October, D.D.B.Ops., was able to minute the C.A.S. that the principle of creating the maximum number of "points of fire" was being exploited to the full while the number of bombs required for saturation was being greatly reduced by the use of the lethal incendiary.

/It

(1) Since his letter to the V.C.A.S. on 10 February 1942 stating his intention to "Kill and terrify the Boche" and his belief in the vast moral and destructive power of H.E. bombs, the C.-in-C. appeared to have modified his views.

(2) Standard Bomb Container.

AWB/IIH/41/3/634
BC/S.22240/2
77A
25.9.42

Ibid
68A

Ibid
83A

Ibid
72A

AWB/
1 II/70/164 ✓
17.10.42

SECRET

AHB/ID4/252
15.9.43

Ibid
16.9.43

It is of interest that, nearly a year later, the C.A.S. informed the Prime Minister that experience had shown that fire damage to German towns was not only three times as widespread per ton dropped as damage caused by mixed loads of H.E. but was also of a more lasting and destructive character. A minute from Lord Cherwell to the Prime Minister about the same time (referring to a recent exhaustive investigation into photographs of bomb damage) quoted the following relative figures of acres of damage per ton caused by different types of bombs then in use:-

	<u>Acres per ton</u>
4 lb incendiary	3 1/4
30 lb " }	1 3/4
8000 lb H.C.	1 1/2
4000 lb H.C.	1 1/4
2000 lb H.C.	1 3/4
1000 lb M.C.	3/4
500 lb M.C.	3/4
1000 lb G.P.	just over 1/2

Although it has been thought advisable in this Section to follow the development of incendiary policy right through to the end of the period, it is now necessary to go back and examine the course of bombing operations in May 1942, and the steps leading up to the issue of an amendment to the Bombing Directive laying particular emphasis on the reduction of the German Air Force.

(x) Reduction of the G.A.F. Amendment to February Directive

It has been seen (1) that, throughout 1942 and particularly in the early months, great stress was laid both by Anglo/American Strategic Planners and at lower levels on the vital importance of giving every possible assistance to the Russians in their stand against the German Invader. It was generally accepted that, having regard to the limited resources available, the best method of helping Russia would be to weaken the German Fighter Force and so reduce the adequacy of the air support available to the German Armies. It would also serve the double purpose of paving the way for a possible invasion of the Continent from this Country in 1942.

AHB/II/70/149(E) ✓
25.1.42

In January 1942, D.D.I.3 (2) had put forward the suggestion that the bomber offensive should be directed against the German aircraft industry. This was rejected by D.D.B.Ops., on the grounds that the majority of such targets were beyond the range of Gee and that while the bomber force was still suffering from the effects of months of winter conditions and dilution to other theatres, it was in no position to deal with such targets in sufficient force and concentration to produce worthwhile results for the effort involved and the losses which might be expected from deep penetration, adverse weather and inexperienced

/crews.

- (1) See Chapters 6 and 7.
- (2) Deputy Director of Intelligence.

crews. He recommended that resources be conserved and concentrated until the time was ripe for a heavy blow against the population of the vital industrial centres; and that the attack on the aircraft industry should be reconsidered when the capabilities of Gee could be determined from operational experience. A subsequent proposal from D.D.I.3. for a change over from night to day bombing with a view to inaugurating what amounted to a "war of attrition" between the G.A.F. and R.A.F. was also rejected on the obvious grounds of the impracticability of such a major step at a time when the bomber force was already in the process of building up for an intensified night offensive.

Ibid
28.2.42

AHB/II/70/
272(B)
Encl. 28A
Min. 5
2.5.42

There is no doubt that, as D.B.Ops. later admitted, the increasingly critical position of the German Fighter Force was not, at that time, fully appreciated. It was on that account that, when the new bombing Directive was issued in February 1942, no particular emphasis was placed on the reduction of the G.A.F. Although several targets were included which were directly associated with the aircraft industry, the general policy of the Directive aimed at the reduction of the German war effort as a whole rather than any specific aspect of it.

S.46368/III
14A

It was not until March that the attack of the German Air Force became a major issue. By that time Intelligence information strongly suggested that, as a result of the heavy strain imposed by the fighting on the Russian Front, the G.A.F. and particularly the fighter force was weaker than it had been at any time during the war. There were also strong indications that the enemy were making great efforts to reduce wastage and consolidate in order to build up their resources for a spring offensive and it was believed that some recuperation had already taken place. Finally, the latest G.A.F. Order of Battle (No. 81) clearly pointed to a strengthening of the enemy's defences in the west.

AHB/II/70/
149(E) ✓
4.3.42

S.46368/III
14A

An immediate outcome of those developments was the issue of a new Directive to Fighter Command (copy to Bomber Command) calling for intensified Circus operations over occupied France: the general policy being to send escorted light bombers against important objectives in order to induce German fighters to accept combat with our own escorting fighters and so increase their wastage.

OOS(42)21st
Mtg.
(o)
8.4.42

The whole question now began to assume greater importance. On 8 April 1942, the Chiefs of Staff invited the A.O.C.-in-C., Fighter Command, in consultation with the A.O.C.-in-C., Bomber Command to make an appreciation of:

"how best to inflict by air action the greatest possible wastage on the German Air Force in the west immediately before the launching of the German Spring Offensive; to assess the wastage involved and to estimate the air situation arising from it".

Much of the A.O.'s C.-in-C.'s findings related to and will be discussed in the Chapter dealing with Circus operations but their general conclusions are of interest here.

COS(42)106
(o)
19.4.42

It was estimated that, at that time, the enemy were finding it difficult to increase or even to maintain the strength of the G.A.F. in the face of operations on several fronts at once. Losses sustained on the western front, coupled with a continuous threat of invasion from this Country, had forced the enemy to build up his western defences, thereby causing a

/weakening

G.169087/ABC/11/50/

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weakening of his fighter forces on the Russian Front

Ibid

Consideration of how further to embarrass the already strained resources of the G.A.F. had led to a number of conclusions and recommendations of which the following are immediately relevant:

- (a) that a number of carefully planned daylight attacks by heavy bombers be carried out against objectives in Germany.
- (b) that continued heavy night bombing of German targets should be carried out to compel the enemy to reinforce his night fighter strength at the expense of his day fighters (thereby increasing their wastage) and to help to contain German fighters in the west to relieve the strain on the Russians.

There is no doubt that the need for drastic action was by this time fully accepted by the Chiefs of Staff and the Air Ministry but although various proposals were circulating as to the best way of harnessing the main bomber offensive to the new strategic aim, it was not until May that they achieved concrete form. In general, there was some doubt among members of the Air Staff as to the ability of the bomber force to achieve sufficient weight and concentration in area attacks or, in view of the short comings of Gee, sufficient accuracy in precision attacks to make a diversion of effort against the German aircraft industry worth while.

AHB/II/70/272(B)
Encl. 28A
Min. 1

On the other hand, the question of aid to Russia was becoming daily more urgent. On 1 May, the Director of Intelligence (O) in a Minute to A.C.A.S.(P) pressed in the strongest possible terms for the issue of a new Directive to Bomber Command which would lay particular stress on the attack of certain important aircraft industrial targets in Germany. As A.C.A.S.(P) pointed out when referring the matter to A.C.A.S.(O), the list of targets in the existing Directive included only three which had any direct connection with the aircraft industry and no particular priority had been given to their attack.

Ibid
Min. 3

Ibid
Mins. 6, 7
8 and 9

After considerable discussion among the Air Staff, the C.A.S. finally agreed to a suggestion by D.C.A.S. that, in place of a fresh Directive, an amendment be issued to the existing Directive modifying the list of objectives so as to place certain aircraft factories and special industrial targets higher in the list of priorities.

S.46368/III
24A

The amendment was sent to Bomber Command on 5 May 1942. After emphasising the importance of reducing the strength of the G.A.F. at that time, it stated that, when choosing alternative targets for attack within the existing directive, special consideration should be given to Bremen, Kasseu, Frankfurt and Stuttgart. Similarly, when considering the attack of precise targets, first priority was to be given to the leading German airscrew factory at Frankfurt and the Robert Bosch injection pump and dynamo factory at Stuttgart. Finally the C.-in-C., was requested to examine the possibility of attacking the following precise targets, which, together with factories at Kassel and Bremen were believed to be responsible for nearly all the output of fighter aircraft in the the Reich:-

/ Messerschmitt

SECRET

Messerschmitt Factory
Messerschmitt Factory
Erla Factory
Wiener-Neustradter Works

Augsburg (Bavaria)
Regensburg (Bavaria)
Leipzig
Weiner-Neustadt
(Austria)
Warnemunde

Arado Factory

(xi) Daylight attack on Augsburg

Before proceeding to an account of the effect of the above amendment to the main Directive on bombing operations in May and subsequently, it would be suitable at this point to consider the attack on the M.A.N. Submarine Diesel Engine Factory at Augsburg on 17 April 1942 which, although unfortunate in some respects made "history" as the first daylight attack on a German target by the heavy bomber force. It is clear from an examination of the appropriate Operational Instruction and of the C.-in-C's subsequent definition of the intentions of the raid that it was closely connected with the current proposals to intensify the war on the G.A.F. and, more specifically, with the joint Paper on that subject by the C.-in-C's Bomber and Fighter Commands already mentioned above. Para. 22 of that Paper stated that:-

"in addition (to Circus operations) a number of carefully worked out attacks by heavy bombers on objectives in Germany using Circuses as diversions, will be carried out from time to time as circumstances permit".

The first of those operations took place on 17 April 1942 when 12 Lancasters of No. 5 Group were despatched to attack the M.A.N. Factory at Augsburg. The Ministerial repercussions of the experiment, which was undertaken without prior reference to either the Air Staff or M.E.W., will be discussed in the next Section.

The Plan of Attack was as follows. Aircraft were ordered to fly in sections of three in company until forced to separate by darkness. They were routed via. Selsey Bill, Dives sur Mer, Sens, Ludwigshaven and Ammer See, the latter half of the route being designed to indicate to the enemy that the objective was Munich. On the return journey aircraft were to set course direct from target to base unless the remaining period of daylight was such as to require a withdrawal further south until there was sufficient cover from darkness. Crews were warned to avoid towns and defended areas. On the outward journey, aircraft were to fly at 500 feet after leaving the English coast until south of Paris in order to avoid detection by enemy RDF. The remainder of the journey they were to fly at heights suitable to prevailing tactical conditions but again crews were reminded that flying at ground level would give greater protection from enemy fighters. The attack itself was to be made at low level with maximum loads of 1,000 G.R. bombs filled RDX and fuse T.D. 11 seconds.

In order to draw off and divert enemy fighters over the North Coast of France, Circus operations were undertaken by 30 Bostons of No. 2 Group, with Fighter cover, against targets near Calais, Cherbourg and Rouen and additional diversionary activities were carried out by Fighter Command alone in the Cherbourg and Pas de Calais areas.

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BC. O.R.B/42
App. B 1910

AH8/TH/241/3/522
BC/S.23767
25A

Ibid

S E C R E T

AHB/TJ/39/1/4(D)

ORS/BC

Day Raid

Report No. 21

In spite of those precautions, the first wave of Lancasters flying in two sections of three were intercepted by a large force of enemy fighters shortly after crossing the French coast and four bombers were shot down. The remaining eight continued on their course and apart from flak over the Bernay aerodrome, no further opposition was encountered until they reached the target where light flak defences were found to be intensive and accurate. Although all eight Lancasters succeeded in bombing their objective, three were subsequently shot down and the remaining five suffered damage in varying degrees. One Boston participating in the diversionary operations was also shot down by fighters over Cherbourg and Fighter Command lost two aircraft in the Pas de Calais area. The failure of the diversions to effect their purpose was probably due to three things, namely: (a) Although enemy fighters were maintained in a state of constant activity throughout the day, losses on both sides were small and there were comparatively few engagements. The enemy were thus kept in a state of alert without being exhausted. (b) The last diversion (Rouen) was leaving the target half an hour before the Lancasters crossed the French coast and the field was consequently left completely clear for the enemy fighters, at least some of which would have had time to land and refuel. (c) The front covered by the diversions embraced the route taken by the Lancasters. It was hoped that the enemy reporting system would be saturated by that move but such was not the case and far from assisting it was estimated that the diversions actually brought about reinforcements in the Le Havre area.

Ibid

Owing to the poor light and low altitude at which the attack was made, photographs taken with bombing lacked all essential details and were therefore inconclusive. They did indicate, however, that at least one and probably all the Lancasters passed directly over their target. Subsequent reconnaissance revealed severe damage, mainly to the south end of the works and also to the Main Assembly Shop. Detailed results of the raid were as follows. The main Diesel Engine shops of 1 - 3 stories and covering an area of 20,000 square yards were severely damaged by direct hits and there was also roof damage to two small buildings and a workshop. A large building believed to be connected with the Power Station was demolished and others badly damaged by blast. Out of four buildings believed to be stores for machine parts, two were demolished and two damaged. In addition, several workshops and weaving sheds outside the main target area were damaged.

AHB/TJH/84

A.M.W.R.

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1942.

USSBS

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That the attack, although light, was at least partially effective is confirmed by the U.S. Strategic Bombing Survey Report No. 32 which states that, in all, seventeen 1,000 lb. bombs fell on the target of which eleven hit structures and one fell near a bridge, damaging it. The remaining five did not explode. Of the 2,700 machine tools and 558 cranes and elevators in use in the plant prior to the first attack, 2.85 per cent. of the former and 2 per cent of the latter were damaged to varying extents. One Machine Tool Shop suffered complete structural damage and another was extensively damaged by direct hits. In addition, a Forging Shop received direct hits which caused extensive damage to

/ equipment

S E C R E T

equipment such as forging furnaces and drop forges although the structural damage was not as great as might have been expected. For further details of damage caused during the raid reference should be made to the above Report which concluded that in the opinion of the survey team the shop type structural steel buildings were not particularly vulnerable to 1,000 lb. and lighter bombs except locally in roof members easily replaced. Nor were machine tools and heavy equipment any more so except in cases of "soft" equipment such as furnaces.

(xii) Ministerial Reactions

The repercussions from the Augsburg raid were immediate and at a high level. On 27 April 1942 Lord Selborne, Minister of Economic Warfare, wrote to the Prime Minister protesting strongly that such a target should have been chosen in preference to all the other targets which had been strongly recommended by the M.E.W. and which had been accepted by the Air Staff as being of the highest priority. He pointed out that in the recent detailed comparison of economic objectives in Germany, six classes had been placed on high priority on grounds of vulnerability, accessibility, concentration of output and economic value. Submarine diesel engine manufacturers were not among them and had been given lower priority on the grounds that the plant was not of vulnerable type and that the total capacity from Germany and occupied countries was such that it could have met all the requirements of the submarine building programme even if the largest plant, the M.A.N. Works at Augsburg, had been completely wiped out. He estimated that the most that an attack on that plant could do would be to hold up the work on the twenty-odd sets of engines which might have been in an advanced state of construction at the time, thereby delaying for two or three months the construction of approximately ten submarines or two weeks planned submarine production. He queried the C.-in-C's failure to select either the Bosch injection pump and electrical accessory factory at Stuttgart Fuerback or the group of ball bearing factories at Schweinfurt, either of which were on high priority, not far from Augsburg and damage to which would have had a far more disastrous effect on a much wider range of war productions as well as being more vulnerable to an equal weight of attack. Finally he deplored the fact that the proposal to attack Augsburg had not been discussed either with M.E.W. or the inter-service Bomb Targets Information Committee, and expressed grave doubts as to whether the operation had been planned, in the light of the best intelligence available, to hit the enemy where it would "hurt him most".

Such a strong indictment could not go unchallenged. The matter was referred by the Prime Minister to the Chief of the Air Staff who replied that the value of the target to the enemy was by no means the only consideration in its selection in that particular instance. In planning what was largely an experiment the C.-in-C., had to take into account important tactical conditions. First, he wanted to penetrate as far south as possible, secondly, since the raid was to be flown at ground level, he had to select a target with good landmarks leading to it and thirdly, with the small number of aircraft involved and the need for a quick getaway, the target itself had to be compact and unmistakable. Neither of the alternatives suggested by Lord Selborne fulfilled the last two conditions. He was convinced that, in his search for a target suitable for such an experiment, the C.-in-C., had

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Mew File
"Policy/
Germany"
27.4.42

Ibid
29.4.42

S E C R E T

been guided by his desire to assist as much as possible in the Battle of the Atlantic. From his examination of U/boat Diesel factories he had found a target not only ideally suited to tactical requirements but also appearing from Intelligence information to be one of the most important in that category. The C.A.S. added that, while the C.-in-C. might have consulted the Air Staff, he was quite justified on security grounds in not doing so, but, in the light of the Minister of Economic Warfare's letter, he was being asked in future to seek a confidential check of the economic importance of any target against which he wished to carry out a special operation. Finally the C.A.S. pointed out that from reports so far received, it appeared that the attack had inflicted important damage on the plant.

ATH/DO/5
2.5.42

Question had been put and answer given and it is evident from further correspondence on the subject that the affair was rapidly developing into one of principle with M.E.W. on the point of liaison between the two departments. In a letter to the Prime Minister on 2 May the C.-in-C. had made it quite clear that the initial intention of the attack was, in pursuance of the common directive to the C.-in-C. Fighter Command and himself, to subscribe to the intention of forcing the enemy to retain and exercise in Northern France a major proportion of his Fighter Force, to the relief of the Russian and other Fronts. Such an aim, said the C.-in-C., necessitated an attack deep into France to disabuse the enemy of the idea that a more defensive crust on the coast was enough. Secondly, he was pursuing his constant policy of forcing the enemy to spread his anti-aircraft defences all over the Continent to the extreme south, into France and all over the interior of Germany in order partially to relieve the bomber force of the heavy concentrations they were then facing over the main targets, in the Ruhr in particular and North West Germany in general. A further consideration was the need to find an entry for the bombers in daylight at a point where the operations of Fighter Command could protect the bombers while they broke through the crust of the enemy defences, on the assumption that further inland they were unlikely to meet serious fighter opposition. It was accordingly necessary to find a worthwhile target in southern Germany which was within range of the bombers proceeding through France, which would enable them to reach their objective in daylight and at the same time to give them cover of darkness shortly after the attack and before penetrating any heavily defended area of Germany on their return. Finally, such an objective had to have approaches unmistakably marked by first class landmarks and such as would also deceive the enemy as to the precise target up to the last moment of the outward flight.

Such considerations, in the C.-in-C's view, led inevitably to a choice between Munich, Nurnberg or Augsburg. By routing the aircraft between Lake Geneva and the Ammer See he believed it possible to deceive the enemy into thinking that Munich was the intended target because it was straight ahead rather than Augsburg which involved a last minute turn of about 90° from the course flown.

On those main principles the decision to attack Augsburg was based. Apart from the hoped for effect on the enemy defences system, however, and the possibility of making a

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App. B 1910

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real contribution to the Battle of the Atlantic by inflicting serious damage on the M.A.N. Works, there were two other aspects of the operation which must be mentioned here. In the first place, a daylight attack on an important industry in a town hitherto unmolested by bombing might be calculated to have a serious effect on the morale of the local population who had probably thought themselves secure. In the second, such an experiment provided opportunity of testing the ability of the heavy bomber, with its greater range, speed and defensive armament; to stand up to or out-fly the enemy defences while, at the same time, indicating its suitability for daylight operations in general.

M.156/2 ?
3.5.42

The C.-in-C's letter was passed to Lord Selborne by Mr. Churchill on 3 May with the comment:-

"Please see this excellent reply by Air Marshal Harris to your paper. I would suggest that you ask him to luncheon one day and have a talk with him. This would knit up afresh the close relations between the two Departments."

There the matter ended as far as this Narrative is concerned. (1) It is questionable whether the experiment was worth its cost in valuable aircraft and lives. In any event, it was to be almost two years before any further daylight operations against German targets were undertaken by heavy bombers with the exception of Moling operations in 1942 which will be described under a separate heading. Meanwhile, in the next Section attention must once again be turned to the normal course of bombing operations against Germany which, in May 1942 were greatly restricted by bad weather on the Continent.

(xiii) Operations in May

Even more than usual, the choice of targets for attack during May was strictly limited by the extremely poor weather which persisted throughout the month. At no time were conditions suitable for operations against first priority targets in the Ruhr and Rhineland. On the other hand, weather restrictions over Western Germany left the Command free to attack aircraft industrial towns such as Stuttgart and Warnemunde as required by the amended Directive. For the most part, operations were on a fairly moderate scale and for ten days in the middle of the month were either entirely prohibited or limited to sea mining and one small raid on Boulogne.

AHB/T/39/1/3(A)
ORS/BC
Night Raid
Report
No. 59

The month opened with an attack on Hamburg on 3/4 May. North West Germany offered good conditions for bombing with a short period of moonlight and a strong force was originally detailed for Kiel. Later forecasts were less favourable, however, and the force was reduced by half and the target changed to Hamburg. The hope that the target area would have cleared by the time the aircraft arrived was unfortunately not fulfilled and most crews reported 10/10ths cloud. In spite of this, 56 of the 81 aircraft despatched claimed to have bombed their objective, mainly on E.T.A. With the exception of 12 aircraft of No. 3 Group

/ detailed

(1) It is worth noting that at a Meeting on 20 April, the War Cabinet expressed its admiration of the courage and determination with which this "daring attack" had been pressed home (WM(42)50th Concl:)

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detailed for a low attack on the submarine slips with 1,000 G.P. bombs, this was an incendiary raid. The glow of fires was seen against the cloud and one aircraft reported a large fire in the built up area in the northern part of the town. This was confirmed by a "reliable intelligence source" which reported very severe damage to property in the northern parts of the city. The "Hamburger Fremdenblatt" on 5 May stated that, almost without exception, bombs fell in densely populated residential districts.

AHS/II/39/1/3(a)

ORS/BC
Night Raid
Report

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The following night weather again necessitated a change of target and an attack on Cologne was cancelled in favour of Stuttgart. Seventy aircraft carrying incendiary bombs were given an aiming point in the built up area of the town and 51 were detailed to attack the Robert Bosch Works with H.E. Once again weather was less favourable than had been expected with 7/10/10ths cloud and considerable haze. Only one aircraft claimed to have seen and bombed the Factory but 73 stated that their bombs had fallen on or close to the town. Photographic evidence suggested that the attack was very scattered but a "reliable informant" present during the raid stated that two districts to the South of Stuttgart were on fire all night and it is probable that the main weight of the attack fell in that area. Confirmation of damage to the Robert Bosch Works was subsequently received from an intelligence source who stated that as a result, 600 workers were unemployed for two weeks.

BC/S.30770/Int:
Encl. 2A

AHS/II/39/1/3(a)

ORS/BC
Night Raid
Report
No. 61

A repeat attack the following night with the force again split between the town and the Factory, appears to have been scarcely more successful. Although there was no cloud over the target, ground haze combined with darkness made pinpointing very difficult and of the 24 night photographs returned, only one was within five miles of the target. It was "reliably reported", however, that the Hirth Motoren (Heinkel) Factory had been damaged and that output would be affected for a month.

BC/S.30770/Int:
Encl. 2A

AHS/II/39/1/3(a)

ORS/BC
Night Raid
Report No.62

On 6/7 May, the third and last attack of that series on Stuttgart was made by 97 aircraft. Once again haze made identification difficult and photographs suggested that, on the whole, crews had failed to find the target and the brunt of the attack had fallen on Heilbronn where it was believed that fires were started in built-up areas, and some useful damage was probably done. The Shaker technique was used on this raid, aircraft of the third wave carrying maximum H.C. or heavy G.P. bombs. All Gee aircraft were ordered to bomb on visual identification where possible or else on homing fixes promulgated by Command Headquarters.

BC/ORB
App. B/1933

Two nights later advantage was taken of good forecast weather to launch a heavy attack on the Heinkel Aircraft Factory at Warnemunde. This was one of the special G.A.F. targets proposed for the C.-in-C's consideration in the Air Ministry letter on 5 May. For this operation (8/9 May), the total force of 193 aircraft despatched was split into three sections. 147 aircraft of Nos. 3, 4 and 5 Groups were detailed to attack the Heinkel Works with H.E. while 34 aircraft of No. 1 Group made an incendiary attack on the town area. A further three aircraft from each Group were sent to attack searchlights in and around Warnemunde which were known to be very active.

BC/ORB
App. B/1937

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Ibid

The raid on the Heinkel Works was planned in three Phases of which the main weight was concentrated in Phase 2. Phase 3 constituted a low level attack by six aircraft from each of Nos. 3, 4 and 5 Groups. The incendiary attack on the town area was timed to overlap Phases 2 and 3 from Z plus 20 to Z plus

AHB/11/39/1/3(A)⁶⁰.

ORS/BC
Night Raid
Report No. 64 ✓

Unfortunately only eight out of the twelve aircraft allotted to the attack of searchlight positions in Phase 2 completed their task and those were unable to cope with the large number of lights in operation which were used to dazzle crews with great effect. As a result many were unable to pinpoint their aiming points. Only 41 aircraft claimed to have identified the Factory successfully but a further 68 stated that they had bombed its estimated position or the neighbourhood. Although 32 of the 34 aircraft of the incendiary force claimed to have attacked the town area, fires were scattered and none of them appeared to have been very large.

Ibid ✓

Altogether 48 successful photographs were taken with bombing of which 10 showed the target and a further 25 points within five miles. Those of the target, however, indicated that many bombs had scored only near misses and this was confirmed by daylight reconnaissance which showed only slight damage inflicted on one building in the Heinkel Works. Four buildings in the neighbourhood of the harbour basin were seen to be destroyed or damaged and there was considerable damage to the railway station and trucks. Other incidents included damage to residential property and roadways but it was estimated that the bulk of the attack had fallen in open country and at least 140 craters were visible around the town.

Ibid ✓

The failure of this operation appears to have been partly due to the very effective use of searchlights by the enemy and partly to the fact that the target was an extremely difficult one since the town and factory formed a narrow strip about a quarter of a mile wide along the waterfront. On the other hand, concentration over the target area was fairly good, 137 of the 149 aircraft which attacked Warnemunde dropping their bombs in the first hour. Altogether 19 aircraft were lost on the raid including eight from among those carrying out low level attacks on the factory and a further three from those which came down low to extinguish searchlights. The majority were believed to have fallen victims to light flak which was very intense over the target area.

BC/ORB
App. B

For the next nine nights weather at home bases or over the Continent was consistently bad. On five nights operations were entirely precluded and on the remainder were reduced to seaming with the exception of the 17/18th when a very small force was sent to Boulogne. Although raids were twice laid on against Bremen and once against Hamburg, all three had to be cancelled owing to weather and it was not until 19/20 May that the Command again operated over Germany.

AHB/11/42
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On that night advantage was taken of a forecast of favourable conditions in South-West Germany to despatch 197 aircraft to attack Mannheim, an important centre of communications and industry. Apart from important general and electro engineering works and a marshalling yard estimated to handle roughly 7,000 wagons in 24 hours, Mannheim was the chief transshipment port on the Upper Rhine and the second largest inland port in Europe.

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App. 1956

AHS/II/39/1/3(a)

ORS/BC
Night Raid
Report
No. 69 ✓

On this operation each Group was ordered to employ its own "target finding force" to attack Mannheim in the first five minutes of the raid. The remaining aircraft were instructed to carry 100 per cent incendiary loads with the exception of Lancasters and Halifaxes which were to carry one 4,000 lb. bomb and Manchesters which were to carry 2 x 1,000 lb. bombs made up maximum incendiaries.

Although there was little cloud, ground haze augmented by smoke in the later stages made pinpointing difficult. A considerable proportion of the 155 aircraft claiming to have attacked the target were unable to distinguish ground detail and bombed on fires on green flares. Huge fires were reported but photographs showed those to be in forests and open country between 15 and 20 miles to the west. In practice very few aircraft appeared to have reached the target where only slight damage was inflicted. In the absence of any known decoy, it was estimated that the failure of this attack was due to misidentification of the target by early arrivals whose incendiaries led the remainder of the force astray.

This was the last night attack on Germany in May until the "thousand raid" on 29/30th which will be discussed in detail in the next Chapter. Although a repeat attack was planned on Mannheim and others on Hamburg, Essen and Kiel, they were all called off owing to poor weather while from 26/27th efforts were made to conserve the force for the big operation which was due to take place on the night of 27/28th or the first suitable night up to 31/1 June.

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App. B

(xiv) Review of First Three Months

At a first glance, operations in the three months under review in this Chapter appear somewhat disappointing. As regards actual damage, it is doubtful whether, with the exception of those on Lubeck and Rostock, any of the attacks produced really lasting results. On the other hand, some very useful "nuisance" effects were created, particularly by raids on Cologne and Kiel and even over the Ruhr where every bomb dropped in that congested area may be presumed to have contributed its quota to the accumulative effect on the morale of the German people of the increasingly heavy and concentrated attacks.

The main reasons for the lack of success of many of the raids was undoubtedly the very poor weather encountered on the majority of operations, the inexperience of crews in the new bombing techniques and the failure of Gee to come up to expectations as a blind bombing device. On the other hand, the considerable improvement in navigation and timing resulting from its use enabled the bomber to reach concentrations in time over target areas of upwards of 100-150 aircraft within and frequently well under the hour. This in itself was a major step in the required direction.

Taking an overall view, this was inevitably a period of trial and error from which, in addition to realisation of the need for much technical improvement as regards flares, target indicators and the like, three very important points emerged, namely:-

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- (a) The C.-in-C's conversion to the use of incendiary bombs not only as tactical aids to accuracy but for damage effect.
- (b) The acknowledgement by the C.-in-C. of the Air Staff view that, in the absence of a proven blind bombing device, it was absolutely essential to have thoroughly experienced crews in the van of the force.
- (c) The knowledge that, to do any really lasting damage to major industrial areas in Germany, particularly in the Ruhr, a very much greater weight of effort was required than had hitherto been attempted or was normally possible with the limited resources available at that time.

This latter point led directly to the period of intensified effort which will be described in the next Chapter. For the rest, the back of the initial problems of method and technique had been broken and, thence forward, tactical development was to be comparatively rapid.

S E C R E T

CHAPTER 17

THE THOUSAND RAIDS AND OTHER ATTACKS IN JUNE. (1)

(i) Conception of the "Thousand Plan".

The Thousand Bomber Raid on Cologne which took place on 30/31 May 1942 was in many ways an anachronism. It was to give the German people an unwelcome taste of what was in store for them in the future at a time when, under the existing circumstances, Bomber Command could not hope to maintain or even repeat at more than very infrequent intervals operations on that scale. Moreover, the mobilisation and operation of a force of such size at a time when the average availability of medium and heavy bomber aircraft with crews was only 346 aircraft, when the largest force hitherto despatched against a single target numbered only 228 aircraft and when the organisation for controlling large numbers of bombers in the air and landing them on return was still in its infancy, was a conception of great daring.

That the C.-in-C., when putting forward the suggestion to the Prime Minister, was fully aware of the risks entailed particularly in the use of large numbers of training aircraft is abundantly evident from his book "The Bomber Offensive".(2) The following excerpt clearly shows his appreciation of the dangers as well as the advantage of such an undertaking:-

"The Bomber
Offensive"
Pages 108-109

"If there were great risks involved in a high concentration of aircraft, then these risks would be increased by sending out large numbers of new crews but if, on the other hand, this high concentration was a definite protection against fighters and flak, then I should not be calling on new crews to run so grave a risk as the front line squadrons had habitually taken. The dangers were many and obvious. If anything went wrong..... then I should be committing not only the whole of my front line strength but absolutely all my reserves in a single battle. Our whole programme of training and expansion might conceivably be wrecked and in any case I had very seriously to consider the inevitable interference with normal training which would occur while the force was being organised.....

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- (1) This Chapter should be read in conjunction with Chapter 12. Section (ii)
 - (2) It is realised that Sir Arthur Harris' was book "The Bomber Offensive" is not a Primary Source. On the other hand, the thousand raid on Cologne was, in the fullest sense, his own "brain-child" and his account of its "conception" is of considerable interest.

S E C R E T

"..... If we succeeded we should have before us a definite and attainable goal, a measure of what could be achieved as soon as our expansion really began. The result of using an adequate bomber force against Germany would be there for all to see and I should be able to press for aircraft, crews and equipment we needed with far more effect than by putting forward theoretical arguments..... But it was not only a question of convincing those in power that bombing could be a decisive weapon; from such an operation we should also learn a number of tactical lessons of the greatest possible value, lessons which could not be learned in any other way and without which we could not prepare for the main offensive.....

"As to the harm such an attack might do to the enemy, this would no doubt be considerable even though it was obvious that Germany, with the industries of the Reich undamaged and the resources of all Europe at her disposal would be able to restore any lost production in a comparatively short space of time. Not one or two such strokes but the cumulative effect of hundreds of them would be needed before the enemy felt the pinch. On the other hand there was a good chance that morale would be affected by the first really heavy blow to get through the main defences of Germany."

AHS/TH/241/3/853.
BC/S.27210
Encl. 2.A.
20.5.42

The above extract leaves little doubt as to the C.-in-C's intentions. He also states that he got Mr. Churchill to agree to the plan late one Sunday evening at Chequers. In any event, on 18 May he discussed it with the C.A.S, who wrote on 19 May that the Prime Minister "warmly approved" and advised him to go ahead with the necessary arrangements.

ibid.
3A,
20.5.42

The first and foremost problem was of course to raise the required force. By mobilising all O.T.U., Conversion Flight and similar aircraft capable of carrying a useful load of incendiaries and/or H.E. which could be manned either by Instructors or O.T.U. crews nearing the end of their training, the C.-in-C. hoped to increase his operational strength to approximately 700 aircraft. The balance he hoped to obtain from other Commands. Meanwhile the inclusion of training aircraft, non-operational and inexperienced crews and the tremendous congestion of air traffic which would result from a force of the size proposed limited the choice of a target to one which was large and easy to find and necessitated the attack being carried out in full moonlight. Hamburg was chosen as a possible target with Cologne as an alternative should weather preclude operations in the first area. The attack was tentatively fixed for 28/29 May or the first suitable night thereafter within the full moon period.

ibid.
23A
and
3A

AHS/TH/241/3/853
BC/S.27210
3A
20.5.42

On receipt of the C.A.S' letter, the C.-in-C's first act was to write personally to all his Group Commanders and to A.Os.C.-in-C Coastal, Flying Training and Army Co-operation Commands outlining his plan and calling for the maximum contributions in aircraft and crews from all concerned. He explained that the idea of the operation was to saturate the A.R.P. arrangements at the objective and to cause a complete and uncontrollable conflagration throughout the target area. To that end, the maximum number of

/incendiary

SECRET

incendiary bombs would be carried, H.Es only being included when essential as a make-weight towards an economical load. (It will be noted that this was in accordance with the original 100% Unison Plan.) The following day, Bomber Group Commanders were warned that no crews capable of taking part should be allowed leave of absence from 28 May until the operation had taken place.

ibid.

9A

21.5.42

The response from all sides was immediate and enthusiastic Coastal Command alone offered roughly 250 aircraft, including the two Wellington and Two Whitley squadrons on loan to them from Bomber Command, four torpedo Hampden squadrons, two Beaufort squadrons and "an assortment of Hudsons and O.T.U. aircraft."

5A

21.5.42

Air Marshal Sir Philip Joubert added that Coastal Command would use their own East Coast aerodromes. From Flying Training Command came a tentative offer of 30 aircraft comprising Wellingtons, Whitleys and Hampdens. There is no record of the original offer from Army Co-operation Command but in the event they operated 16 Intruder sorties in conjunction with aircraft of No.2 Group.

which was fortunate because the Coastal Command Contingent had been withdrawn. (1)

From the Operational and O.T.U. Groups the response exceeded even the G-in-C's expectations. It was soon apparent that well over a thousand aircraft would be available from Bomber Command alone and that the large Coastal Command contingent would not be required. (1) On 30/31 May the combined effort from Nos: 91 and 92 Groups was 367 sorties of which the astonishing total of 259 was despatched by No. 91 Group alone.

(ii) Organisation of the Thousand Force.

Air Marshal Joubert had asked that Coastal Command aircraft taking part in the Thousand Raid might operate from their own Stations, but, for satisfactory co-ordination of such a vast undertaking, it appeared more practical to have all aircraft located on and under the control of Bomber Command Stations. Arrangements ~~had~~ ^{been} therefore put in hand for the accomodation of Units from Coastal, Flying Training and Army Co-operation Commands within operational Groups. In addition accomodation had to be found for No.26 O.T.U. (92 Group) and a limited number of aircraft from certain Units of No. 91 Group which were to operate from advanced bases. (2)

AHB/IC4/24/3/853.

BC/S.27210

22A

23.5.42

All this obviously entailed a vast amount of detailed administrative organisation both at Command and Group Headquarters and on the Stations concerned. Briefly, the plan was as follows:-

/(a)

(1) Apparently as a result of an Admiralty intervention. (A.H.B./ID3/1502).

~~(1) This statement was obtained verbally from an Operations Officer at Headquarters Bomber Command. It has not been possible to check its accuracy or to discover any other reason for Coastal Command's non-participation in the first "thousand" raid.~~

(2) Details of the Units and Squadrons involved in the move will be found at Appendix 11.

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G.169087/DC/11/50/

- (a) All aircraft of No.1, 3, 4, 5 and 92 Groups (excepting No. 26 O.T.U) and certain Units of No.91 Group to operate from their own Stations.
- (b) Aircraft from Flying Training, Coastal and Army Co-operation Commands, No.26 O.T.U. and certain Units of No.91 Group to operate from advanced bases in Bomber Command.
- (c) North Luffenham to come under the operational control of No.5 Group.
- (d) Station Commanders to assume full operational control of visiting aircraft.
- (e) All Units moving to advanced bases to take sufficient maintenance personnel to maintain their aircraft during their stay.
- (f) As many aircraft as possible moving to advanced bases to carry bomb loads as laid down in B.C. Operation Order No.148. Any Unit unable to comply to notify receiving Station which would arrange to bomb them up. All receiving Stations to arrange for sufficient available bombs for repeat operation if required.
- (g) In order to make full use of limited number of Standard Bomb Containers available the following arrangements to be observed:
 - (i) No.91 Group deficiencies to be met by transfer on loan from No.92 Group.
 - (ii) Coastal Command deficiencies to be met by transfer on loan from No.2 Group.
 - (iii) Flying Training Command deficiencies to be met as far as possible by Bomber Stations at which located.

The above gives some idea of the many problems and difficulties which were met and overcome. Flying Training Command aircraft were scheduled to move on 25 May 1942, and all other aircraft were to complete their move by 1800 hours the following day. The former, through no fault of their own, caused a considerable amount of additional work at the operational Stations at which they were located. The numbers involved had been cut from the original force of 30 to 14 but even so, despite strenuous maintenance work, the seven Hampdens and three of the Whitleys were unable to take part in the operation although places were found for several of the crews in Bomber Command aircraft. After the expenditure of many man hours in fitting the necessary "gadgets" which were not part of the normal equipment of training aircraft, the four F.T.C. Wellingtons at Feltwell were able to operate.

/(iii)

A48/
1 TH/241/3/8 53
BC/S.27210
40A & B
and 42A

ibid.
43A
14.7.42

AH6/TH/241/3/853. (iii) The Operational Plan

BC/S.27240
21A

ibid.
23A

An Operational Order giving alternative plans of attack for Hamburg and Cologne respectively, the target to depend on weather conditions in either area, had originally been issued on 23 May. This was subsequently cancelled and Bomber Command Operation Order No.148 issued on 26th in its place. (1)

If, as subsequently happened, the choice fell on Cologne as the target for the night's operation, the attack was planned to last an hour and a half from Z to Z plus one hour thirty minutes. All available Gee-equipped aircraft of Nos.1 and 3 Groups were to attack during the first 15 minutes and all available heavies of Nos.4 and 5 Groups in the last 15 minutes of the raid. The remaining aircraft were to be evenly distributed over the intervening period. In addition, Nos.1, 3, 4 and 5 Groups were each instructed to detail two experienced crews to bomb the target just before the end of the raid and to take night photographs and make a visual report of the results of the attack.

ibid.

All aircraft were ordered to carry the maximum economical loads of 4 lb and 30 lb incendiaries made up, where necessary, with large H.C. and G.P. bombs. In particular as many 4 lb X.I.Bs as possible were to be dropped by aircraft of Nos.3, 4 and 5 Groups, the greater proportion being carried by aircraft in the first wave. As the attack was to be carried out in bright moonlight flares and markers were not to be used.

AH6/TH/39/1/3(A)

ORS/BC
Night Raid
Report ✓
No.74

and
BC/S.27240
23A

AH6/TH/241/853
Encl. 23A.

Three separate aiming points were allotted. Nos.1 and 3 Groups and aircraft operating with them were given one in the centre of the town; No.4 Group and No.92 Group one about one mile to the north of it and Nos.5 and 91 Groups about one mile to the south of it. All crews were instructed to bomb between rather than on existing fires. Finally, so that there should be no waste of effort, aircraft unable to identify Cologne were ordered to set course direct for Essen with any built-up area seen in the Ruhr as a last resort target.

ibid.

The route to the target was direct. Aircraft were to leave the area immediately after dropping their bombs (minimum height 8000 ft.), increase speed and lose height. They were then to proceed approximately S.S.W. for about 20 miles before setting course for home parallel to their outward track;

AH6/TH/241/3/853.

BC/S.27240
Encl.23A

Owing to the large numbers of aircraft operating and the very limited hours of darkness, the importance of adhering strictly to the pre-arranged timing was strongly emphasised. In particular, in order to avoid aircraft which were late owing to delays at take off or through faulty navigation being intercepted in daylight on the return journey, all aircraft were ordered to turn for home not later than Z plus one hour 45 minutes wherever they might be and whether they had dropped their bombs or not.

/It

(1) See Appendix 11

It has been seen that the C-in-C was fully alive to the danger to the whole future of the bomber offensive in the event of the operation proving a fiasco. It was expected that the high concentrations over the target would saturate the enemy defences and provide the maximum protection against flak. Meanwhile everything possible was done to protect the force from fighter interception and particularly on the return journey. on 23 May the D/C-in-C wrote personally to Air Vice Marshal Henderson at Fighter Command asking for co-operation with No.2 Group and Army Co-operation Command in Intruder work to keep down the German night fighters. He also asked for night fighter sweeps over the North Sea to cover the returning bombers.

At a Meeting at Bomber Command on 25 May to discuss the co-ordination of Intruder activity it was agreed that, in the event of the target being Cologne, as early in the night as possible all Blenheims of No.2 Group and Army Co-operation Command would attack the aerodromes of Venlo, St. Trond, Juvincourt, Bonn, Vechta and Twente Enschede and that Bostons and Havocs of No.11 Group Fighter Command would attack Schipol, Eindhoven, Gilze-Rijen, Leeuwarden and Soesterburg. Long range Hurricanes would operate at the discretion of the A.O.C. No.11 Group during the latter half of the night. A Fighter Command Operation Order had already been issued on 24 May instructing the A.O's.C Nos.11 and 12 Groups to co-operate with all possible fighter protection for the returning force as well as with maximum Intruder activity.

(iv) The Attack on Cologne.

Weather

The initial date for the operation, tentatively fixed for 28/29th had been put back to 27/28 May and on 26 May the great bomber Armada was standing by at its allotted bases awaiting the signal to attack. Then, as always, the critical factor and one which could not be controlled by any amount of pre-planning was the weather. Throughout the month this had been bad and on 27/28 May thundery conditions and much cloud over the Continent forced a postponement to 29/30th. On that night similar conditions persisted and once again the task was postponed. The position was now becoming tense. Advantage had been taken of fair weather over France on 29/30th to send a small force to attack the Gnome and Rhone Works at Gennevilliers and a few aircraft had undertaken minelaying missions but for the past three nights the major proportion of the bomber force had been standing idle. Clearly, this could not go on indefinitely. On 30 May good conditions were promised at home bases but over Germany thundery cloud still persisted. It was for decision by the C-in-C whether to take advantage of good conditions over a large number of aerodromes in this country which was essential for the landing of a force of that size and to risk the possibility of the target being cloud covered, the operation proving a fiasco and the plan being disclosed to the enemy or to wait for better weather over Germany and chance the possible deterioration of conditions in this country. To make the latter choice might well mean keeping the force idle for several more nights and possibly, if conditions did not improve before the full moon waned, disbanding it with the task not done.

The Rhineland was the only area offering reasonable chances for a successful attack and by 1200 hours on 30 May it had been decided to mount the operation against Cologne the same night. The Executive Order was despatched at 1223 hours and all aircraft were warned to avoid flying in cloud as far as possible.

G.169087/MFG/11/50/

/In

ibid.
13A

ibid.
17A

ibid.
31A

BC/ORB.
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1973

S E C R E T

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In practice the force encountered 8-10/10ths cloud over the North Sea and No.4 Group in particular experienced severe icing conditions. Over Holland the cloud began to break up, decreasing to nil in the target area with the exception of small amounts of cirrus. The majority of home bases remained serviceable throughout the night and visibility was generally moderate although towards dawn it reduced to 2000-4000 yards in Nos.4 and 5 Group areas.

The Force

A total of 1046 aircraft were actually despatched for Cologne of which all but four Flying Training Command Wellingtons were raised from Bomber Command's own resources. Full details of the forces taking part are at Appendix 11 but briefly, they comprised:

Heavies	338 aircraft
Mediums	708 "

Of those totals, 367 medium aircraft were put up by the Training Groups (1) and the remainder (less four F.T.C. aircraft) were supplied by Operational Groups and their Conversion Units. No.3 Group alone put up 221 and No.91 Group 259 aircraft which, at that time, were regarded as strong forces in themselves.

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The Attack

Timing of the attack closely followed that laid down, the raid opening at 0038 hours (17 minutes early) and finishing at 0310 hours (45 minutes late). But only 38 (including a number of training aircraft) claiming to have attacked Cologne bombed outside the allotted period. There was, however, a certain amount of overlapping of the three waves and in particular, a considerable proportion of the third wave was early, some crews being as much as 20 minutes ahead of schedule.

Ibid. ✓

Apart from that, everything went according to plan. First wave aircraft reported that Gee was of great assistance in navigating to the target area but, once there, they were able to identify it visually in the full moon. Likewise, second and third wave aircraft had no difficulty in recognising the target in the light of fires started by first arrivals. Aircraft bombing after 0115 hours reported large and growing fires and some crews saw those from as much as 150 miles away on the return journey. The A.O.C. No.3 Group who personally accompanied his crews in a Stirling reported fires within half a mile of the aiming point before his heavies attacked.

BC/ORB
App. A.372

Tonnage Dropped

AHS/II/39/1/3(A)

ORS/BC
Night Raid Report
No. 74 ✓

Altogether 898 aircraft (86%) claimed to have reached and attacked the target, dropping a total of 1455 tons of bombs (540 tons of H.E. and 915 tons of incendiaries). In order to reduce the possibility of one aircraft taking a photograph with another aircraft's flash bomb, only 246 cameras were carried and 45 photographs (representing 5% /of

(1) These were to be manned by instructional staffs although crews could be made up with u/t. personnel at the discretion of A.O's.C.

S E C R E T

of the attacking force) were taken showing ground detail. From their distribution it was estimated that at least 60% of the total tonnage was dropped more or less evenly over an area of three miles radius from the Neuarkt. This gave an average density of 31 tons per square mile but it was thought that this might have been somewhat greater since it was likely that the limited number of photographs gave a pessimistic view of the raid's accuracy.

Enemy Defences

Ibid ✓ In spite of Intruder operations, enemy fighters were much more active than usual, particularly on the return journey when the intruder effort was appreciably less. German night fighters were concentrated mainly in the coastal areas and in the neighbourhood of the target. Although the main searchlight belt was reported as absent, searchlights were very active in the Rotterdam - Over-Flakee area and along the Rhine and in the target area activity was intense, particularly in the earlier stages of the attack.

Ibid ✓ Flak defences which were working in close conjunction with cones of searchlights and night fighters in the target area, were moderate in intensity but crews claimed that after the first three quarters of an hour they seemed to become weak and confused. On the other hand, it was thought that this impression may have been given by the enemy's decision (on realising the magnitude of the raid) to concentrate on single aircraft. Crews also reported that the majority of the aircraft falling victim to flak were held in searchlights and from available evidence it appeared that one aircraft was shot down by flak every seven or eight minutes throughout the whole attack. This suggested that the large concentrations over the target did not prevent the enemy location devices from selecting and following single targets. On the other hand, aircraft may have been picked out by searchlights quite fortuitously and then followed visually.

Damage and Losses

Ibid ✓ Altogether 40 (3.8%) of the aircraft despatched against Cologne were missing and a further 116 suffered in greater or lesser degree, 12 having to be written off and 33 receiving serious damage. From crews reports it was estimated that 22 aircraft were lost over the target area from the following causes:

Flak	16
Enemy Fighters	4
Collision	2

The losses in collision were probably due to the fact that a number of aircraft did not follow instructions to leave the area after unloading their bombs but circled the target for some time observing results. Outside the target area losses to flak and fighters were estimated in the ratio of 1.2. Two aircraft were known to have been destroyed in collision over this country. As regards O.T.U. aircraft, losses sustained by both Groups were 3.5% (1) which was appreciably below the 4.0% lost by operational Groups.

/On

(1) A further 45 aircraft were damaged from various causes.

AHB/TJH/241/3/853.
BC/S.27210
23A

On the other hand, O.T.U's had been ordered to man their aircraft as far as possible from the Instructional Staffs although crews could be made up with u/t personnel at the discretion of A.O's.C. In practice, the greater proportion of pilots lost on the Cologne raid were Instructors (including seven from No.91 Group alone) who could ill be spared from the Training Organisation(1).

AHB/II/39/1/3(a)
ORS/BC
Night Raid
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In general, although the missing rate (3.8%) on this operation was slightly above the average missing rate for attacks on Cologne between August 1941 and April 1942 (3.5%) the average missing rate for attacks on Western Germany in conditions of full moon and no cloud between June 1941 and March 1942 was 4.6% so that the 3.8% lost over Cologne on 30/31 May 1942 was considerably below normal.

Results of Attack

Ibid.
and
BC/ORB
App.A.373

Early on 31 May four Mosquito aircraft of No.2 Group operated for the first time in a harassing attack against Cologne. The pilot of one of the aircraft reported that there were numerous fires in the centre of the City and surrounding residential areas on the west bank of the Rhine and several large fires in industrial and residential areas on the east bank. Smoke from the fires covered the city and rose to a height of 15,000 feet, effectively preventing photographs from being taken.

AHB/II/39/2/3(a)
ORS/BC
Night Raid
Report No.74 ✓

Later reconnaissance, however, obtained photographs which clearly indicated the extent of the heavy damage achieved and the very evident success of the operation. 600 acres were seen to have been completely destroyed of which about half were in the centre of the town and there was no appreciable area free from incidents. Over 250 factory buildings were estimated to have been either destroyed or seriously damaged. They included metal works, rubber works, blast furnaces, chemical works, a large oil storage plant, railway workshops and manufacturers of submarine engines, accumulators and batteries for submarines, undercarriages, rolling stock, machine tools, steel rope, dyes and glassware. Public buildings destroyed included Police Headquarters, a Post and Telegraph Office and a number of Churches.

AHB/6
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German records show that altogether 12,840 houses were damaged (about 1,200 by fire) and 45,132 people rendered homeless. Intelligence sources reported that 140,000 people had to be evacuated, the majority to Munich or Stuttgart and that emergency feeding, first aid and other measures broke down altogether, some people having to walk as much as 30 miles to find lodgings.

/German

(1) Actual figures of aircrews lost in Staff and Pupils are as follows:

	<u>Staff</u>		<u>Pupils</u>
Pilots	10	Pilots	7
Others	30	Others	42

AHB/6 German Records also mention 1505 works and 328 factory air-
Translations raid shelters damaged with the following results:

36	factories	had	100%	decrease	in	production
70	"	"	50-80%	"	"	"
242	"	"	less than 50%	decrease	in	production

In addition, the tramway service in the centre of the town was interrupted for a week and railway traffic from the central stations was discontinued for some days. In this connection, Intelligence sources reported that by 6 June only one instead of six passenger trains was running between Cologne and Basle and travel on that was subject to strict control.

AHB/TH/84
A.M.W.R.
Manual of
B.C. Ops.,
1942

Finally, German Police Records reported 468 people killed and 5,027 injured. In addition to damage to houses and factories, 17 water mains 32 electricity cables, 12 telephone cables and 5 gas mains were stated to have been completely destroyed.

AHB/6
Translations

AHB/TH/84
A.M.W.R.
Manual of
B.C. Ops.,
1942

Although reports from Intelligence Sources have to be accepted with some reserve, the following items are of interest as "background" material:-

(a) Extract from diary of German soldier killed in Russia:

"Last mail made an overwhelming impression. On everybody's lips are the words "Koln" and "Essen". Relatives write terrible things. Friedrich was informed that "life come off the rails" and people simply cannot recover after this dreadful disaster".

(b) Account from reliable informant who visited the City:

"The devastation is absolutely indescribable. To my own knowledge 16 factories and _____ a large number of banks and insurance buildings have disappeared. 140,000 people were officially evacuated but the exact number of dead I was unable to ascertain. They are buried in communal graves and the number is stated as 10,000. The population is very bitter against the Party whom it accuses of not paying sufficient attention to the protection of the town, for shortly before the attack a large proportion of the Flak had been moved from Cologne to the Eastern Front. Today in Cologne the Party uniform has the same effect on the population as a red rag to a bull. The resentment of the inhabitants was still further increased by the fact that neither Hitler, Goebbels nor Goering came to the funeral of the victims _____

/(c)

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- (c) Another account states that evacuees were "reminded forcibly" that their sufferings were personal, and not typical of general events upon which subject they must keep quiet. In future representatives of the Ministry of the Interior with emergency powers would be sent to towns which had been heavily bombed.
- (d) The following report on Germany A.R.P. was received from a wellplaced source:

"Since the attack on Cologne the whole German A.R.P. system has had to be re-organised. Up till that time the A.R.P. services including fire-brigades went into action as soon as a raid started but the losses in A.R.P. personnel in the Cologne attack were so great that.....it is expected that instructions will shortly be given that in the case of raids on a large scale the A.R.P. organisations should not go into action until after the raid has ceased even should this result in a considerable extension of fires..... By the time the raid was over so many A.R.P. personnel had been killed or injured and so much fighting equipment badly damaged that it was as a result impossible to deal with the fires."

- (e) In connection with the breakdown of the A.R.P. it was also reported that early in the attack the Police Headquarters and the Central Telephone Exchange for the fire alarm system were hit and the consequent confusion was believed to be largely responsible for the failure of the A.R.P. services to co-ordinate.
- (f) Other reports state:
- (i) That the raid caused serious dislocation in the supplies of Ruhr coal and coke for German industry and railway purposes
- (ii) Frequent appeals were made, even as late as 10 August for accommodation for the thousands of skilled and unskilled workers drafted to Cologne to assist in repair and clearance work.
- (iii) Nine days after the attack Cologne was still cut off from communication by telephone or telegraph with the rest of Germany. No mail was to be allowed to go out from the City for two weeks and even then would be censored.
- (iv) An Army depot containing spare engines for lorries was hit and over 1000 destroyed or seriously damaged.

/Fighter

S E C R E T

Fighter Support and Intruder Activity

ANB/11/39/1/3(A)

ORS/BC
Night Raid
Report
No. 74 ✓

In addition to the 1046 aircraft despatched against Cologne, 16 aircraft of Army Co-operation Command co-operated with 34 aircraft of No.2 Group in bombing enemy aerodromes between 2355 and 0315 hours. Thirty-five of those aircraft successfully accomplished their allotted tasks, bombing the runways at all aerodromes as well as aerodrome buildings at Venlo, Twente and Bonn. (1) Only one out of nine aircraft succeeded in reaching Vachta, however, the remainder being prevented from fulfilling their mission by weather, much low cloud and fog over the East Frisians being encountered en route.

Ibid.

As well as providing fighter cover for aircraft over part of the return route, Fighter Command aircraft also undertook Intruder operations against the following enemy aerodromes which were so timed as to dovetail in with and support Bomber Command's Intruder sorties: (1)

Leeuwardern	Eindhoven	Soesterburg
St. Trond	Venlo	Schipol
Gilze-Rijen	Deelan	Twente

Fighter Command claims included one enemy aircraft destroyed and four damaged. One aircraft of Bomber Command attacking Juvincourt claimed to have dropped its bombs on an aircraft which was landing.

From all those operations, Bomber Command, Fighter Command and Army Co-operation Command each lost one aircraft.

(v) Thousand Attack on Essen

In the event of the attack on Cologne proving successful, it was planned to take advantage of the full moon and the large force already assembled to launch a second thousand raid the following night. All Groups had been warned to standby but a forecast of cloudy weather over Germany necessitated a postponement until 1/2 June. Although conditions on that night were none too promising, the large concentrations of aircraft could not be kept immobilised indefinitely. It was accordingly decided to take advantage of the prospect of at least reasonable weather in the Ruhr to attack Essen. Not only was Essen a top priority target and within Gee range but it also offered the most likelihood of freedom from the low cloud which threatened in other areas. Moreover, it was in a latitude where there was a longer period of darkness to enable the attack to develop than was available over N.W. Germany.

/The

(1) See appendix 11

S E C R E T

AHB/II/39/1/3(a)
ORS/BC
Night Raid
Report No.76 ✓
and BC/ORB
App.B. 1922

The normal shaker technique was used on this operation, the force being divided into three sections comprising a flare force, an incendiary and a main force. The following detailed instructions were issued for the attack which was timed to open at 0050 hours:-

Section 1: Between Z and Z plus 23, 20 selected Gee-equipped Wellingtons of No.3 Group to drop 12 bundles of three flares at eight second intervals, giving a stick about four miles long. The flare force were to approach the target along the B latticeline, dropping their flares at a given release point calculated to place the centres of the stick over the target.

Section 2: From Z plus 2 to Z plus 15 minutes, 60 specially selected aircraft of No.3 Group, 10 Gee aircraft of No.1 Group, 30 Halifaxes and 25 Lancasters carrying maximum loads of 4 lb. I. Bs made up where necessary with 30 lb. I. Bs to navigate to the target along the same lattice line but dropping their bombs on visual identification confirmed by Gee fixes. Crews attacking in the first three minutes of this wave to be specially selected for their navigational ability.

Section 3: All remaining aircraft carrying loads made up of incendiary bombs and large H.E. to spread their attack evenly over the period Z plus 15 to Z plus 90 minutes.

All crews were specially warned against dummy fires which were numerous in the area and aircraft unable to identify the target were ordered to attack any built-up area in the Ruhr.

AHB/II/39/1/3(a)
ORS/EC
Night Raid
Report No.76 ✓

As on the Cologne raid, Intruder activities were undertaken by 34 Blenheims of No.2 Group and 14 Blenheims of Army Co-operation Command in an attempt to reduce the enemy's night fighter activity. Twenty-seven were successful in accomplishing their task and a further seven bombed other aerodromes than those detailed owing to inability to reach or find their target. Fighter Command again undertook Intruder sorties to supplement the bomber effort and also provided cover for the returning force over as much as the route as possible.

ibid. ✓

Altogether 956 aircraft took off for Essen, including 244 aircraft of No.91 Group, 103 of No.92 Group, and two Wellingtons of Flying Training Command. Of the force despatched, 767 (80%) claimed to have dropped their bombs in or near Essen. Unfortunately very few were able to identify the target with any certainty owing to weather conditions; most crews reporting 5-10/10ths thin cloud at 8000 ft. and a few found a second thin layer at between 2000-5000ft.

/On

S E C R E T

ibid. ✓

On balance, this attack does not appear to have been anything like as successful as the Cologne raid. From crew reports it appeared that there was a tendency to release flares early, while some stated that all flares were west of the target area. These observations were confirmed by photographs taken with bombing during the flare period which, in the main, fell into two groups - one about three miles west of Essen and the other around Hamborn. In any event, flares were not very effective in lighting the ground owing to haze and the fact that many of them appeared to have been dropped too high. On the other hand, a number of crews reported that they were very useful as guides to the target area and those jettisoned by one aircraft near Geldern did not seem to have misled the rest of the force.

ibid. ✓

A number of aircraft, seeing built-up areas, fires or flares on E.T.A. Essen bombed on those, while other bombed on Gee fixes or E.T.A. from pinpoints on the Rhine. Altogether 73 photographs were taken with bombing and those suggested that the attack was very scattered. None showed the target and only eight were within five miles but a number were plotted in the Duisburg-Hamborn area.

Ibid. ✓

The evidence of night photographs was later confirmed by daylight reconnaissance on 2, 3, 5 and 6 of June. No damage appeared to have been inflicted on Krupps Works. About 30 or 40 houses, mostly in the south and south-east of Essen were seen to be destroyed or severely damaged and a few coaches were burnt out west of the railway station. On the other hand, severe damage was inflicted on Oberhausen where the main station was extensively damaged and its chief buildings gutted. A boiler works, a zinc rolling mills, a tar works, the tramway depot, a bank and an unidentified factory building all suffered severely. In addition about 70 other commercial and residential buildings were destroyed or damaged. A direct hit was also scored on one carriageway of the autobahn where it crossed the Rhine-Herne Canal.

Ibid. ✓

Considerable damage also occurred at Mulheim where a group of factory buildings were burnt out and 14 houses destroyed. In the Duisberg area there was damage to railway property in three places, notably to the locomotive repair shops in the Wildau district. In addition, numerous craters were seen in open country and damage to residential property near decoys was also visible.

Ibid. ✓

Altogether 31 aircraft (3.2%) were missing from the operation including 11 from the O.T.U.s. A further 99 were damaged from various causes, 23 seriously and five others having to be written off. In the target area, flak defences were less intense than usual and after 0110 hours, their effectiveness decreased, but outside the target area there did not appear to be any lessening in efficiency. Once again the main searchlight belt was absent, lights being very active at the target while a belt of searchlights operating in cones of five was reported in the area Hague-Rotterdam-Overflakkee. The enemy night fighter effort was considerably larger than usual being concentrated mainly around the target and over the coast on the return journey. In general, losses were again below normal but a much higher proportion occurred outside the target area than on the previous thousand raid. A large number of aircraft were shot down near the coast on the return journey. In addition to main force losses, two aircraft of Bomber and one of Army Co-operation Command were missing from Intruder operations.

/(vi)

AHS/II/39/1/3(a)
ORS/BC
Night Raid Report
No. 77 and
BC/ORB
App. B. 1925

(vi) Other Operations in June.

On 2/3 June 1942 195 aircraft were sent to Essen as a follow up to the thousand raid the previous night. The attack was planned to last for half an hour, starting at 0130 hours. Fifteen specially selected Wellingtons of No. 3 Group were detailed to illuminate the target during the first 18 minutes of the raid, releasing their flares on Gee fixes. The remainder of the force carrying maximum economic incendiary loads were to spread their attack as evenly as possible between 0132 and 0200 hours, the best crews in each squadron being detailed to lead.

AHS/II/39/1/3(a)
ORS/BC
Night Raid Report
No. 77 ✓

Unfortunately, despite reasonably good weather apart from moderate smoke and haze, night photographs showed the attack to be widely scattered, with no evidence of concentrations anywhere. This lack of success was ascribed partly to the fact that the flare force was late arriving and the majority of flares were scattered and in some cases at a considerable distance from the target. Nevertheless, many of the 147 aircraft claiming to have bombed their target stated that flares were very useful for the identification of built up areas. As a few photographs showed built-up areas in Duisberg, Oberhausen and Mulheim, it was thought possible that some of the damage in those districts which had previously been ascribed to the thousand raid on Essen may have occurred in this attack.

Ibid. ✓

One outstanding feature of the raid was the very high casualty rate, with 13 (6.6%) aircraft missing and a further 24 (12.3%) damaged. The percentage missing was double that of the thousand raid, probably due to the enemy defences being "keyed up" after the previous very heavy attacks on Cologne and Essen.

AHS/II/39/1/3(a)
ORS/BC
Night Raid Report
No. 78 ✓

To avoid a further concentration of defences in that area, advantage was taken of good forecast weather the following night to launch an attack on the important naval town of Bremen. The same method of attack was used and on that occasion the plan for illuminating the target appears to have worked well, many crews reporting that the flares were extremely helpful in identifying the built-up area. From night photographs it was estimated that about 65 aircraft bombed within five miles of the aiming point but there was no evidence of any very high concentrations over the target, probably due to the prevalence of haze. Daylight reconnaissance confirmed that some useful if scattered damage had been inflicted. Three large buildings and three tanks all belonging to oil refineries and a large warehouse on the quays were destroyed and three other large industrial buildings partially destroyed. There were also a number of scattered points of damage to residential and commercial buildings, mainly in the suburbs. The above assessment of the effects of the attack are confirmed by

/German

A.H.B./6
translations

German Police Records which state that in addition to two crude oil tanks and a diesel oil tank belonging to a Mineral Works, five wharves belonging to different firms were completely burnt out. A pier and two wharves of a grain installation were destroyed and several vessels received slight damage. Ten aircraft were missing from the attack and 18 damaged, the greater number being heavies. It was believed that the majority were accounted for by enemy fighters.

AHB/U/39/1/3(a)

ORS/BC
Night Raid
Report
No.80 ✓

Losses were again high two nights later on 5/6 June when 180 aircraft were detailed for a shaker attack on Essen. The choice of this highly defended and difficult target was mainly dictated by weather. A front with much cloud lying across the North Coast of Germany and for some distance inland prohibited attacks in that area. More to the south there was a choice of targets and Essen had been selected as the most important one within convenient range. Altogether 100 of the 118 aircraft claiming to have reached and bombed their target attacked within the planned half hour but once again flares were very scattered and the attack was spread over the western Ruhr. There was no evidence of any good concentrations being achieved in time or space and to this was attributed the fact that the loss rate of both heavy and medium bombers was again well above average. There was much heavy and accurate flak reported and searchlights were very active over the whole Ruhr. Altogether 12 (6.6%) aircraft were missing from the operation and a further 35 (19.4%) damaged. While there was no evidence of any damage to Essen, night photographs suggested that a part of the attack had fallen on Duisberg, Oberhausen and Sterkrade.

There were to be only two more major attacks on Essen in June and indeed only three more in the whole of 1942. On all three the missing and damaged rate was again very high, mainly due to the scattered nature of the raids and the consequent lack of concentration in time and space of the forces employed.

AHB/U/39/1/3(a)

ORS/BC
Night Raid ✓
Report No.83

Although 126 of the 170 aircraft despatched on 8/9 June claimed to have bombed the target, very few were able to identify it positively owing to the presence of much cloud and poor visibility. All but one aircraft dropped their flares blindly, on Gee and none appeared to have fallen on Essen. Night photographs, confirmed by daylight reconnaissance, showed that the raid was very scattered, many bombs falling in open country and in Essen itself only a few cases of minor roof damage resulted from the attack. From this very unsuccessful attempt 17 (10%) aircraft were missing and a further 10% damaged.

Ibid. ✓
No.86

The fifth and last raid on Essen in this month took place on 16/17 June. Owing to very cloudy conditions over the target areas, 106 aircraft were despatched on a blind bombing attack with instructions that if the cloud broke on reaching Bonn they were to bomb that or any other built-up area outside the Ruhr. As a result, only 16 aircraft actually reached and claimed to have attacked the primary target. Forty-five aircraft, finding cloud beginning to break up over the Rhine, attacked Bonn. Others attacked Aachen, Cologne and built-up areas in Western Germany. Owing to poor visibility very few aircraft were able to see ground detail and little success was achieved. The spreading of the force over a wide area led to very low concentrations against the enemy defences which were easily able to pick off individual bombers. As a result, 7.5% of the force were missing from the operation.

/Other

SECRET

Ibid.
No. 81 ✓

Other operations during June, however, were rather more successful. On 6/7th fine weather gave a wide choice of target areas within range during the short hours of darkness. Emden was selected as being of a suitable size to be heavily damaged by a medium sized force. 233 aircraft were despatched and a very successful incendiary attack developed. The Shaker technique was again used on this raid which was planned to last 40 minutes. Altogether 198 aircraft claimed to have reached and bombed their objective and these reported that the majority of the flares were well placed and very helpful in identifying the target. Although sticks of incendiaries dropped in the first few minutes of the attack appear to have been somewhat scattered, later arrivals reported considerable fires in the docks and town area which grew to such proportions that they were seen by returning crews from as much as 100 miles away. Daylight reconnaissance fully confirmed the success of the attack. Ten acres of the ship building and ship repairing yards of the Nordseewerke were seen to be devastated; five large sheds and eight smaller ones being completely destroyed. Nearly all the buildings of Schulte and Bruns, builders of small sea craft, twelve sheds belonging to the Herings Fischerei A.G., the Harbour Offices, Customs House and a number of other workshops and sheds in the docks area were all destroyed. Damage was done to railway buildings and the gas works and 45 acres of the town, mainly comprising commercial and residential property, were devastated. In that area alone at least 150 houses were believed to have been destroyed or seriously damaged and a further 100 in other parts of the town. Most of this damage was by fire.

Ibid. ✓

The undoubted success of this attack was mainly due to good weather, close adherence to instructions by the flare carrying aircraft, and the very high concentration reached over the target. 190 aircraft bombed in the first 35 minutes of the raid, thus achieving the equivalent of a concentration of 326 aircraft per hour. Although the missing rate (3.9%) was slightly above normal, this was attributed to the very large proportion of the force which actually reached the target.

A4B/II/39/1/3(c)
ORS/BC
Night Raid Report
No. 89 ✓

Following this operation, poor weather conditions set in and, apart from the two attacks on Essen already described, no other operations were possible against Germany targets until 19/20 June when the first of three more fairly heavy raids was made on Emden. On that night there was some doubt as to whether the clear skies expected would extend as far west as Emden by the time the attack was delivered. 194 aircraft were despatched with instructions to go on to Osnabruck should they find 10/10ths cloud over their primary target. As a result, the force split up, 131 claiming to have attacked Emden while 29 went on and bombed their alternative target.

/Over

SECRET

Ibid. ✓
Over Emden 7-10/10th cloud was encountered and few aircraft were able to identify it visually. Unfortunately the illumination of the target by the flare force did not go as planned. The 15 aircraft detailed for the task had been carefully timed to provide the maximum illumination over the first 24 minutes of the half-hour attack. Of those fifteen, five went on to Osnabruck, two returned early and one was missing. The remainder adhered fairly closely to their pre-arranged timing and a considerable number of the main force bombed on their flares. None of the three photographs taken with bombing and showing ground detail could be plotted however and as there was no daylight reconnaissance before the repeat operation the next night, the result of the attack is not known.

Ibid. ✓
Aircraft bombing Osnabruck found little cloud and good visibility and there was every indication that the attack, although small, was very successful. Daylight reconnaissance showed an area of approximately nine acres around the Grosse Strasse devastated by fires which were still burning next day. There was not much industrial damage but ten small buildings in an iron and steel works, a cotton weaving factory and a soap factory were damaged in addition to the destruction of about 25 to 30 houses scattered throughout the town. Losses on this operation were again high (4.1%) the bulk being due to enemy fighters which were very active.

Ibid. ✓
No.90
Slightly better results were obtained the following night when 159 of the 185 aircraft despatched claimed to have identified and bombed Emden. Early flares were reported as accurate but later ones were mainly to the south over the coast. From night photographs it appeared that only a moderate proportion of the force actually identified and attacked the target and this was confirmed by daylight reconnaissance. Only a small amount of damage resulted from this operation. In the town a large industrial building and two smaller ones were gutted and another building, possibly a warehouse, was burnt out. Near the Appelmart, an area of commercial and residential property, more than an acre was devastated and 20-25 buildings in other parts of the town destroyed. Although night fighters were very active, losses at 3.2% were about average..

Ibid. ✓
No.92
The third and last of this series of operations on Emden took place on 22/23 June when 227 aircraft were ordered to attack using the shaker technique. Although 10/10ths cloud was encountered in places over the North Sea, the target area was quite clear enabling crews to make visual identification. 196 aircraft claimed to have attacked the target and of the 90 photographs taken with bombing showing ground detail, 50 were plotted within five miles of the aiming point and eleven showed the target. Some of the former, however, were of open country and 15 were close to the Larrelt and Wybelsum decoys. Flares were on the whole well placed and from subsequent daylight reconnaissance it was evident that considerable damage had been inflicted in the docks and town. The most important incident was the destruction by fire of a group of industrial buildings thought to be the main

/portion

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portion of the Cassens shipyard. Other important incidents occurred at the Emden-Pewsum railway station where the main office building, four large goods sheds and a group of small buildings were burnt out and at the Outer Harbour Station where the main buildings and a warehouse were severely damaged. About seven other small industrial buildings and the main building of the Hamburg-Amerika line were destroyed or severely damaged and about 30-40 residential, commercial or public buildings in the town as well as 40-50 workmen's dwellings were destroyed, mainly by fire. Losses on that night (2.5%) were considerably below normal probably as a result of the high concentrations achieved.

(vii) The Thousand Raid on Bremen

While the bomber force was continuing its normal offensive in June, preparations were already underway for the third of the thousand raids in the next moon period. As always, choice of a suitable target was dictated by strategic and tactical considerations. Apart from being sufficiently congested and inflammable to prove vulnerable to a heavy incendiary attack, it was essential for the operation of so large a force that the target area should be fairly large, easy to find and, as far as possible, not too heavily defended.

After due consideration of the important targets within range of the bombers during the limited hours of darkness at that time of year, Bremen was selected as the most practicable and plans were made for an attack on 25/26 June or the first suitable night thereafter within the full moon. It will be remembered that Bremen was a high priority target within Gee range in the February Directive. Not only was it a vital submarine building centre, the second largest port in Germany and an important transportation target having direct rail communication with Berlin, Hamburg, Hanover, the Ruhr and other parts of Germany but it also housed, among other industrial concerns, the Focke Wulf Works which had assumed special importance, in view of the amended Directive in May, 1942.

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II G1/42

AHB/17/39/1/3(a)
ORS/BC
Night Raid Report
No. 95 and BC/S
27360 GB
AHB/11/24/3/474
encl. 6.B.

Against this vital target on 25/26 June was despatched a force of 904 aircraft, including 166 from No. 91 Group, 106 from No. 92 Group, 15 Blenheims from No. 2 Group and a further 5 Blenheims from Army Co-operation Command. In addition, Coastal Command co-operated with a force of 102 Wellingtons and Hudsons which operated from their own East Coast aerodromes. On the same night 44 aircraft of No. 2 Group and 15 from Army Co-operation Command carried out Intruder operations in conjunction with Fighter Command, the latter also providing cover for the bombers by carrying out sweeps as far out to sea as possible from the East Coast particularly at dusk and dawn.

/Administrative

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AHB/TM/241/3/474.
BC/S 27360
6B

Administrative preparations for this operation were similar to those for the attack on Cologne. Arrangements were made for a maximum of 45 aircraft(I) of No.91 Group to be accommodated at advanced bases in No.1 Group and for two squadrons of Army Co-operation Command in No.2 Group. The remaining aircraft of Nos.91 and .92 Groups operated from their own aerodromes.

Ibid. The plan of attack was slightly more involved than on the two previous thousand raids and required very careful timing, particularly as Coastal Command were operating from their own aerodromes. Apart from the Focke-Wulf Works and the Dechimag Submarine Building Yards which were given as special targets to No.5 Group and Coastal Command respectively, the force was allotted three separate aiming points; namely, the town centre, the south end of Bremen and the south east end of the docks. If the primary target could not be identified, aircraft were ordered to turn to port and bomb the built-up areas of Wilhelmshaven, Emden or Bremerhaven.

Ibid. The attack which was planned to last 65 minutes from 0120 to 0225 hours was to be carried out in three waves consisting of an advance force of Gee aircraft, a main force and a rear force of heavies. Minimum bombing height was 8000 ft. and, as before, in order to avoid stragglers returning in daylight and proving easy targets for the enemy defences, all aircraft were ordered to turn for home wherever they might be at 0230 hours. Crew were also warned to avoid flying in cloud as far as possible and to exercise the greatest care not to be misled by the many decoys known to be operating in the area.

Ibid and *ANS/11/39/1/3(a)* Timing of the Force was as follows:-
ORS/BC

Night Raid Report No.95 First Wave: 50 Stirlings and 50 Halifaxes to attack the centre of the town between Z and Z plus 10 minutes, followed by all Gee Wellingtons of Nos.1 and 3 Groups between Z plus 10 and Z plus 20 minutes.

Main Force: aircraft to bomb between Z plus 20 and Z plus 55 minutes as below:

No.1 Group	South end of docks
No.3 Group Wellingtons	Town Centre
No.91 Group	S.E. end of docks
No.92 Group	South end of docks
No.5 Group	Focke-Wulf Works.

In addition, aircraft of Coastal Command attacking with the main force were to bomb their special target between Z plus 30 and Z plus 50 minutes.

Rear Force: All Stirlings and Halifaxes not included in the first wave to attack between Z plus 45 and Z plus 65 minutes. Stirlings to bomb town centre and Halifaxes to divide their attack equally between the south end of the docks and the south east end of the town.

/On

(I) In practice only 11 aircraft of No.91 Group operated from advanced bases.

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On this occasion the maximum number of night photographs were to be taken and two experienced crews of each of Nos:3, 4 and 5 Groups were detailed to make a visual report on the attack.

Ibid.

As the raid was to be made in bright moonlight no flares or markers were to be used. All aircraft were instructed to carry maximum economic incendiary loads made up with big blast with the exception of No.5 Group which were to carry 50% of each and Coastal Command whose Wellingtons were to carry maximum 500 lb. G.P. bombs and Hudsons maximum 100 lb. A.S. bombs.

AHS/II/39/13(a)
ORS/BC
Night Raid
Report No.95

Prior to the attack aircraft had been sent on special weather reconnaissance missions and from their reports it was anticipated that while the target area was not free from cloud at the time of the reconnaissance, there was every likelihood of a clearance by the time the raid began. Unfortunately, the wind changed direction with the result that the target was covered by thin layer cloud with only occasional small breaks throughout the operation and similar conditions were experienced en route.

Ibid.

Although 661 of the 904 aircraft despatched by Bomber Command and 71 of the 102 despatched by Coastal Command claimed to have attacked their targets, only a few were able to see any ground detail and those which did merely caught glimpses of built-up area or rivers. The majority of the first wave aircraft relied on Gee fixes and 117 bombed completely blind. Under the circumstances, it is notable that the fires started by early arrivals quickly grew to considerable size and their glow on the cloud formed the chief means of identification for the remainder, although 34 of the heavy bombers of the rear force also attacked on Gee fixes. Only two aircraft of No.5 Group claimed to have located the Focke-Wulf Works with any certainty, the remainder having bombed the town area, 58 of them blindly on Gee. As a result of adverse weather conditions, only two night photographs were returned but daylight reconnaissance confirmed that at least a proportion of the force has been successful in overcoming weather difficulties and attacking their target. It was estimated that about 731 had bombed in a period of 80 minutes.

Ibid.

While the attack was nothing like as successful as might have been expected from the size of the force involved, taking into consideration the poor weather experienced and the usual inefficacy of Gee as a blind bombing aid, some very useful results were obtained. The most important item was probably the serious damage inflicted on the Focke-Wulf Works, a large block believed to be the machine or Press shop having received a direct hit and being completely demolished. A nearby building was also damaged and four others suffered in varying degrees. No serious incident occurred in the docks area but about 40 industrial or commercial buildings in different parts

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of the town were destroyed and a further 30 damaged. Damage to business and residential property was more extensive, in all about 27 acres having been completely destroyed, mainly by fire. The largest of those areas was ten acres and probably the most serious destruction occurred in the Ostertors district. A number of aircraft unable to identify the primary target bombed other towns in North West Germany, mostly on Gee fixes or ETA and large fires were reported in the Wilhelmshaven and Emden areas.

Ibid. ✓

Intruder operations on 25/26 June were also only moderately successful. Bostons flying in formation made low level attacks on seven aerodromes at dusk but only at Valkenburge and Ardorf did the whole formation succeed in finding their target: in all other attacks one aircraft at least was unable to bomb for various reasons. Two Mosquitoes were sent to Stade and two to Schleswig aerodromes; one attacked Schleswig but the others failed to locate their primaries owing to darkness. Of the 31 Blenheims despatched on night Intruder operations, 18 claimed to have bombed their targets, one or more attacking each of the six aerodromes involved. The following aerodromes were also attacked by aircraft of Fighter Command:

- | | | |
|--------------|------------|----------|
| Gilze Rijen. | Eindhoven. | Schipol. |
| Soesterburg. | Deelan. | |

Ibid. ✓

44 (4.9%) aircraft were lost by Bomber Command from the attack on Bremen and 65 (7.2%) were damaged, 22 seriously. Coastal Command also lost five aircraft and two Blenheims were missing from Intruder operations. It was concluded that the above average losses experienced were mainly due to inaccurate navigation on the part of inexperienced pupil crews flying in difficult weather and without the aid of Gee. In particular heavy casualties were suffered by Whitleys and Wellington Ics of No.91 Group which lost a total of 22 aircraft, 21 of which were manned by 100% pupil crews. Heavy bomber losses at 5.2% were also high but these in turn were swollen by the high casualty rate of the Halifaxes. Apart from the specific instances given, heavy and medium bomber losses would have been comparatively low, averaging 2.6% and 2.5% respectively.

(viii) Further attacks on Bremen.

It will be noted that previous experience with Gee had strongly suggested that while it was invaluable as a navigational aid, as a blind bombing device it was too inaccurate to be of much use. The success achieved by the large number of aircraft which attacked Bremen on Gee fixes on 25/26 June was therefore all the more unexpected. As weather during the remaining nights in June was quite unsuitable for normal bombing operations, it was decided to take advantage of good conditions at home bases to exploit Gee in the capacity of target finder.

On 27/28 June 144 aircraft equipped with Gee were ordered to attack Bremen, dropping their bombs on Gee fixes laid down by Command Headquarters, unless conditions over the target were found to be clear. No flares were to be used and attacks were to be made along the B lattice line from 0130 to 0215 hours. Crews were specifically ordered to bomb individually on their own fixes regardless of other aircraft or fires unless they could clearly see and identify the target.

AH6/11/39/136
ORS/BC
Night Raid ✓
Report No.97
and BC/ORB
App.1966

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AHS/II/39/1/3(a)
ORS/BC

Night Raid

Report No. 97 ✓

119 of the sorties despatched claimed to have attacked the target area and with the exception of five who were early all bombed within the time laid down. This gave an average concentration of 216 aircraft per hour. All crews bombed blind although one or two claimed to have recognised built-up areas shortly after bombing. No night photographs were obtained but a successful daylight reconnaissance on 29 June revealed considerable new damage to the target. Seven acres were seen to have been destroyed by fire near the Neustadt Guter Bahnhof, where about 11 sheds, probably railway buildings, were destroyed. Roughly 15 small industrial buildings in other parts of the town were also either destroyed or seriously damaged while the largest concentration of residential damage was at Suder Vorstadt where about 40-50 houses were destroyed in an area of 13 acres gutted.

Ibid ✓

It had been expected that the considerable cloud experience would serve to embarrass the defences but wastage on that night was well above the average with 9 (6.2%) bombers missing and 22 (16% damaged). Flak was reported as much more severe than on previous raids and the enemy's night fighters were very active. Greatest sufferers were No. 3 Group who sustained 70% of the total damage from flak and fighters. All those aircraft bombed consistently high where visibility would undoubtedly be good at that time of year and it was concluded that this accounted for the large number of interceptions reported and the damage sustained.

Ibid

No. 99 ✓

Two nights later a large force of 253 aircraft was again detailed for a blind bombing attack on Bremen. Instructions laid down were similar to those for the raid on 27/28th with the exception that the period of the attack was extended to one hour. Altogether 208 aircraft claimed to have reached and bombed their primary target and although a few scattered aircraft extended the time over the target by thirteen minutes, actually 184 dropped their bombs within 23 minutes giving the very high rate of 480 per hour. Daylight reconnaissance on 1 July revealed several new items of damage. Sheds at the Neustadt Guter Bahnhof had again suffered severely and there were about five incidents of destruction to small industrial buildings. Damage to residential buildings was scattered, about 30 houses being affected. On the same day reconnaissance was also made over Delmenhorst which showed that that town had also been heavily attacked. Damage was mainly confined to industrial buildings such as the Linoleum Factories, Jute and Woollen Spinning Mills and Wool Processing Works. About five separate factories had all suffered severely. Three quarters of a jute factory had been completely burnt out, two large areas of a woollen spinning mill together covering 10,000 sq. yards had been gutted and about 8 buildings or groups of buildings in other factories either gutted or severely damaged. Losses on the operation were about average with 9 (3.5%) aircraft missing and 41 (16.2%) sustaining varying degrees of damage.

(ix) Conclusions

In despatching no less than three forces on the thousand scale in less than four weeks, Bomber Command had achieved the seemingly impossible. The effects of the attack on

/ Cologne

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Cologne were most encouraging; the attack on Bremen, although less striking, achieved a high degree of damage while the raid on Essen, although missing the primary target, inflicted severe damage on the nearby districts of Oberhausen, Duisberg and Mulheim. In the absence of evidence to the contrary, it may be assumed that the effects on the morale of the civilian population in the affected areas, although localised, must have been considerable.

In this country, the precedent set by those peak efforts had a somewhat unfortunate effect. Despite specific warnings by the Prime Minister to Parliament and the general public that "thousand" raids must not be regarded as the general rule until the size of the bomber force had been considerably increased, there was already a growing tendency in both official and unofficial circles to regard the 200-300 sorties which was Bomber Command's normal effort at that time as mere chicken feed. In France, the attack on Cologne had been received with evident satisfaction. On 1 June, the American Charges d'Affaires at Vichy had cabled Washington that the French public had reacted enthusiastically and there was a general feeling of satisfaction that at last Germany was beginning to know what war meant. The hope was being expressed that raids on the thousand scale would become a nightly event.

AHB/ II/70/168 ✓
Apart from the thousand raids, there are several other points worth noting in connection with operations in June, namely: the greatly increased concentrations of aircraft in time over the target areas, rising in one instance to the very high average of 480 per hour; the consistent use of maximum incendiary loads on all major operations and the high casualty rate incurred on the majority of operations, particularly by training aircraft and heavy bombers. In that connection, it was already becoming apparent that the use of inexperienced pupil-crews on operations in any but the best weather conditions was of little value in comparison with the high wastage and loss in training time incurred.

In general, the month marked yet another milestone in the development of Bomber Command in 1942. The "thousand plan" had proved a success and the problem of handling large numbers of aircraft on operations had been faced and overcome; increased experience in the use of Gee was leading to heavier concentrations than ever before and, in spite of bad weather on many occasions, a considerable amount of very useful damage had been inflicted on a number of Germany's vital industrial areas⁽¹⁾. The direct result of those improvements was the Air Staff's decision to sanction a policy of using the O.T.U's to augment the main bomber effort for a time and the C.-in-C's proposals to standardise a system of using the largest possible force against suitable targets in Germany on the three or four fine nights available in a month and to devote the remainder of the month to small scale diversionary raids and a greatly increased minelaying effort. This in turn marked the opening of a new phase in tactical planning the results of which will be examined in the next Chapter.

(1) Unfortunately, at the present time very few German Records of the results of bombing attacks in 1942 have come to light and assessments of their success or otherwise have been based almost entirely on night photographs taken with bombing and daylight reconnaissance.

S E C R E T

CHAPTER 18

FURTHER ATTACKS ON GERMAN INDUSTRY AND MORALE. (1)

(i) Plans to increase the Operational Effort

It has been seen that for many months past both the Air Ministry and Bomber Command had been aware that a very much greater weight of effort than was normally available at that time (i.e. 1941/42) must be found if the bombing offensive was to succeed in its object of inflicting really serious and lasting damage in area attacks on the major German industrial cities. Although consistent efforts were being made to expand the bomber force to a size commensurate with the tasks required of it, for the reasons shown in Part I of this Narrative, so far comparatively little progress was being made. The only other answer to the immediate problem was the continued use of O.T.U's and other non-operational aircraft to augment the normal effort. This had been done more or less successfully in the thousand raids and despite the inevitable interference with the training programmes which such a course involved, both the C.-in-C. and his O.T.U. Group Commanders were anxious to continue the experiment for a time not only for the purpose of enlarging the operational effort but on the grounds of morale among pupil crews and the experience they would gain from participation in operations against targets which were large and comparatively easy to find.

DGO Folder?
I E
30/6/42

After detailed discussion of the pros and cons of such a step, it had been generally agreed at a Meeting at Air Ministry on 30 June 1942, that the policy of making limited use of O.T.U's on operations should continue for a time until its effect on expansion could be assessed.

This decision meant that in theory the C.-in-C. could, on suitable occasions, raise upwards of 600 sorties from his own resources. His next step was to evolve a plan which would make the best possible use of the increased effort available. Details of that plan have already been discussed.⁽²⁾ Briefly, he proposed to operate anything from 700 to 1000 aircraft (depending on the resources of the Command at the time) on the three or four really fine nights which might occur in a month. The remaining nights would be devoted to small scale raids and routine minelaying. For the success of the plan, much depended on weather, wastage, the effect on the training output and the rate at which replacements were forthcoming. In practice, a combination of all those factors made it impossible to implement the plan on anything like the scale originally conceived although O.T.U's did take part in four more raids before the end of September 1942 when the scheme was dropped.

(ii) Operations in July

AH/II/39/1/3(a)
ORS/BC
Night Raid
Report
No.101 ✓

Operations in July opened with a comparatively unsuccessful raid on Bremen on 2/3rd. Owing to the possibility of unsatisfactory conditions at bases, plans for a full scale effort using all the resource of the Command were

/abandoned

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- (1) This Chapter should be read in conjunction with Chapter 12 Sections (iii) - (vi).
(2) Chapter 12 Sections (iv) and (v).

abandoned in favour of an attack by 325 aircraft of the Operational Groups. As the operation was to be carried out in moonlight, flares were not used but all aircraft carried maximum economic incendiary loads and the best crews in each Group were ordered to lead the attack. Unfortunately, despite reasonably good weather over the target, night photographs indicated that bombing was scattered over a considerable area to the west and south-west of the target with evidence of a small concentration in the neighbourhood of Delmenhorst. Daylight reconnaissance confirmed that the raid had failed to inflict any serious damage in Bremen⁽¹⁾ but in Delmenhorst new damage was revealed to the Nordd Wollkammerei und Kammgarn Spinnerei and residential area.

AWB/12/39/1/3(a)

ORS/BC
Night Raid
Report
No.106 ✓

During the next five nights bad weather restricted the effort to minelaying but advantage was taken of an improvement on 8/9 July to stage a heavy attack on Wilhelmshaven. Although it was included in the current Directive as one of the alternative priority targets within Gee range, Wilhelmshaven had not been attacked in any strength since January 1942. Recent reports had indicated, however, that the port was again very active and had recovered to a large extent from damage inflicted in previous raids.

Ibid ✓

Although 245 of the 285 aircraft despatched to attack the submarine building yards claimed to have bombed their objective it seemed likely from crew reports and the evidence of night photographs that not more than 100 actually reached the target, the remainder of the attack having fallen in open country to the west of Wilhelmshaven. The raid was not without its effect, however, a certain amount of useful damage being revealed by daylight reconnaissance. On the north side of the Tirpitz Hefen two large sheds, the engineering workshop and smithery of Deutsche Works, had been severely damaged and in the naval dockyard west of the Bauhafen the Armour Plate shop was completely gutted, the Foundry half gutted and several other sheds damaged. Fire damage was also caused east of the Bauhafen where at least 10 small warehouses and ships stores were burnt out and there was considerable damage to residential property in other parts of the town. Losses were unusually low at 1.4%, probably due to the high concentrations achieved in the target area (387 aircraft per hour) and the small amount of enemy night fighter effort in comparison with the size of the raid.

Weather again prevented bombing operations during the following four nights but opportunity was taken to press ahead with the intensive minelaying effort undertaken by the C.-in-C. On the 13/14 July it was decided to take advantage of an expected improvement to send a force to Duisberg. Although some damage had already been inflicted during previous raids on Essen, this was the first direct attack of the year against a target which figured high in the current list of priorities.

Apart from its general value as a morale target, Duisberg was notable as the greatest inland waterway harbour in Europe, as an extremely vital railway centre and for numerous iron and steel, heavy engineering and other industries including the Thyssen Steel Works at Hamborn.

/The

(1) German Police Records mention only seven cases of slight material damage but state that the Finnish Steamer Marieborg was hit and later sunk and six other vessels suffered slightly.

S E C R E T

AHS/II/39/1/3(a)

ORS/BC
Night Raid
Report
Nos. 110, 114,
115, 116.

The attack on 13/14th was the first of four made during July which, although individually somewhat scattered as a result of poor weather conditions, collectively achieved considerable success. Daylight cover was not obtained until after the last attack on 25/26th and it is not possible therefore to ascribe particular results to any one night. In general, while there were no large areas of devastation, P.R.U. photographs showed a considerable number of small points or areas of damage over the whole of the Duisberg/Hamborn/Homberg area. The most important incident was a direct hit on the rolling mills of the Thyssen Steel Works which caused severe structural damage and roof damage over 150,000 square feet. Fresh damage was also inflicted on other buildings in the works and it was observed that repairs had not yet been made to damage inflicted in previous raids. Seventeen other industrial plants and small factories were affected in varying degrees, including five steel works, chemical factories and a colliery where nearly all the pit-head buildings and equipment were destroyed, rendering the mine unserviceable. Considerable damage was also inflicted on the docks and nearly 450 houses or house blocks in urban and residential districts were either destroyed or seriously damaged. Although German Police Records are not available, reports from intelligence sources stated that the four raids had upset the coal traffic from Germany to Italy for a week and the Niederheinische Hutte, Krupps and Thyssen Steel Works suffered considerably. The large French tug Nantes was also said to have been sunk during the raid.

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AHS/II/39/1/3(a)

ORS/BC
Night Raid
Report
No. 112

After the first attack on Duisberg on 13/14 July very bad weather set in and apart from one sea-mining operation no further night raids took place until 19/20 July when 99 heavy bombers were despatched to make a twenty-minute attack on the Bremer Vulkan Submarine Yards at Vegesack. Owing to a change in the weather that target had been chosen to replace two planned dusk attacks on Warnemunde and Stettin. Although 81 aircraft claimed to have reached and bombed their objective, the majority on Gee fixes, subsequent daylight reconnaissance revealed no damage to the target. In view of the poor conditions and the known inaccuracy of Gee as a blind bombing device, the result was in no way surprising.

Ibid
No. 117

This abortive effort was followed by three more raids on Duisberg in persistently indifferent weather. On 26/27 July however, good conditions were predicted in the Hamburg area and since it was the first night for several weeks that that target had been within range under cover of darkness, a heavy attack was planned. Operational Groups were ordered out at full strength but although the use of O.T.U's was considered, it was decided that the high wind expected and poor weather at home bases made their inclusion undesirable.

Ibid

403 aircraft of the other Groups were despatched of which 315 claimed to have reached and bombed their target, the majority having little difficulty in recognising it visually in the excellent conditions prevailing. The method of attack followed the by now normal three-wave routine; opening with picked crews carrying 4lb. incendiaries, followed by a second incendiary force and closing with the remaining aircraft carrying H.E's. Night photographs were satisfactory, 70 of the 135 returned being plotted within five miles of the centre of Hamburg and 22 showing the actual target.

/Daylight

S E C R E T

Daylight reconnaissance confirmed the success of the attack and revealed substantial damage, mainly to the residential area where between 300 and 400 buildings were completely destroyed. Some damage was also inflicted on business premises and in the docks.

Ibid ✓
No.118

Two nights later on 28/29 July a follow-up to this successful attack was planned utilising the whole resources of the Command. Unfortunately, deterioration of base conditions caused the effort from Nos.1 and 5 Groups to be cancelled and those aircraft of the O.T.U's which had already taken off had to be recalled when it became apparent that the main effort would not be sufficiently concentrated to give them adequate protection.

Ibid ✓

Eventually 256 aircraft were despatched from the remaining operational Groups but owing to the extremely bad weather encountered 83 aircraft had to be recalled. Of the remainder only 69 succeeded in reaching Hamburg where they found 10/10ths cloud. Night photographs suggested that some aircraft at least had succeeded in penetrating the defences which were very active and bombing their target but although subsequent daylight reconnaissance was made the photographs obtained were of areas not previously covered and it is uncertain whether the 20 new points of damage revealed occurred on the first or second attack. German Police Records are not available but Intelligence sources reported that the two raids caused very great damage to the Blohm and Voss and Deutsche Werft Yards. At both, a number of workshops and storesheds were said to have been burnt out while the Management building at the Deutsche Werft, including the drawing office, was almost completely destroyed by a direct hit. The report also stated that one shift of workers and the entire SS guard was killed by a direct hit on an air-raid shelter. The main feature of the second attack on Hamburg, however, was the loss rate which at 11.3% was very high - presumably owing to the bad weather and lack of concentration achieved by the bombers over defended areas.

AHB/ITH/84.
A.M.W.R.
Manual of
BC. Ops.
1942

On 29/30 July, weather conditions required the choice of a target as far south as possible and it was decided to send a large force of 291 aircraft to Saarbrucken. Although not included in the current Directive, (1) Saarbrucken was not without importance as the largest town in the Saar, an industrial and coal mining centre and a railway junction. Normally considered a difficult target to locate, it was hoped that there would be sufficient moon to enable crews to find it while the attack of a target hitherto almost untouched by bombing would help to spread the enemy defences in direct line with the C.-in-C's stated policy.

AHB/
IIG/42
AHB/II/39/1/3(a)
ORS/BC
Night Raid
Report ✓
No.119

Ibid ✓

A very satisfactory attack developed. Most aircraft, carrying maximum incendiary loads, bombed visually and concentrated fires, many of them very large, were reported in the target area after the first ten minutes of the raid as well as other fires scattered all round Saarbrucken. Subsequent reconnaissance confirmed the success of the operation. Most of the damage was seen to be on the north

/side

A.H.B./
IIG/86/6A
Encl:63

(1) At a meeting on 23 April the Target Committee was informed that the Russians had suggested that Saarbrucken was a good target. D.B.Ops. said that there was no reason why it should not be regarded as an alternative objective for nights when Bomber Command might not wish to attack the more heavily defended areas. In this connection M.E.W. pointed out that it was no more important than other similar targets in Germany.

S E C R E T

side of the river in the central city area and the western suburbs. The two chief factories in the town, the Eich Dudelinger Ironworks and the Erhardt and Schiner Engineering Works were both severely damaged, approximately a quarter of the latter being destroyed. In the Iron works the laboratory and three sheds were gutted and at least 20 other buildings suffered roof damage. In addition, about half the buildings of the main goods station were destroyed together with several railway sheds and many other unidentified industrial buildings suffered in varying degrees. There was also considerable damage inflicted on residential and business property, including three large areas in which a total of 245 buildings were gutted or completely destroyed. German Police Records state that 403 buildings were destroyed in all and a further 5,729 damaged.

AHB/6
Translations

As was expected, since this was the first operation planned against Saarbrucken, enemy defences were light over the town but night fighters, benefiting from the bright moonlight, were very active. Nevertheless, the bombers were able to take advantage of plentiful cloud cover thus preventing the fighters from pressing home their attacks and losses from all causes were low at 2.7%.

(iii) Heavy Attack on Dusseldorf

So far the C.-in-C's plan for an intensified effort utilising all the resources of his Command on three or four fine nights in a month had not been fulfilled owing to the unsuitability of prevailing weather conditions. But on 31 July forecasts were extremely promising and despite the possibility of bad visibility at bases on return, it was decided to seize the opportunity to make a heavy attack on Dusseldorf which was not only a high priority target but was also within convenient range for the less experienced crews.

BC/ORB
App.B/2010
and AHB/27/39/1/36
ORS/BC
Night Raid
Report
No.121 ✓

The attack, timed to last 50 minutes, was planned in three waves, the first manned by picked crews who were to act as fire-raisers. All but a few aircraft of the first two waves were ordered to carry maximum incendiary loads while aircraft of the third wave were to complete the attack with H.E's.

Ibid ✓

Altogether 630 sorties were despatched, including 106 from No.91 and 105 from No.92 Group. In addition, six aircraft of No.2 Group co-operated with Intruder sorties against the aerodromes of St. Trond, Venlo and Twente.

Ibid ✓

As expected, weather proved excellent with no cloud and only slight haze in the target area but in the later stages of the attack the presence of much smoke hindered identification of ground detail. A total of 484 aircraft claimed to have bombed Dusseldorf and towards the end of the raid the town was stated to be a mass of flames and smoke. 191 photographs were returned showing ground detail and although a large number were of open country which suggested that a proportion of the effort was scattered, 33 were of one or the other of the two aiming points in the town and a further 58 were plotted within five miles of the town centre. In that connection it must be noted here that Lancasters alone were successful in obtaining 23 of the former and 20 of the latter.

/It

It appears from crew reports that most of the scattered bombing was to the west of the town while Krefeld and Munchen/Gladbach were both attacked by a number of aircraft. Photographs also indicated that some aircraft, apparently mistaking the Maas for the Rhine, bombed Venlo.

Ibid ✓
and ~~ANG/11H/8A.~~
A.M.W.R. Manual
of
BC. Ops 1942

Nevertheless daylight reconnaissance showed that Dusseldorf had suffered severe damage from the raid particularly to its factories more than 20 of which were affected in varying degrees. Those which suffered most severely included a machine tool factory, a steel castings factory, two engineering works, a rolling mills, a chemical works, a paper factory, a petroleum company's factory, a petroleum receiving depot and a number of warehouses and sheds in the docks and customs.

Ibid ✓

Some of the above items and many other lesser incidents occurred in an area of 25 acres near the docks which was completely devastated and there was also substantial damage to public buildings and railway communications. It was estimated that 400 business and residential buildings had been destroyed more than half being in the main business and shopping centre of the town where great havoc was caused. A further 60 to 70 of the houses seen to be destroyed were in industrial districts and were probably workmen's dwellings.

Ibid ✓

Unfortunately German Records are not available but further amplification of the results was obtained from ground sources which stated that a machinery factory and an iron and steel works had been badly damaged, several sections of the latter being out of action. It was also reported that the rolling mills had been so badly affected that they had been compelled to cancel an order for 250 tons of gas and water pipes for delivery to Turkey.

Ibid ✓

Moonlight and lack of cloud favoured the enemy defences. There were numerous interceptions and heavy flak was intense over the target and accurately predicted in co-operation with searchlights. Losses were not unduly high under the circumstances, however, averaging only 4.6% of which the major part (7.1% of the sorties despatched) were born by the O.T.U. Groups as against 3.35% of sorties despatched by the operational Groups.

Ibid ✓

The intruder effort was less successful. The two aircraft sent to Twente reached and bombed their target but neither of the two despatched to St. Trond were able to identify it. One bombed Brussels aerodrome instead and the other attacked an aerodrome believed to be Lille. Of the remaining two despatched to Venlo, one experienced engine trouble and attacked Haamstede as an alternative and the other failed to return.

(iv) Operations in August

The month of August, otherwise comparatively uneventful, was marked by three significant incidents which together formed yet another landmark in the story of the tactical and strategic development of the bomber offensive and which, curiously enough, all took place within a few days of each other; namely, the first indications that the enemy had evolved an antidote to Gee, the formation of the Pathfinder Force and the first independent operation by aircraft of the U.S. VIII Bomber Command.

/On

S E C R E T

On 9/10 August crews returning from a raid on Osnabruck reported that their Gee sets were ineffective east of the Zuider Zee. Considerable interference had already been experienced on earlier operations that month and on the available evidence there no longer seemed to be any doubt that jamming of the Gee service had begun and that the six months uninterrupted operational "life" predicted for it with such remarkable accuracy, was nearing its close. This severe tactical blow was alleviated to some extent by the existence of the newly formed Pathfinder Force which, nine days later 18/19 August made its operational debut in an attack on Flensburg. It will be remembered that one of the arguments put forward for the formation of such a force was that it would provide a spearhead for the bomber effort when Gee failed. By the middle of August it looked as if that claim would be put to the test.

Coincidental with those tactical developments, strategic 'history' was also being made. On 17 August the United States VIII Bomber Command flew its first independent bombing mission when 12 Flying Fortresses attacked the railway Marshalling Yards at Sotteville. Small as it was, that raid was the first plank in the structure of the combined Anglo/American bombing offensive against Germany which was to assume definite shape under the Casablanca and Pointblank Directives of January and June 1943 respectively.

Apart from the highlights mentioned above, operations in August followed their normal course. During the first week very poor weather was experienced and there was no large scale effort. On 4/5 August 38 sorties were despatched to make a blind bombing attack on Essen under cover of cloud. (1) Unfortunately severe icing conditions compelled nearly a quarter of the attacking force to turn back and only 18 actually claimed to have reached and bombed the target. Results of the attack could not be observed owing to the prevailing conditions but it is of interest in the light of subsequent events that a number of reports were received from crews of Gee fading either over the Dutch coast or some miles from the target. If, as was suspected, the fading was due to enemy interference, those reports constituted the first indication that Gee was approaching the end of its useful life as a navigational aid over enemy territory.

AHA/2/39/1/3(a)
ORS/BC
Night Raid
Report
No.123 ✓

Ibid
No.124 ✓

A similar operation the following night was again marred by weather and suspected enemy interference with Gee. A small force of 25 aircraft was split between Essen and Bochum but only four succeeded in reaching their targets. One attacked Essen and three dropped their bombs on a steel works at Bochum. Of the remainder, seven turned back owing to absence of cloud cover over the Ruhr and others were unable to locate the target owing to the failure of Gee. The resulting lack of concentration was probably responsible for the high loss rate of 20%.

Ibid
No.125 ✓

On 6/7 August weather showed signs of improving and forecasts appeared to be sufficiently good to justify an all-out effort by the operational Groups. Duisberg, being a high priority Ruhr target suitably situated for attack on a dark night and providing a comparatively easy run for less experienced crews, was selected as the target for

/215

(1) See Section (V) on Moming operations.

215 aircraft using the normal Shaker technique. As a result of ground haze which made identification difficult and the unreliability of Gee fixes due to enemy interference, the attack was widely scattered and a large proportion of it fell in open country to the west of Duisberg where dummies succeeded in attracting some attention. In the later stages, however, several fires were reported in the target area including two large ones at the aiming point. The exact effects of the raid cannot be assessed. Daylight reconnaissance only covered three districts and that incompletely but it revealed one important new point of damage, an engineering works and foundry having received at least one direct hit.

AHB/
IIG1/42

During August two attacks were also made on Osnabruck, chosen as a primary target for the first time that year. Although not included in the current Directive, Osnabruck was a vitally important railway junction situated where the main line from Berlin through Hanover to Holland was crossed by a main line leading north eastwards from the Ruhr to Bremen and Hamburg. Apart from its value as a transportation target, it was of some industrial significance containing iron and steel rolling mills, a non ferrous metal plant, blast furnaces and a coking plant as well as several less important engineering works, large cotton spinning and weaving mills, a paper factory and an inland harbour connecting with the Mittelland Canal.

AHB/II/39/1/3(a)
ORS/BC
Night Raid
Report
No.127 ✓

The first attack was made on 9/10 August by 193 aircraft using the Shaker technique, but although crews found good visibility and little or no cloud and 168 aircraft claimed to have found and bombed the target, it was clear from crew reports and the evidence of night photographs that on the whole the flares had been dropped over too wide an area and fires tended to be widespread rather than concentrated. Once again, the poor results seemed to be due to interference with Gee. Indeed it was on that raid that crews first reported that their sets were unserviceable over enemy territory and it was subsequently firmly established that the device had been effectively jammed between the Zuider Zee and the target.

Ibid
No.134 ✓

The second attack on Osnabruck was made on 17/18 August. Although effects of the previous raid had so far not been confirmed by reconnaissance, it was decided to take advantage of suitable weather in that area to make a repeat attack with 129 aircraft. For that operation the force was divided into two sections, the first being ordered to attack during the first five minutes of the raid with incendiaries and 4000 lb.-bombs and the second to arrive thirty minutes after the end of the first wave when the fires had had time to obtain a good hold.

In all, one hundred and eleven aircraft claimed to have reached and bombed their target. Most of Section One aircraft arrived late but Section Two were well on time and after the first ten minutes of their attack large and fairly concentrated fires were seen burning in the target area. Owing to ground haze, flares proved of little use and as interference with Gee was experienced on exactly similar lines to the previous raid, the majority of crews were compelled to bomb on ETA or existing fires.

In spite of those handicaps, a good attack developed and from daylight reconnaissance it was evident that the total damage inflicted by the two raids on Osnabruck was considerable although there were no large areas of devastation. Round the

/Kanal

S E C R E T

Kanal Hafen destruction extended over about 25 acres, at least 30 warehouses being destroyed and three neighbouring factories suffering moderate damage. Important damage was inflicted on the Goods and Shunting Stations while damage to residential property and public buildings was scattered all over the town and suburbs, over 200 buildings including two barrack buildings being destroyed and the Head Post Office damaged by a direct hit. Enemy flak and searchlights were severely hampered by weather conditions en route and over the target and cloud provided cover against night fighters which probably accounted for the relatively low loss rate.

Ibid
No. 129 ✓
and
No. 130 ✓

Two moderately successful attacks were also made by medium sized forces on Mainz on 11/12 and 12/13 August respectively. Once again the target selected was not included in the list of priority objectives in the current Directive but its choice was, as frequently happened, dictated by weather considerations and the C.-in-C's desire to seize every opportunity to spread the enemy defences away from the heavily defended priority areas. Nevertheless, Mainz was, in its own right, an important railway centre and, with its inland harbour, one of the largest transshipment centres on the Upper Rhine. The success of both raids was confirmed by daylight reconnaissance on 15 August which revealed extensive devastation amounting in all to about 135 acres. By far the most serious damage was inflicted on public and municipal buildings and business and residential property in the heart of the city. It was estimated that between 600 and 800 buildings had been destroyed. In the north and north-east of the town a chemical works, a shipyard and a sawmill had all suffered severely while in the city area three warehouses and about 10 industrial buildings in addition to several other smaller factory buildings were completely destroyed. There was also considerable damage to railway property, barrack blocks and military buildings. Reports from reliable sources stated that 400 people had been killed and many more injured and of the 40,000 who had been evacuated, 30,000 were homeless. It was also reported that two oil transport trains had been burnt out and that twenty-four barges laden with coal had been sunk. There is nothing to account for the high losses (9.1%) suffered by aircraft during the first attack, which were almost exclusively incurred by Wellington III's and Halifaxes. It must be presumed that single aircraft strayed from the briefed route and fell victim to the heavily defended areas.

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AHB/TIH/39/1/3(a)
ORS/BC
Night Raid
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No. 132 ✓

Two nights later, 131 sorties were despatched to Dusseldorf. Although that important target was normally within Gee range, recent experience of enemy jamming suggested that the device was unlikely to be of much use and the operation was planned as a normal bombing attack. Unfortunately, visibility was very poor and, in the absence of Gee, most crews had great difficulty in locating their target. 100 aircraft claimed to have done so but night photographs indicated that the attack was very scattered and that probably no more than a very small proportion of the force actually bombed their objective.

(v) Early Operations of the Pathfinder Force.

There was no doubt that enemy jamming of Gee was having its effect on the ability of crews to find their objectives in the poor weather encountered in the middle of August.

/Great

S E C R E T

Great hopes were pinned on the ability of the newly formed Pathfinder Force to overcome some of the difficulties of target finding but in considering their first operations described below, it must be remembered that the force was as yet in its infancy, that it was deprived from the start of the assistance of Gee and was also without suitable instruments or weapons to assist them in finding and marking the target. Less experienced crews had still to be weeded out and the force knit together into an integrated and specialised unit. It was not to be expected, therefore, that the early attacks in which Pathfinders took part would show a sudden and miraculous increase in efficiency. True, the supposedly best crews were now automatically in the lead, but, on the other hand, the C.-in-C. had for some time past made a practice of employing the best crews from each Group to lead operations. The difference at this stage was not, therefore, great. It was only as their experience increased, new techniques were evolved and the required aids became available that the real value of a picked band of specialist crews operating in the van of the bomber force made itself felt.

AH6/11/39/1/3(a)

ORS/BC
Night Raid
Report
No. 135 ✓

The Pathfinder Force operated for the first time on 18/19 August 1942 in an attack on Flensburg. Apart from two small daylight raids in July this was the first time these important submarine construction yards had been attacked in 1942. The choice of Flensburg as the objective for the night's operations was dictated indirectly by the C.-in-C's constant preoccupation with the urgent need to give all possible assistance to anti-U-boat Warfare and, more directly, because its position on water made it a comparatively easy objective under dark conditions. The plan of attack was to provide a pattern for many subsequent Pathfinder-led operations and is therefore worthy of note here.

The PFF were ordered to attack during the first five minutes of the raid, first illuminating the target by flares and then releasing incendiary bombs in salvo to form 'blobs' of fire around the aiming point. Once the target had been correctly marked, the Main Force were to attack in three waves; the first carrying a mixture of incendiaries and H.E's, the second carrying mainly incendiaries and the third bringing up the rear with H.E's only.

As experience grew, the use of coloured flares for target marking as well as illuminating gradually achieved precedent and the 'blob' fires were relegated to the position of secondary markers. Many PFF aircraft also carried H.E's in the initial stages of an attack to act as deterrents to the enemy fire-watchers and fire-fighting organisations.

Unfortunately, on 18/19 August very poor visibility was encountered and the flare-carrying Pathfinders, deprived of the assistance of Gee, were unable to locate their target. A very scattered attack resulted and it is doubtful whether any bombs fell in the primary area.

A spell of bad weather then set in and there were no further night bombing operations until 24/25 August when conditions required the choice of a target as far south as possible. It was decided to send a comparatively large force of 226 sorties to Frankfurt which was at a convenient range. The general plan of attack followed that used on the previous raid but on this occasion 190 aircraft carried Gee sets modified to counteract the effect of enemy jamming. Although from reports received it was certain that enemy jammers were operative, very much better results were obtained on the

Ibid
No. 138 ✓

/modified

S E C R E T

modified sets. Fixes, believed to be due to freak conditions, were received as far as 425 miles from Daventry. Notwithstanding the (temporary) reinstatement of Gee, the attack was not a success. Heavy haze and much cloud hindered the majority of crews from seeing the Pathfinder markers and from night photographs it appeared that bombing was very scattered. Daylight reconnaissance revealed only a small amount of damage in the town. Casualties on the other hand were very heavy, 16 bombers (7.05%) being lost mainly, it was believed, to flak en route although night fighters were also very active. Under cover of the main attack, three Lancasters of No.5 Group were also despatched to drop one 4000 lb. on each of the following targets in the Frankfurt area; Western Army Headquarters at Bad Kreuznach, Bingen and Mayen. Photographs taken with bombing indicated that at Mayen the target had been hit, but at Bingen the bomb fell one mile wide and Kreuznach remained unplotted.

Ibid
No.139

Very much better results were obtained on 27/28th when a force consisting of all available aircraft of the operational Groups (with the exception of nine Lancasters of No.5 Group which were reserved for an operation against the Graf Zeppelin at Gdynia) were despatched to make a heavy attack on Kassel, which was within convenient range for a return before fog rendered home bases unfit. The method of attack was very similar to previous operations, except that the four flare-carrying aircraft of the PFF also dropped "deterrent" H.E's. Weather over the target was good, apart from some slight haze which does not appear to have interfered seriously with target identification. Bombing tended to be scattered, however, possibly owing to bad timing on the part of PFF aircraft, all but one of which was late. Nevertheless, the target was well illuminated by the flares dropped by the single aircraft at zero hour and crews reported that the 'blob' fire marking (although late) was accurate and helpful. Casualties were very high with 30 aircraft missing and 58 damaged as a result of enemy action. Night fighters were particularly in evidence, presumably assisted by the excellent weather and bright moonlight while intense flak was encountered at various points en route.

AHB/6
Translations

In spite of the scattered bombing, daylight reconnaissance showed that some useful results had been achieved. Incidents included damage to Henschel and Sohn, locomotive manufacturers, one building having been seriously damaged by a direct hit and several others by blast. A number of unidentified factory buildings were also destroyed as well as a railway goods yard apparently connected with bulk freight and a barrack block which were both gutted. German Police Records state that fires were started throughout the whole town of Kassel, the old town being particularly badly hit. The report also confirms and amplifies the evidence of the reconnaissance that the Henschel Works, the Crede railway wagon firm and the important Fieseler Works, makers of aero-engines, had all been damaged by fire.

The last operation of the month was split between two important targets. Nurnberg, a transportation and general industrial centre requiring deep penetration, was given to the more experienced crews capable of operating at that range while the remainder were sent to Saarbrucken.

AHB/
11/39/1/3(a)
ORS/BC
Night Raid
Report
No. 140 ✓

101 of the 159 aircraft despatched to Nurnberg claimed to have reached their target and a very successful attack developed. In addition to the ordinary reconnaissance flares and incendiaries, coloured marker flares (red with green stars) were carried by the Pathfinders for the first time and dropped when the aiming point had been positively identified to ensure following aircraft that the fires started there were genuine.

Under conditions of bright moonlight and no cloud all aircraft were able to bomb visually and, from crew reports it appeared that the marker flares and blob fires were very effective. Daylight reconnaissance revealed severe damage to industrial and residential buildings, the most concentrated area lying to the east of the main railway station and including an area of approximately 10 acres of burnt out houses. There were also three other large areas of devastation including three H.E. incidents, the biggest of which devastated over 3½ acres. The M.A.N. and Siemens-Schukert Works were not vitally affected but elsewhere about 45 industrial and factory buildings were severely damaged. German Police Records placed the number of cases of damage at 3,895 and the dead at 136 persons. It was also reported by a reliable intelligence source that a locomotive shed had received a direct hit during the raid and that since the beginning of the year, 16 locomotives, 51 trucks and 20 passenger coaches had been destroyed. A Nurnberg Paper of 5 September published an official announcement by the Mayor that, until further notice the Sunday holiday would be abolished for all building and transport workers. Casualties were very heavy (13.2%) and in view of the high proportion of aircraft attacked (7.5%) and damaged (3.8%) by enemy night fighters, it was probably that the fighters, benefitting from the bright moonlight and absence of cloud, were responsible for a large number of the losses experienced.

A.H.B/6
Translations
AHB/JH/84
A.M.W.R.
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BC Ops
1942

Losses were also heavy (8.9%) on the Saarbrucken raid that night which was comparatively ineffective. Pathfinders did not take part but the best crews were placed in the lead. There was no daylight reconnaissance of the target but from night photographs obtained and crew reports it appeared that the attack was scattered over a wide area and it is doubtful whether any serious damage was inflicted. (1)

(vi) Moling and Scuttle Operations

Considering the uncertainties of Gee, the inexperience of the Pathfinder Force in its new task and the very disappointing weather encountered some useful results were achieved during August. But operations were by no means on the scale originally intended, mainly due to the unsuitability of prevailing conditions for large scale efforts. Indeed, the limiting effect of weather on night operations not only during August but throughout the early years of the war has been self-evident. It was in an attempt to overcome those limitations and to maintain the pressure on German morale during the periods when weather was unfit for major attacks that Moling and Scuttle activities were introduced. The intention was to exploit (by day and night 'nuisance' raids over a wide area making use of cloud cover) the current German A.R.P. regulations which decreed that, on the sounding of the Air Raid Alarm, everyone must take cover and remain in shelters until the All Clear. It was assumed that:

/"The

AHB/6
Translations

(1) Monthly Police Returns mention damage to only 455 buildings.

"The German mentality is not well constituted to withstand this sort of treatment. A crowd of Germans herded together in a communal shelter lacks the collective sense of humour which sustains a British crowd under similar circumstances of discomfort and there is no doubt that enforced confinement particularly in winter, has a profoundly depressing effect on them."

AHB/IIH/241/3/488
BG/S25859
Encl. 1A

The above excerpt has been taken from a Bomber Command Instruction on Scuttle operations issued in November, 1941. While the reasoning is open to question in the light of post-war knowledge, it is an interesting example of the general feeling in regard to German morale at that time. Groups were warned that, on nights when weather precluded more precise attacks, selected crews would be given roving commissions to patrol specified zones of Germany under cover of cloud, bombing and built-up area seen through breaks and, if no such breaks were found, proceeding by D.R. navigation to a pre-selected key-point and bombing its estimated position on E.T.A.

AHB/IIH/241/3/619
BG/23746/3
Encl. 3A

On 20 March 1942 cloud cover operations were extended to include daylight attacks by Nos. 3, 4 and 5 Groups who were authorised to employ up to 10% of their Gee-equipped aircraft in daylight blind bombing raids on Essen or any alternative target in Germany. Although such operations were to be initiated at the discretion of Group Commanders, the final decision was to be taken in consultation with Command Headquarters to enable the necessary Gee facilities to be provided.

AHB/IIH/241/3/488
BG/S.25859
Encl. 2A

By August 1942 an increasing number of cloud cover operations of one sort or another were being carried out by small numbers of aircraft both by day and by night. Group Commanders issued their own instructions on methods to be adopted and, in consequence, a large number of new code names were springing into existence denoting operations which were really very similar in character. Clearly the time had come for a further co-ordination of this subsidiary effort of the Command and on 10 August 1942 a new instruction was issued, dividing the various types of cloud-cover raids into three broad categories:

Moling

Operations by day or night against specific targets when there was 8-10/10th cloud, bombs being released on a Gee fix. That type of operation was only to be undertaken when there was sufficient cloud cover en route to enable aircraft to avoid searchlights or evade enemy fighter attacks. Aircraft could always attack alternative targets in Germany if there was insufficient cloud cover to enable them to reach their primary objectives.

Scuttle

Roving commissions by individual aircraft over a wide area, bombs being released on built-up areas seen through gaps in the cloud or, as a last resort, on E.T.A. of a Gee fix over a pre-selected aiming point.

/Deep

Deep Penetration

Use of cloud cover to obtain greater penetration areas clear of cloud outside the normal range during hours of darkness. Such operations required special instructions from Command Headquarters.

It was intended that Moling and Scuttle operations by day should be planned and executed on the initiative of Group Commander when weather conditions seemed suitable for that type of operation. They could, however, be ordered either by day or by night by Command Headquarters when conditions were unfavourable for other forms of attack. When operations had to be cancelled on any one night owing to weather, it was the C.-in-C's intention that a Moling operation would take its place at a strength of about ten sorties. In order to take advantage of bases with the most favourable weather, Groups were warned that as soon as the night's operation had been cancelled they were to inform Headquarters Bomber Command of the number of sorties they could offer for Moling, those Groups able to home their own aircraft offering ten and the others three sorties. They would then be informed of the number of sorties required from them to make up the Command total.

Between March and the end of September 1942 roughly 204 sorties⁽¹⁾ were flown on daylight Moling or Scuttle operations by heavy and medium bomber Groups but, as far as can be determined, very few were ordered by night. Moling attacks by 38 aircraft on Essen on 4/5 August and by 25 aircraft on Essen and Bochum on 5/6 August have already been described in the previous Section of this chapter. As regards the daylight raids, the majority were on a very small scale involving only one or two aircraft but it is notable that, on many occasions, the targets selected were German coastal ports and submarine building yards. In particular, two fairly large scale daylight raids were made on the building yards at Danzig and Lubeck on 11 July and 16 July respectively. The attack on Danzig by 44 Lancasters of No.5 Group is mainly notable as the heaviest daylight raid so far attempted by heavy bombers against a target which, situated approximately 750 miles from base, was the most distant ever attacked by home based aircraft. These and other operations of a similar nature, although inconclusive, may be regarded as comprising at least a small part of Bomber Command's overall contribution to the war at sea.

With the approach of winter, the importance of Moling and Scuttle operations redoubled. It will be seen from the next Section that, in September one last effort was made to increase the weight of attack by the inclusion of O.T.U's in bombing operations. In the middle of October, however, the offensive was almost wholly diverted against Italian targets in support of Operation Torch and the number of major raids on Germany was very considerably reduced. Meanwhile, the general anxiety to find ways and means of keeping up the pressure on Germany under conditions which made heavy night attacks impracticable is reflected in a demi-official letter from the C.-in-C. to his Group Commanders on 26 September. Urging them to prepare to undertake Moling operations on their own initiative and estimation of suitable conditions he asserted his personal belief in the possibility of using cloud cover to attack the

/smaller

(1) These figures do not include sorties by Mosquitoes of No.2 Group which will be considered separately in a later chapter on No.2 Group operations as a whole.

AH6/TUH/241/3/620
BC/S.23746/5
Encl.57A

AH6/TUH/241/3/620
BC/S.23746/5
Encl.60A

S E C R E T

smaller less defended targets in the extreme south, extreme east and in the north of Germany without undue risk. For such attacks he suggested, cloud cover could be used in three ways: either (a) on both the outward and homeward journey (b) on the outward journey only, returning by night or (c) on the homeward trip after a dawn attack. Depending on weather and opportunities of evasion, anything from 2 to 50 aircraft could be so employed. They should work as nearly as possible to an E.T.A. in order to achieve concentration over the objective but should proceed in twos and threes or even, if conditions warranted it, singly, eventually making rendezvous over the Baltic or some undefended area of Germany well past the heavily defended zones. Such attacks, he urged, quite apart from the actual damage they inflicted, would have an "enormous" moral effect as well as helping to spread the defences which had become mainly concentrated around the well known targets.

(vii) September - An Increase in Sorties

The bad weather which was largely responsible for the failure of Bomber Command to carry out any large scale attacks on German industry and moral in August, abated somewhat the following month and a further effort was made to increase the weight of attack by the inclusion of O.T.U. in operations. But Autumn was fast approaching with its herald of winter and September was to see what was virtually the end of the period of intensified effort which had opened with the thousand raids in May and June. A few moderately heavy attacks were made in the first half of October but, thereafter, the main effort of the Command was directed against Italian targets in support of the campaign in North West Africa.

AHB/T/39/1/3(a)
ORS/BC.
Night Raid
Report
No. 142 ✓

The month opened with a raid on Saarbrucken by 231 aircraft. Weather had required the choice of a target as far south and west as possible and it was thought that as Saarbrucken had already been heavily damaged by the raid in July, a further successful attack might have cumulative results. It had the added tactical advantage that, since the flak defences were believed to be moderately light, aircraft might be able to get underneath to bomb if the prevailing cloud was not well broken.

From the evidence of night photographs, it appeared that a very heavy and concentrated attack developed on Saarlautern(1) in mistake for the primary target, considerable damage being inflicted on that town. Crews reported that the area was a mass of flames with a high column of black smoke. Several violent explosions were observed and an 8000 lb. bomb dropped during the attack was seen to burst with a terrific yellow flash between two fires in the centre of the town. Crews also reported that Pathfinder marking contributed greatly to the concentration achieved. As was expected, flak and searchlight opposition was practically nil over the target and only four aircraft (1.7%) were lost, one or possibly two of them to night fighters which were active.

/In

(1) Although comparatively unimportant industrially, Saarlautern was the centre of the administration of the Province of the Saar.

S E C R E T

Ibid
No. 143 ✓

AHB/TH/84
A.M.W.R. Manual
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In accordance with the C.-in-C's policy of spreading the enemy defences, 200 aircraft were despatched the following night to Karlsruhe, which target also offered the most promising weather conditions. It was hoped that an attack on a hitherto rather neglected spot(1) might prevent the transfer of the defences to other more important areas. In that connection, a report was subsequently received from an intelligence source which stated that the inhabitants of Karlsruhe had attributed the success of the operation to the fact that a good proportion of the heavy flak defences had actually been removed from the town on 1 September.

Night photographs showed that about half of the 170 aircraft which claimed to have attacked their primary target had bombed within three miles of the aiming point. Pathfinder marking was accurate and fires were seen which increased in size and intensity as the attack developed.(2) About 20 other photographs were plotted west of Karlsruhe outside the three mile circle, many of them covering the docks area where fires were also burning. Daylight reconnaissance confirmed the success of the operation, revealing very heavy damage to industrial property at Grunwinkel and to the east end of the harbours where 60 acres of industrial buildings and yards had been devastated. In all, about 27 factories were affected in varying degrees and about 30 other sheds or warehouses were destroyed. Industrial premises which suffered partial or complete destruction included a fire-fighting equipment factory, two food factories and a factory making small electric motors. A long shed in the railway repair shops was also severely damaged and at least one direct hit obtained on a platform at the main station causing damage to tracks and rolling stock.

AHB/TH/84
A.M.W.R. Manual
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Ground sources reported that as many as 200 fires were burning during the attack while the Goods Station was still on fire the next afternoon. Five days later the town was still without electric light. It was also reported that 500 trucks of coal on the harbour sidings were destroyed as well as 12 locomotives and, on 4 and 5 September coal traffic through the town had fallen by 30%. As a result of large fires started in the coke storage depots which took several days to put out, 900 tons were destroyed and eventually the burning coal and coke was thrown into the Rhine. 800 houses were said to have been severely damaged and 48 hours after the attack, several thousand people were evacuated. This would seem very probably correct in the light of German Police Records which state that 5,785 people were rendered homeless. There is no doubt that the operation achieved considerable success for the loss of only eight (4.0%) aircraft, three or possibly four of which were believed to have been destroyed by enemy fighters.

AHB/6
Translations

The following night weather was unfit for anything but Moling and a small force of 11 bombers raided Emden without any notable results. On 4/5 September however, it was decided to take advantage of the fine weather predicted for North West Germany to attack again the heavily defended port of
/Bremen

AHB/TT/39/1/3(a)
ORS/BC,
Night Raid ✓
Report No. 145

AHB
IIG1/42

(1) This was the first attack on Karlsruhe since October 1941. Although comparatively insignificant industrially, the target was of considerable importance as a transport centre by virtue of its position on the main route for the bulk of the coal supplies to and from the Ruhr. Despite the many alternative routes available, attacks might also be expected to result in incidental damage and dislocation to the vital coal traffic between Germany and Italy.

AHB/6
Translations
G.169087/MKL/11/50/

(2) Police Records mention 2045 fires in the town.

S E C R E T

Bremen which had been unmolested (except for small daylight Moling raids) since the beginning of July. 251 aircraft were despatched to attack the town, 25 Lancasters of No.5 Group being given the Focke-Wulf Factory as their special aiming point.

From crew reports it appeared that the target was well and accurately marked by the majority of the P.F.F. who were using flares as their primary and incendiaries as a secondary method and the attack which developed was concentrated and intense. This view was supported by P.R.U. photographs which revealed considerable damage to factories, warehouses, railways and residential property. At the Weser aircraft works the machine shop was completely destroyed and other buildings suffered minor damage. A large building containing workshops was also gutted at the Atlas Werke shipyard while elsewhere about 25 industrial buildings, including railway and dockside warehouses were either completely destroyed or very severely damaged. Severe damage was also caused by a direct hit on a hangar-type building at the Focke-Wulf Factory. Police Records for the night confirmed the damage to the Atlas Works where the Rigging Loft and Shipbuilding shed were completely burnt out. Other damage reported included the Headquarters of No.5 Flak-Batterie 2/265 in the Europa Harbour which was gutted. As was to be expected, enemy defences were very active and 11 bombers were missing from the operation.

AHB/6
Translations

AHB/II/39/1/3(a)
ORS/BC.
Night Raid
Report
No.146

Following those two very concentrated attacks on Karlsruhe and Bremen respectively, attention once again turned to the Ruhr, always on high priority. On 6/7 September 207 sorties were despatched against Duisberg. Cloudy weather over Germany and a high wind automatically limited the range but it was anticipated that over the target a north-easterly wind would give comparatively clear conditions. This proved correct but the good visibility was marred by patches of thick ground haze which may have been partly responsible for the fact that the raid was less concentrated than usual. Nevertheless a useful attack developed and although subsequent reconnaissance revealed no larger areas of devastation, there were a considerable number of fire and H.E. incidents. Five buildings in the United Steel Company Works at Morderich and elsewhere about 20 other industrial buildings were destroyed and as many more again damaged. There was also some damage to railway tracks and installations and it was estimated that between 130 and 150 houses had been either destroyed or damaged. (1) It was reported by ground sources that 90 barges had been sunk, rendering the harbour unserviceable. Information was also received that 2,000 workers of the Demag Company, makers of equipment for heavy industry, were unemployed due to stoppages caused by recent heavy air-raid damage to the Works. (2)

AHB/II/H/84
A.M.W.R. Manual
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/On

AHB/6
Translations

Ibid

- (1) German Police Records place the number of houses destroyed at 60 with a further 180 damaged.
- (2) While this may have been an exaggeration, it is supported to some extent by Police documents which recorded a 20% decrease in production for two days as a result of damage caused by the attack on 6/7 September.

S E C R E T

AHB/U/39/1/3(a)

ORS/BC.
Night Raid
Report
No.147 ✓

Ibid No.148 ✓

On 7/8 September 16 aircraft including two P.F.F. Halifaxes were briefed for an attack on the Heinkel Works at Warnemunde but a last minute study of the weather forecasts resulted in the cancellation of the operation and the aircraft were recalled. The following night it was necessary to go south to find a target clear of frontal conditions and as threatened bad weather at bases limited the possible range of attack Frankfurt was chosen as the objective most suiting those requirements. 249 aircraft were despatched and from night photographs it was evident that the Russelsheim district bore the main weight of the attack intended for Frankfurt. Early in the raid incendiaries were burning in the area of the Opel Works (producers of armoured vehicles and components) which evidently led some aircraft astray and a very scattered attack developed over the neighbourhood with local concentrations near Florsheim, Opelbahn and east of Russelsheim. From crew reports it appeared that there was considerable doubt as to the correct identification of the primary target and there were complaints that the target marking was not as good as usual. Reports stated variously that flares were widely scattered, too high, and late while the absence of coloured marker flares, which were not used, made identification difficult. The P.F.F. on the other hand were severely hampered by the presence of 8/10th cloud and considerable ground haze at the beginning of the attack which affected the planned concentration of flares and blob fires. Nevertheless, subsequent reconnaissance of Russelsheim covering part of the Opel Works showed some useful damage to the latter while hits on the Bischofsheim Marshalling Yards damaged at least four tracks.

(viii) Last Operations by O.T.U's

AHB/U/39/3(a)

Ibid No.150 ✓

It was now six weeks since O.T.U's had been able to participate in a major operation over Germany and on 10/11 September it was decided to make a heavy attack on Dusseldorf which promised fair weather, presented no serious navigational problems for O.T.U. crews and was within suitable range to enable aircraft to return before the onset of predicted fog at bases. Of the 476 sorties despatched, 174 were from the Training Groups, the newly formed No.93 Group participating for the first time with 33 aircraft. The attack was planned in four Sections as follows, very special emphasis being laid on the importance of adhering to the pre-arranged timing for each Group:-

- (a) 24 PFF a/c - Zero to zero plus 5 minutes.
- (b) All a/c of No.5 Group - Zero plus 3 to zero plus 15 minutes.
- (c) All a/c of Nos.1, 4, 91, 92 and 93 Groups - Zero plus 15 to zero plus 50 minutes.
- (d) All a/c of No.3 Group plus 13 a/c of PFF - Zero plus 45 to zero plus 55 minutes.

The Pathfinders were to illuminate the target by strings of flares. On definite identification of the target, steady red flares were to be dropped at the west end of the town and steady green at the east end. As auxiliary markers, 'blob' fires were to be used at the beginning of the attack. In addition, two of the new experimental 4,000 lb. incendiaries which on impact burst with a pale yellow flame were to be dropped during the marking period while a number of aircraft also carried H.E's to discourage fire-fighters.

/Altogether

S E C R E T

Altogether 365 (76.7%) of the sorties despatched on this operation claimed to have bombed their primary target and from night photographic evidence it seemed certain that a very concentrated attack developed with at least 50% of the attacking aircraft bombing within three miles of the aiming point in the centre of Dusseldorf. A further 10% bombed the docks, marshalling yards and built-up areas of Neuss. There was only a relatively small amount of mis-directed bombing throughout the entire operation. From all reports, including statements by crews specially detailed to make reconnaissance during the attack, it was evident that Pathfinder marking was accurately placed and timed despite the presence of haze and the target was well illuminated as a result. The red and green flares formed the chief means of target identification by many of the main force and the apparent scatter of some of them which was reported by crews was attributed to enemy simulation flares. There were few references to the 'blob' fires but several crews commented on the striking and gigantic yellow flame produced by the new 4000 lb. incendiary bombs.

Enemy defences were found to have greatly strengthened since the previous attack at the end of July flak and searchlights being particularly intense over the target. As a result losses were fairly high at 30 (6.3%).

The success of the attack as a whole was strongly confirmed by subsequent reconnaissance which revealed heavy damage throughout the towns of Dusseldorf and Neuss. In Dusseldorf the greatest damage occurred in the centre of the town where business and private property suffered extensively. Over 100 acres between the Rhine and the main railway line were devastated and many public buildings, shops and blocks of flats were destroyed, in addition to numerous warehouses and industrial premises. The total area of devastation amounted to about 120 acres. Nineteen industrial premises were heavily damaged or destroyed including an iron foundry, a chemical factory, a steel tube works (the greater part being destroyed) and a factory making insulating materials which was completely destroyed. In addition, some of the warehouses in the inland harbour were burnt out; the main railway station received a direct hit which wrecked half the main block of buildings; rolling stock in Derendorf Marshalling Yards was damaged by fire; the Post Office and postal administrative buildings and the telegraph office were seriously damaged and also a Savings Bank, the main tramway depot and the State Observatory.

In Neuss, five large factories including a chemical factory were seriously damaged as well as many industrial premises and warehouses. Railway buildings near the Roundhouse were damaged and the track in several places. Three schools were seriously affected and 13 acres of the residential and business district in the centre of the town were devastated.

This was undoubtedly one of Bomber Command's more successful operations in 1942. The exact assistance given by the training aircraft is problematical. While the moral effect of the greater numbers deployed over the target is difficult to assess, an O.R.S. analysis put the percentage increase in material damage as a result of their employment at only 4%.

/Nevertheless,

S E C R E T

AHB/II/39/1/3(a)

ORS/BC
Night Raid
Report
No.151 ✓

Nevertheless, on 13/14 September 139 O.T.U. aircraft were again employed to swell the numbers in a heavy attack by 446 bombers on Bremen. It was one of the very rare occasions when weather set no time limit on operations and it was decided to plan the attack in two Sections, the second time to open exactly one hour after the first had finished. This was the longest gap so far attempted by the Command. The first Section consisted of the Pathfinder Force and aircraft of No.5 Group which, between them, were to start fires which would be well established by the time the second Section arrived. Pathfinders were allotted two functions. Once the target had been well illuminated and marked with flares and 'blob' fires, aircraft of No.35 Squadron equipped with Mark XIV bomb sights were to drop their incendiaries (including two 4,000 lb. I.B's) on the exact centre of the concentration as early in the attack as possible in order to provide a focal point. Lancasters of No.5 Group were ordered to attack as soon as the target had been adequately illuminated. One hour later, the second Section led by No.4 Group were detailed to bomb with incendiaries and H.E's, aircraft of No.3 Group (and any PFF aircraft not detailed for target marking) bringing up the rear with incendiaries.

Despite the careful planning, this attack was much less concentrated than the previous raid on Dusseldorf and there was a large amount of indiscriminate bombing. Pathfinders encountered very thick haze in the target area and had great difficulty in finding their objective. Nevertheless, fires started in the first half of the attack were still burning when the Second Section arrived and the last crews to bomb reported very large fires in the built-up area of Bremen. Although daylight reconnaissance revealed a certain amount of useful damage to residential and industrial buildings including the Lloyd Dynamo Works and the Borgward Engineering Works, German Police Records include only 10 cases of slight material damage to buildings and no casualties. Five vessels were also reported to have received slight damage and an intelligence source stated that, largely as a result of recent attacks, the output of the Lloyd Dynamo Works had fallen by 33%.

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AHB/II/39/1/3(a)

ORS/BC.
Night Raid
Report
No.154 ✓

Three nights later on 16/17 September O.T.U's again took part in what was to prove their last operation over Germany during this period. Range was limited by the very high wind forecast but that condition, together with the small amount of cloud expected, promised better visibility than usual in the Ruhr area and it was decided to send a force of 368 aircraft (including 126 from O.T.U's) to Essen which had not been attacked in any strength since the middle of June. Pathfinder technique underwent a further modification on that occasion. The target area was first to be illuminated by long strings of flares, followed by shorter sticks across the actual aiming points. Once it was well lit up, the four best Lancaster crews were detailed to mark the aiming points with blob fires.

In practice, only six of the Pathfinders carrying flares claimed to have reached Essen and owing to the cloud and darkness had extreme difficulty in pinpointing their objective. Flares were undoubtedly very scattered although a few were sufficiently well placed to enable following aircraft to bomb the target. In general it seemed that the attack improved in the later stages, probably due to the decreasing amount of cloud and better visibility. Flak and searchlight opposition was intense and probably accounted for a high proportion of the 39 missing aircraft. It is doubtful, in

/the

S E C R E T

the absence of daylight reconnaissance, whether any very serious results were achieved in Essen by this attack although the plot of night photographs which were comparatively few in number, represented the best concentration so far achieved on that target.

(ix) Other Attacks in September and October

The raid on Essen described above marked what was virtually the end of a phase. The attempt to increase the weight of attack on Germany by the use of O.T.U's had been only partially successful owing to adverse weather and the internal difficulties of the Command mainly connected with the training organisation. After discussion with the C.A.S. the C.-in-C. decided for reasons already enumerated in an earlier Chapter, (1) against any further use of O.T.U's on operations until both operational and training units had been brought up to full strength.

Although never entirely abandoned, the intensive effort against German industry and morale in 1942 was rapidly coming to an end. In the middle of October, a major part of the bombing offensive was deflected to the attack of Italian targets in order to give all possible air assistance the the Campaign in North West Africa. Such targets had the added advantage that they offered better bombing weather than was normally to be found in Germany under winter conditions. The Winter Campaign, of which the Italian offensive formed a major part, is the subject of another Chapter. In the meantime, the C.-in-C. continued to launch heavy attacks against Germany whenever and wherever prevailing weather allowed.

AHB/II/39/1/3(a)
ORS/BC.
Night Raid
Report
No.152 ✓

A raid by 202 aircraft on Wilhelmshaven on 14/15 September achieved at least moderate success. In spite of thick haze and low cloud, the Pathfinders were on the whole successful in marking the target and an unusually high proportion (90%) of the attacking force claimed to have reached and bombed their objective. Night photographs showed sticks of incendiaries burning in the docks area, in the town and in the suburbs to the North and West as the attack developed. Several crews reported seeing 4,000 lb. bomb bursts in the town and near the docks and there were a number of references to a particularly large explosion in the dock area towards the end of the attack. Although there was no daylight reconnaissance of the target, a reliable source reported that the naval yards had suffered further damage and casualties among the population were very heavy. The proportion of aircraft missing from the operation was unusually low (1.0%) probably due to the absence of moonlight and the thick haze over the target.

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AHB/II/39/1/3(a)
ORS/BC.
Night Raid
Report
No.157 ✓

Moderately successful attacks were also made on Munich (for the first time that year) and Saarbrucken on 19/20 September the latter being chosen as a suitable target for shorter ranged aircraft and conveniently situated on the route to Munich to enable the two forces to achieve reasonable concentration over the known defended zones. Pathfinders were in the van of each force but in spite of

/accurate

(1) Chapter 12, Section (iii).

accurate marking at Munich, the weight of the attack fell mainly on the southern part of the city inflicting a moderate amount of damage, mainly by H.E. A large number of incendiaries also fell on the target but fires apparently failed to gain a hold, from which it was deduced that Munich was comparatively invulnerable to incendiary attack. Main items of industrial damage revealed by daylight reconnaissance included the total destruction by a 4,000 lb. bomb of a small engineering works extending over $2\frac{1}{2}$ acres in the centre of town.⁽¹⁾ At Saarbrücken, poor visibility which resulted in a scattered raid also restricted observation of results but a number of small fires dispersed over a wide area and three large ones in the town itself were reported by returning crews.

Ibid No.159 ✓

By September, emphasis on the vital importance of an increased offensive against the U-boat industry was reaching a new peak.⁽²⁾ It will have been noted that throughout the summer and early autumn an increasing number of attacks were levelled at German ports and submarine building yards. On 23/24 September advantage was taken of the fair conditions expected over North West Germany to strike yet another blow at those vital targets. Small numbers of low flying heavy bombers were despatched to attack the submarine building yards at Vegesack, Wismar and Flensburg, each target being allotted to one Group. Unfortunately bad weather marred the raid on Vegesack. Only five of the 26 sorties despatched by No.3 Group reached the primary area where they found the target completely obscured by cloud. Considerable success was achieved at Wismar, however. Fifty of the 83 Lancasters from No.5 Group claimed to have reached and bombed their target and the crew of the last aircraft to attack reported that there was no evidence of bombs having fallen outside the primary area. Large fires were reported in the town and, in the area of the Dornier Works which had been given as a special target to 20 selected crews, a big building thought to be part of the factory was left blazing fiercely. A second building in that area with numerous chimneys and sheds was also seen to be well alight and one pilot claimed to have scored a direct hit on the factory from roof top height. Incendiaries were also burning on the aerodrome and a fire in the fjord $2\frac{1}{2}$ miles away was presumed to be a ship ablaze.

An accurate attack was also made on Flensburg by 16 of the 28 aircraft from No.4 Group. One of the first aircraft over the target reported that its bombs had caused a big explosion followed by "a vast red fountain 500 feet high and 100 feet across" which was also seen by other crews. A large explosion was reported in the shipyards as well as fires in the town itself.

A second attack on Flensburg on 26/27 September was cancelled at the last minute after a final study of the weather forecast but the target received further attention on 1/2 October in common with Lubeck and Wismar.

/Twenty-five

AHB/6
Translations

(1) German Police documents record that 49 houses were totally destroyed, 746 partly destroyed and a further 700 slightly damaged. As a result, 3,242 people were homeless. Industrial and commercial incidents were estimated at 34 buildings totally and 214 partly destroyed. 3 military buildings were also destroyed and 32 damaged. They also record damage to streets, gas and water mains and power cables and 31 works shelters.

(2) Chapter 20.

S E C R E T

AHS/II/39/1/3(B)

ORS/BC.
Night Raid
Report
No.165

Twenty-five Stirlings of No.3 Group were despatched to attack the Submarine Building Yards at Lubeck and a much larger force of 78 Lancasters to attack the town and Dornier Factory at Wismar. From crew reports it appeared that the attack on Wismar was diverted by a decoy in the area and that part of the attack may have fallen on Rostock and Warnemunde. In both cases bad weather prevented accurate pinpointing and although one aircraft claimed a direct hit on the submarine slipway at Lubeck, in the absence of daylight reconnaissance, the results of the attacks are doubtful.

Rather better success was achieved by 12 of the 27 Halifaxes despatched to Flensburg by No.4 Group. Considering the small weight of attack considerable damage seems to have been inflicted on the town and shipyards. Three fires, one of major importance, were reported in the built-up area and several in the shipyards. Defences at Flensburg were particularly active, however, and of the 17 aircraft missing from the entire night's operations, 12 were lost on that target.

AHS/II/39/1/3(B)

ORS/BC.
Night Raid
Report
No.173

One final attack on Wismar was made by 59 Lancasters of No.5 Group on 12/13 October. Under conditions of extreme darkness and low cloud, 49 aircraft claimed to have reached and bombed their target but from night photographs it appeared that the main effort was directed about 15 to 20 miles west of the aiming point where two or three large fires were visible. On the other hand, one pilot who was on his third visit to Wismar reported a huge fire in the target area in the light of which the Dornier Factory was clearly visible. Other reports tended to confirm his statement but without the evidence of daylight reconnaissance it cannot be regarded as conclusive.

Ibid
No.166

Meanwhile two comparatively ineffectual attacks had been made on Krefeld and Aachen on 2/3 and 5/6 October respectively. The attack on Krefeld was the first operation of any size for almost a fortnight. Unfortunately thick haze in the target area prevented the Pathfinders from identifying the aiming point with the result that flares were widely scattered and the attack by the main force too dispersed to achieve decisive results. German Police recorded the destruction of 171 and damage to 6,663 houses. Other incidents included the destruction of four public buildings and 12 farms and hits on 36 industrial buildings.

Ibid
No.167

The attack on Aachen was even less satisfactory. The target had been chosen as the most suitable under prevailing conditions but, owing to a series of minor mishaps, the Pathfinder plan was disorganised which, together with the bad weather experienced, resulted in very scattered bombing. Some damage was inflicted on the town and Police Records mention the destruction of five factory buildings and damage to a further 845 buildings of various types.

Ibid
No.168

Following these abortive efforts, a much more satisfactory attack was made the following night on Osnabruck which had not been visited since 17/18 August. In spite of bad visibility, the target was well illuminated by P.F.F. flares and nearly 90% of the attacking force claimed to have reached and bombed their primary. Although there were no large areas of devastation, daylight

/reconnaissance

reconnaissance revealed considerable damage to a number of industrial and railway works, chiefly by fire. Major items included a Cotton and Weaving Mills, metal works and a copper and wire works (said to be producing submarine hull parts and armour plating). It was stated by a reliable source that the latter which had received serious damage in previous attacks causing a 40% loss in production for some 2½ months had only just resumed full capacity. Other reports mentioned wide scale damage to railway lines and rolling stock, and also to four factories said to be engaged in armament production. One of two main petrol depots was also stated to have been destroyed. The success of the attack was confirmed by Police Records which reported damage to eight industrial buildings including the Copper and Wire works, the administrative buildings, pattern-shop and laboratory of the Hammersen-Klockner Works, and a vehicle works. The railway line from Osnabruck to Hanover was also stated to have been cut.

AHB/IIH/84
A.M.W.R. Manual
of B.C. Ops/
1942

AHB/6
Translations

AHB/II/39/1/3(B)

ORS/BC.
Night Raid
Report
No.174

On 13/14 October, a slight improvement in the poor weather which had been effectively prohibiting large scale operations for several nights led to the despatch of 288 sorties to attack the town and harbour of Kiel. Conditions at home bases necessitated an early return and, apart from its intrinsic value, Kiel had been selected as promising to be clear of cloud shortly after dusk that night. The 237 aircraft claiming to have bombed their objective experienced good visibility despite a slight ground haze and an effective smoke screen over the docks. From night photographs it appeared that the main weight of the attack fell on the shipyards and the adjacent built-up area to the east. Nevertheless, despite prompt and accurate marking by the Pathfinders the heavy concentration intended was not achieved. There was some scatter and about half the bombs dropped fell in open country. Both P.R.U. cover and German Police Records confirm that impression, the extent of the destruction inflicted being small in comparison with the size of the attack. The former revealed a certain amount of damage to industrial and residential property, mainly by fire, and two reports received subsequently stated that the lockgate at the entrance to the Kiel canal had been badly damaged and was not fully repaired until 3 November. Police Records mention damage to 10 industrial buildings but state that there was no fall in output. Other damage included 631 houses, 31 of which were destroyed, 12 public and one military building.

AHB/6
Translations

AHB/II/39/1/3(B)

ORS/BC.
Night Raid
Report
No.176

Finally, on 15/16 October 289 sorties were despatched to Cologne which had received no attention other than sporadic daylight raids since the thousand bomber operation in May. A very high wind put long distance targets out of reach on that night. Cologne was chosen partly for tactical reasons, partly in the hope of preventing the possible removal of some of the defences after such a long time lag and partly with the object of nullifying the progress reported in the repair of public buildings and utility services damaged in the previous attack.

Unfortunately, the attack which was to be made in two Sections consisting of Pathfinders and Main Force aircraft, went badly astray, the main concentration occurring between 7 and 13 miles south-west of Cologne.(1) The main reason for the diversion was the failure of the Pathfinders to mark the target correctly. They in turn were probably deflected by

/decoys

AHB/6
Translations

(1) Police Documents report only three medium and six smaller fires in Cologne where 226 houses were slightly damaged.

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decoys strongly defended by heavy A.A. artillery to the south-west of the city as well as being hindered in their identification of the target by heavy cloud en route and the successful jamming of Gee. In view of the lack of concentration achieved, the above average loss rate of 6.2% was only to be expected but an outstanding feature was the large number of interceptions experienced in comparison with the "thousand" raid in May.

(x) Review

The main events described in the preceding Chapter may be summarised as follows:-

- (a) The C.-in-C's decision to initiate a period of intensified effort during which one or more attacks on the 'thousand' scale would be made on German targets each month.
- (b) The Air Staff's approval of the proposal to utilise O.T.U's to augment the operational effort and enable attacks on the new scale to be carried out.
- (c) First stages of the elimination of Gee as a target finding device by enemy jamming.
- (d) The establishment and early operations of the Pathfinder Force.
- (e) Attempts to maintain the moral effect of heavy night raids on the German population by increased Moling and Scuttle sorties by day and night when weather prohibited attacks on a large scale.

The C.-in-C's bold plan to undertake one or more 'Colognes' each month with the help of the O.T.U's was doomed almost from the start by a number of unavoidable circumstances which included the highly unsatisfactory weather conditions experienced, tactical problems, difficulties within the training organisation and his inability to raise a sufficiently large operational effort to make the inclusion of the O.T.U's worth while.

One such attack was made on Dusseldorf at the end of July, during which the O.T.U's lost heavily. In August bad weather restricted operations to the minimum; moreover, the Command was then facing the tactical problems engendered by first indications that Gee was being subjected to jamming by the enemy. It is true that the Pathfinder Force became operational at almost the same time, but it too was suffering the inevitable difficulties of a new force which had not as yet had time to reap the benefit of specialisation and was without scientific aids and suitable weapons for target finding and marking. By the middle of October Pathfinder-led operations were beginning to fall into more definite pattern and it was found that on occasions when weather conditions were moderate or good, they contributed effectively to the success of the attack. Under poor conditions, however, the absence of radar aids and suitable marking devices was reflected in inaccurate and scattered marking which was either of no assistance to or definitely misled the main force.

/An

An improvement in weather and other circumstances in September resulted in the use of O.T.U's on three more operations in quick succession. The total numbers of aircraft involved in each attack were considerably below the 600/1000 sorties originally intended and it was extremely doubtful whether the O.T.U. contribution to the success of the raids was sufficient to balance the heavy casualties they had suffered. For those and other reasons which have been enumerated, the scheme was abandoned at the end of September.

Although the three and a half months under review were generally rather disappointing, several very successful attacks were made on vital German targets and considerable advances occurred in the tactical field. It will have been noted that in the later stages bombing operations tended increasingly to be directed against a wide range of targets, many of which were not included in the current priority lists. The reason for this was three-fold. Weather, as usual, frequently limited operations to one area or even, on occasion, to a single objective. A second factor was the C.-in-C's intention, consistently pursued, to force the enemy to spread his fighter and anti-aircraft defences as widely as possible, thereby relieving the growing concentrations facing the bomber force over first priority targets in the Ruhr and elsewhere. Finally, by creating a popular as well as tactical demand for greater concentrations over the less well defended targets, he hoped to force the enemy to retain both equipment and personnel for the defence of Germany which would otherwise be deployed on the Russian Front.

During the summer and early autumn, operations were also directed with increasing frequency against German Ports and Submarine Building Yards. Together with an intensive minelaying campaign, they formed a major part of Bomber Command's contribution to the war at sea in general and the Battle of the Atlantic in particular. The threat to Allied Shipping, particularly by enemy U-boats, was giving rise to increasing concern both to the Americans and British. The effect of that threat on bombing policy and the course of the strategic offensive against Germany will be reviewed in a subsequent chapter.

In the meantime, before examining the course of the winter campaign against German and Italian targets, an account must first be given of the attack of industrial targets in occupied territory in 1942. Although subsidiary to the main offensive, such operations were, in a sense, complementary to it and the targets were welcomed by the C.-in-C. as providing useful alternatives on occasions when weather, short nights and other tactical considerations imposed unavoidable restrictions on the attack of Germany itself.

S E C R E T

CHAPTER 19

INDUSTRIAL TARGETS IN OCCUPIED TERRITORY

(i) The Night Attack of Factories in France

Until February 1942 the attack of factories in Occupied France had been confined to daylight operations, mainly by No.2 Group, with or without Fighter escort. For some time past, however, the Political Warfare Executive had been conducting a "go slow" campaign among the French Workers. The possibility of lending support to that campaign by extending the existing bombardment policy to include heavy night attacks on factories known to be making munitions for the enemy with the object of restricting Germany's use of French resources and discouraging French Nationals from working for the enemy had formed the subject of a Memorandum to the War Cabinet by the Secretary of State for Air in November 1941. In it he emphasised that, quite apart from the economic effect of actual physical damage to factories concerned in the manufacture and assembly of aircraft, aer-engines, tanks and lorries for the Germans, such attacks could be expected to have a considerable moral effect on workers in other factories which would result in a general loss of output. They would also encourage the French Nation as a whole, particularly as they had repeatedly asked the British to bomb plants known to be working for the Germans. Finally, since the targets were at present lightly defended, their attack might possibly result in a diversion of A.A. guns from Germany to France.

W.P.(41)260
6.11.41.

Ibid

The political implications of night attacks were great, however, and the Secretary of State warned the Cabinet that, in order to avoid undue casualties caused by stray bombs falling among French civilians, the operations would have to be undertaken in good weather which would involve a diversion of effort from Germany and the Battle of the Atlantic on the rare occasions when conditions were really favourable. Urging them to accept his proposals, he suggested that an attack should be carried out on the heaviest scale at the first opportunity. If successful it should be given the widest publicity to secure the maximum effect on morale. Other attacks would then be made at suitable intervals so as to interfere as little as possible with the main offensive against Germany.

W.M(42)3rd
Conclusions
8.1.42

Discussion on the Memorandum was deferred until 8 January, 1942 when the War Cabinet signified their general concurrence in the views set out subject to the agreement of the Prime Minister, then in Washington, that they were consistent with plans being considered for Super Gymnast. Pending a final decision, the Secretary of State for Air was invited to consult with the Foreign Secretary as to the exact form of the radio and leaflet warning to be given to the French that it was proposed to bomb their factories and urging them to absent themselves from work.

There followed some delay occasioned by an exchange of telegrams with Washington. The Chiefs of Staff there were of the opinion that there was no necessity for an immediate decision since in any event the operation could not take place until the next moon period. In the meantime it should be very carefully considered in the light of its repercussion on Gymnast.

/ The

S E C R E T

D.B.Ops.
Folder Attack
on French
Industry.
25.1.42.

The Air Staff, on the other hand, were anxious for authority to carry out such operations in the near future and before the introduction of Gee. They considered that attacks on short range targets in less heavily defended areas would provide a welcome opportunity to test out the tactical methods which it was proposed to use in conjunction with Gee.

Ibid
S. of S.
Minute to
P.M.
27.1.42.

On 27 January the Secretary of State for Air wrote to the Prime Minister (then returned to this Country) supporting that view and pointing out that Gymnast was becoming more remote while weather conditions which at that time of year were frequently so unsuitable for long range operations might well be more favourable for attacks on Occupied France. After further discussion, final approval was given at a War Cabinet Meeting on 2 February 1942 and the Prime Minister ruled that operations should begin immediately.

W.M(42)14th
Conclusions
2.2.42.

D.B.Ops.
Folder "Attack
on French
Industry"
MEW. to A.C.A.S
(I) 14.1.42.

(ii) The Selection of Targets

The targets approved by the War Cabinet for night attacks had been selected by the Air Intelligence Branch in consultation with M.E.W. on the assumption that the aim of such attacks would be to cause, directly or indirectly, the maximum interference with French industrial collaboration at the minimum cost in diversion of the bombing effort from Germany itself. Under those circumstances, it was considered that the targets should be few in number and should satisfy the following conditions:-

- (a) They should be large and easily identifiable to allow concentrated and accurate bombing.
- (b) There should be incontrovertible evidence that they were working for the enemy.
- (c) So far as possible there should be no built-up areas in the immediate vicinity in order to minimise the danger to civilians.
- (d) They should be in sufficiently close proximity to big centres of population to ensure that news of the damage inflicted could not be repressed by the Germans.

S.46348/Vol.III
Encl. 51A
30.1.42

Ibid

Within those general principles it was considered that the best results would be obtained from the attack of objectives near Paris and the following targets were selected as most nearly fulfilling all the requirements:

Renault Works at Billancourt, manufacturing tanks, tank engines and aero-engines and also engaged in a substantial amount of repair and overhaul work.

Ford Matford Works at Poisey, engaged exclusively in the manufacture of lorries or lorry parts.

Gnome and Rhone Works at Gennevilliers, making main castings and forgings for Gnome and Rhone aero-engines and containing what was believed to be the largest drop-forging plant in Europe.

Aircraft Works at Villacoublay, engaged to some extent in the manufacture of components but mainly concerned in the assembly of parts supplied by other firms.

Gien, tank repair depot.

/ A word

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A.H.B./IIG/
86/6A. Encl.
45A, 48A and
52A.

AHB / II/70/272(C)
23.10.42.

A word must be said here about Gien which was to be a source of much controversy in following months. In September 1941 photographic reconnaissance had revealed the presence of some 2000 vehicles at the depot. In December, it was confirmed that they were Armoured Fighting Vehicles but it was considered that repeated heavy attacks would be required to do decisive damage. The question of night attack was left in abeyance pending an examination, in the light of the wider issues at stake, of the relative value of other possible objectives in France. In the end, as has been seen, Gien was accorded only fifth place in the new target list for the following reasons:

- (a) Attacks on tank factories were likely to be more effective than attacks on a depot where the number of vehicles present would be liable to fluctuate.
- (b) The psychological effect would be greater if attacks were directed against factories in more thickly populated areas where the results could be observed by a larger number of people.
- (c) Gien was only a small target, extremely difficult to find and it was considered that an effective attack could only be made by a small number of highly skilled crews in exceptional weather.

Nevertheless, the concentration of so many A.F.Vs in such a small space appears to have fired the imaginations of a number of people in high places and during the new few months the Air Staff were constantly being called upon to support their decision and answer criticisms in Government and Parliamentary circles regarding the non-attack of that target.

AHB/IIH/241/3/621
B6/S.23746/IV
107A
5.2.42

In the meantime, Cabinet sanction having been obtained, the first four targets were embodied in a Directive to Bomber Command on 4 February, 1942, first priority being accorded to the Renault Works. Although its construction was unsuitable for incendiary attack, the C.-in-C. was instructed to combine the operation with a full scale trial of the new flare technique. The remaining targets were to be attacked as soon as possible afterwards and before the enemy could reinforce the defences. Once Gee had been cleared for operational use, targets in France were only to be attacked when conditions were particularly suitable and at the same time less suitable for operations against priority objectives in Germany. Finally, the G.-in-C., was to consider as the primary object of those operations the total destruction of the industrial plants as an indication of the fate awaiting other industries in occupied territory which continued to work for the Germans. While some loss of life among French workers would be unavoidable, he was warned of the vital importance of careful planning, timing and co-ordination of the attacks since indiscriminate bombing would result in loss of British prestige and of the good will of the French people as a whole particularly if a large number of casualties was inflicted and the target not decisively damaged.

Plans for the attack on the Renault Works were put in hand at once but after a careful study of the available data, the C.-in-C., concluded that the chances of destroying the

Ibid 118A
14.2.42.

target at Villacoublay, which consisted of a thin fringe of buildings round the aerodrome, were remote and its attack would be a waste of effort. Similarly, while the Ford Matford Works at Poissy was, economically, of undeniable importance, the overall area was very small and he recommended that it should either be attacked by a small force of not more than 12 Lancasters manned by picked crews or that the operation should be postponed until it could be undertaken by Mosquitoes at a later date.

Ibid 124A
17.2.42.

On 17 February the Air Ministry approved the deletion of Villacoublay from the current list but left it to the C.-in-C's discretion in the light of experience gained on the Renault works to attack the remaining two targets in whichever order he preferred.

(iii) The Renault works at Billancourt

There is no doubt that the attack on the Renault Works at Billancourt by 235 bombers on 3/4 March 1942 was one of the outstanding successes of the year. Only 11 aircraft failed to reach their primary area where, with good weather and excellent visibility, the target was clearly identifiable. The attack was planned in three waves: the first consisting of an advance force of all heavy aircraft for which reliable crews were available; the second or main force comprising medium bombers and the third or rear force made up of all available Manchesters, Halifaxes and Wellingtons fitted to carry 4000 lb. bombs. All aircraft were instructed to carry the maximum number of flares compatible with their allotted bomb loads. Leading aircraft of the Advance Force were to release sufficient flares to enable them to locate the target and, after bombing, to drop their remaining flares to windward. Following aircraft were instructed to repeat the procedure with the object of keeping the target illuminated throughout the attack. Two aiming points were allotted, aircraft of No. 3 Group being instructed to bomb that part of the works situated on the island in the middle of the Seine and the remainder of the force to bomb the main target on the river bank.

BC ORB Appendix
HM/11/34
B.1835

AHS II/39/1/3(a)
BC/O.R.S.
Night Raid
Reporting
No.20.

D.B.Ops.
Folder "Attack
on French
Targets"
5.3.42.

Practically all the night photographs returned showed the target area and daylight reconnaissance confirmed that great destruction was caused. A point of general interest in connection with this early raid was the high concentration achieved which, at the rate of 121 aircraft per hour was the greatest so far reached not only in time and space but in height also. Roughly 461 tons of bombs were dropped on the target by the 223 aircraft attacking which compares very favourably with the heaviest raid on this country recorded by the Bomb Census organisation when over 505 German aircraft dropped only 446 tons (excluding I.Bs.) on London on 16/17 April 1941.

First interpretations of the photographs suggested that it would be impossible to use the plant again on anything like the previous scale and, in any event, much repair and reconstruction would be required to render it serviceable at all. This was later confirmed by Secret Intelligence sources which stated that the Works would not be in a position to start production again on any appreciable scale for at least four months.

A.H.B./6.
Translation
No. VII/75

Post-war translations of French documents in no way detract from those first impressions. It appears that almost complete surprise was effected as no "red" warnings / were

SECRET

were sounded and A.A. fire was negligible. The factories were therefore immediately under bombardment and the night shift of workers and factory guards had to run considerable risks to reach shelter. Normal defence precautions, including black-out, had been observed but were stated to have been rendered negligible by reason of the flares dropped by attacking aircraft which gave a bright but not blinding light and, together with the moonlight, produced almost "daylight" conditions in which the bombers were said to have been clearly visible.

Ibid

The same sources state that the effects of the attack were very severe, particularly from blast. Doors were torn away several hundred metres from the point of the impact and walls were reduced to ruins. Only the iron walls of certain workshops withstood the blast. A large number of private houses in the vicinity were also hit, causing severe damage and loss of life. In particular, the motor works of Salmson were attacked just at the time when the night shift were taking over and about 200 workers were actually in the factory when the raid began.

Ibid

Ten bombs were reported to have been dropped on the factory, where the magneto shop was reduced to ruins and all the magnetos inside completely destroyed by the intense heat. Electric motors also suffered considerable damage and only a few were repairable. The total damage was valued at between 30 and 40 million francs.

AHB/II H/84
A.M.W.R.,
Manual of
B.C. Oper-
ations
1942.

Although secret intelligence source reports must be treated with reserve, a number were received which are worth quoting as interesting sidelights on the effects of the raid. One "reliable informant" claiming to have contact with high Nazi authorities and the Military Governor, stated that those Officials were impotent with rage against the German High Command who, in direct violation of their advice, had denuded Paris and the greater part of the occupied zones of defensive equipment. The public, on the other hand, were said to be "overjoyed" at the raid particularly as the Renault Works were considered symbolic of collaboration.

Ibid

Another informant reported that one third of the factory was definitely out of action, one third so damaged that it would be four months before it could be used again, one sixth undamaged and the remaining sixth so damaged by shock that it would be two or three months before it could be used again. It was claimed that at the Lorraine Districh works 200 engines for fast motor boats and 52 aeroplane engines were completely destroyed. Finally an indication of the moral effects of the attack on the suburbs was received in another report which stated that the Berliot automobile works thereafter stopped work at 2200 hours, the night shift having been cancelled and the A.R.P. strengthened.

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In June 1942 the Air Staff received a translation of the text of the official report made by M. Louis Renault to the German authorities after the attack in March. This stated that the chief damage had been destruction of buildings although every shop had a certain amount of materials unusable. The work of re-starting production could only be accomplished after the necessary repair and rebuilding of buildings and cleaning and adjustment of machines.

/ M. Renault

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M. Renault estimated that, with the exception of one or two shops which might be operating again in approximately 15 days, more than three months would be needed to get production going and even then it would be well below the speed of output attained before the raid. He also stated that although 3000 workmen were on duty at the time, only five were killed. On the morning after the attack, the works gave the impression of total destruction, with smashed roofs, crumbled walls and framework overthrown. The only parts left intact were the shop used for tyres, cartons, paper, felt, rubber and metal framework, and the so-called artillery shop for the construction of machine-tools. On the other hand only the machines situated at points of impact were rendered unusable. The others could be made serviceable after repair.

Ibid This report was received from a Polish Intelligence source who stated that, on the day after the raid, the German authorities announced their intention of removing the usable machinery to Germany. M. Renault objected as he felt that to retain the repair work in his own hands would be the best way not only of safeguarding his interests but of delaying the utilisation of the machinery and making it possible to continue the 'go slow' policy previously adopted. On the basis of his report, (which may well have been 'coloured' to that end) the Germans agreed to reverse their previous decisions in the matter.

It is interesting to note how this information lines up with that already received and also with the post-war damage assessment made by the U.S. Strategic Bombing Survey Unit. This estimated that 11.8% of the total area of the plant had been either destroyed or damaged; 60% of which was either total destruction or serious structural damage and 40% light damage. Out of a total of 14,746 machine tools, 721 were destroyed, 578 seriously damaged and 1809 lightly damaged. Rain and snow which persisted throughout March resulted in rapid deterioration of machines left roofless or moved into the open to permit debris clearance, precision machines being most seriously affected. In addition, office buildings containing designs, blueprints, technical documents and machine tool records were destroyed by fire and 722 vehicles ready for delivery were either destroyed or damaged. On the other hand, while estimates of production losses by current Intelligence were far in excess of actuality and recuperation had been assessed in terms of years, in fact pre-attack production was exceeded in a matter of four months. Finally, the effect on morale was most noticeable. Owing to the supposed greater danger from bombing at night, Renault workers had showed a distinct reluctance to work the night shifts upon which maintenance and the operation of forges, foundries and power plants depended. As a result, between March 1942 and the first American daylight attack in April 1943 the evening shift shrank from 1072 to 550 workers and the night shift from 127 to 79 workers.

(iv) The Ford Matford Works, Poissy

Even at the time, there was quite sufficient evidence from a variety of sources to justify the assumption that further attacks on the Renault Works would not be necessary for some months. With that Plant more or less out of action, the Ford Matford Works at Poissy assumed added importance.

On 8 March, 12 Bostons IIIs of No.2 Group had been despatched to carry out a daylight attack from low level with Fighter escort. Eight aircraft bombed their target

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D.B.Ops.
Folder "Attack
on French
Industry"
19.3.42.

Ibid

and a P.R.U. mosaic on 9 March showed that seven hits had been scored on the main buildings, one on a subsidiary building ant at least four among a long line of lorries. A report subsequently received from what was believed to be a reliable source stated that considerable damage had been done to buildings but a large part of the actual machinery had escaped serious damage. The four large machines from the United States used for boring cylinder holes in engine blocks which were one of the principal bits of machinery in the factory were untouched. Another report stated that as a result of the two recent attacks on French factories flak and fighter protection of Paris had been reinforced and on 12 March Goering had arrived in Paris personally to assist in the re-organisation of the defences.

BC. ORB. Appendices

A.H.B.IIM/
A1/3A
B.1916.

Considering the small scale of the attack and the weight of bombs dropped (7.2 tons) results were satisfactory but it was evident that to do really serious damage a larger force dropping heavier bombs would be necessary. The Air Staff were extremely anxious that such an important objective should be destroyed and the C.-in-C. decided to make it a special target for all available Whitleys of No. 4 Group, assisted by those Wellingtons of both Nos. 4 and 1 Groups capable of carrying the 4000 lb. bomb.

AH/12/39/1/3(a)
BC/O.R.S.
Night Raid
Report
No.37

The attack was planned for the next moon period and 1/2 April 41 aircraft from the two Groups set out in excellent conditions with good visibility and bright moonlight. The Plan of Attack was similar to that used on the Renault Works, Wellington aircraft bringing up the rear with 4000 lb. bombs.

Unfortunately only two photographs were taken with bombing, neither of which showed the target and, despite claims of direct hits on the works, there was no definite proof that the main plant had been seriously damaged.

Ibid
No.38

Under the circumstances it was decided to take advantage of the last night when the April moon was at its best to make a repeat attack with 50 aircraft on 2/3 April. This time there was no doubt that the raid was most successful. Several aircraft spent some time over the target observing and nine took photographs independent of bombing. These showed fires burning and a large column of smoke coming from the Matford Works and the adjacent Foundry buildings. Daylight reconnaissance confirmed that the main factory buildings and other plants to the south and south-west had received direct hits and it appeared that severe destruction had been caused in the machine tool workshops at the eastern end and other workshops at the western end of the main buildings. A direct hit was scored on the north wall of the transformer station which it was expected would hold up production for some time. There was no evidence of hits by 4000 lb. bombs, however, though night photographs showed four bursting in the open near enough to have caused blast damage to the works.

D.B.Ops.
Folder "Attack
on French
Targets"
17.4.42.

Further confirmation of the success of the raid was received in a telegram from the American representative at Vichy which stated that a reliable source had reported that the Ford Factory at Poissy had sustained such damage that it was forced to cancel orders for parts which were to have been furnished by the Renault Factory at Le Mans and was suspending all operations.

/In spite

In spite of the report of increased defences in the Paris area, only two aircraft were missing from both operations although 21 suffered flak damage.

(v) The Gnome and Rhone Works, Gennevilliers

With the factories at Billancourt and Poissy at least temporarily out of action, only one target remained from the original directive. The Gnome and Rhone Works at Gennevilliers was attacked three times, on 5/6 April, 28/30 April and 29/30 May, but although other factories in the area suffered very considerably the primary target escaped decisive damage on each occasion.

AH6/11/39/1/3(a)

O.R.S./BC.
Night Raid
Report No.39

The first attack was made by Whitleys of No.4 Group as a subsidiary effort to a large scale raid the same night on Cologne. Despite moonlight and good visibility there was no evidence that the works were hit but a column of smoke was observed from a rubber reclaiming factory 200 yards away.

Ibid No.57

On 29/30 April, a much larger force of 92 aircraft was despatched from Nos. 1, 3 and 4 Groups but, once again, daylight reconnaissance revealed that no damage had been inflicted on the primary target although other plants in the vicinity had suffered severely. In particular a two-bay building in the Thomson Houston Factory was gutted and a large building on the east side of the Goodrich Tyre Works received direct hits. A five-bay wood-work Factory and a large building believed to be part of the Construction Aeronautiques Factory were completely gutted while a part of a metal works was damaged.

The third and last raid was made on the night immediately proceeding the Thousand raid on Cologne when the majority of crews were resting.

Ibid No.73

It was decided to take advantage of favourable weather, however, to despatch a comparatively small force of 77 aircraft from the operational Groups. From night photographs with bombing and daylight reconnaissance it appeared that a large amount of damage was done on this attack to important industrial works in the vicinity but although 12 buildings at the Gnome and Rhone Works were affected only two were seriously damaged. Unfortunately, available French reports of the results of the three attacks are very brief but one such states that the small amount of damage inflicted in April had been almost completely repaired by the time of the third raid at the end of May. On that occasion about 50 bombs fell on the works. Fires were limited by prompt action of the fire service, but there was considerable blast effect. From an O.R.S. Post-war Ground Survey Report, however, it appears that damage was confined to broken windows and the stripping of a limited area of roof covering which had no effect on production.

A.H.B./6.
Translations
No. VII/75

O.R.S./B.C.
S.228

(vi) Special Attacks on Pilsen Skoda Works

The close relation between bombing policy in Occupied France and the Political Warfare Executive's campaign has been demonstrated. In the next Section it will be shown how that policy was extended for tactical reasons, and in response to pressure from the P.W.E., to include other countries in Occupied Europe.

These were not the only occasions, however, when Bomber Command was called upon to give support to particular campaign's outside the scope of their normal strategic offensive. At

SECRET

AHB/IIG/86/6A
60A

a Target Committee Meeting on 26 March reference was made to requests from the Czechoslovaks for bombing attacks on the Skoda Works at Pilsen which, next to Krupps, was the most important general armament works in Europe. D.B.Ops. stated that there was little or no prospect, for tactical reasons, of such an attack being made and, in any event, the target would very shortly be cut out of range during the hours of darkness.

The question was subsequently reconsidered, however, in connection with Subversive Operations Executive plans for extensive sabotage of the German lines of communication with the Russian Front. Owing to the widespread nature of the proposed campaign it was represented by the S.O.E. authorities that a bombing attack, apart from the economic importance of the target, would be the best way of synchronising the action of the widely dispersed sabotage groups which would standby to destroy key objectives under cover of the raid. There was also another aspect. The Gestapo had boasted that it was beyond the power of the R.A.F. to drop bombs in the Protectorate. The success of such an operation would not only discredit their contention but would provide definite evidence of outside sympathy and intervention which it was hoped would have an immediate effect on the morale and confidence of the Czech Resistance Organisation, would stimulate their recruiting and might be expected to result in a general increase in sabotage and resistance to the enemy.

AHB/IIH/2A1/621
B.C./S.23746/
Vol.IV.20A

This plan was presented to Bomber Command on 18 April 1942 with the request that an attack be made on the Skoda Works on or after the night of 23/24 April provided that C.-in-C. considered that conditions offered a 50/50 chance or better of success. He was informed that the S.O.E. authorities had offered to arrange for beacons to be lighted in the vicinity of the target to guide the aircraft in and that the attack would be the signal for action by a highly organised sabotage group in the vicinity. At least five days notice was required to make the preliminary arrangements and S.O.E. had already initiated action in that connection on 18 April. Apart from that, they required to be in a position to despatch an executive signal at 1225 hours on the day in question.

AHB/IIH/2A1/3/754
B.C./S.26588
Encl.4A

Preparations were immediately put in hand and close liaison was maintained between Bomber Command and the S.O.E. authorities. The target was given to six Stirlings of No.3 Group who were to be routed via South Foreland and south of the Ruhr in order to by-pass the heavily defended zones.

AHB/II/39/1/3(a)
ORS/B.C.
Night Raid
Report No.53.

The operation had twice to be cancelled owing to adverse conditions but on 25/26 April weather promised a fair chance of being suitable in the target area and the attack was laid on. 10/10th cloud was encountered on the approach to the target, however, and persisted over the area. Five of the six Stirlings despatched claimed to have dropped their bombs on the objective, four bombing on E.T.A. and the fifth coming down below cloud and identifying the target visually. The remaining aircraft was shot down by flak near Mannheim.

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AHS/1
11/11/241/3/621
BO/S.23746/Vo.IV
AHS/11/34/1/5
O.R.S./Night
Raid Report
No.60.
AHS/11/11/241/3/759
BO/S.26588
11A and 13A

On 1 May a repeat attack was requested and the operation was carried out by five Stirlings of No.3 Group on 4/5 May. Three of the five aircraft claimed to have found and bombed their target from below cloud at 7000 to 9000 feet. S.O.E. reported that neither of the attacks had actually succeeded in hitting the primary objective but in the first, five hits were scored on the local marshalling yards. As a result of the second operation considerable damage was inflicted on Ziegleruv Dul, a subsidiary of the Skoda Works specialising in filling artillery shells, and at Holysov, on an ammunition factory also working for Skoda. The exact division of damage between air bombardment and sabotage by the Czech organisation, however, was uncertain.

(vii) Extension of bombardment policy to other countries in Occupied Europe

S.46368/
Vol.III
Min.25.

It has been seen that for some time past the Political Warfare Executive had been pressing for the attack of industrial plants in occupied territory in order to give substance to their propaganda which aimed at discouraging nationals from working in German controlled factories. The outstanding results of the raid on the Renault Factory in March had lent colour to their arguments in favour of similar operations against other occupied countries. The C.-in-C., also for tactical reasons, had requested a further list of targets in occupied territory which did not require penetration of the more heavily defended zones.

The matter was discussed at a number of Target Committee Meetings in March and April and, as a result, Air Intelligence in consultation with M.E.W. listed the following eight objectives in Norway, Holland, Belgium and Denmark as suitable for attack subject to Cabinet approval;

Norway.	Heroya.	Norsk Hydro Aluminium and magnesium plant.
Denmark.	Copenhagen	Burmeister and Wain Diesel engine works.
Holland	Rotterdam	Portvarea and shipyards.
	Eindhoven	Phillips Valve and Radio works.
Belgium	Liege	Heavy engineering works.
	Tertre	Coke ovens and chemical plant.
	Gand-	} Canal and paths alongside.
	Terneuzen - Canal.	
	Antwerp	Ford and general motor works.

S.46368/Vol.
III Min.25.

The selection of the targets was based on their economic importance, ease of identification and situation to built-up areas so as to achieve the maximum moral effect with minimum casualties. It was pointed out, however, that some loss of life would have to be accepted. On the other hand, the two Dutch targets were equal in importance to first priority targets in Germany and Prince Bernhardt of the Netherlands had himself pressed for their attack most strongly. Approach was made to the Dutch authorities who indicated their preference for daylight attacks but agreed to accept the risk involved by night with the proviso that radio and leaflet warnings should be issued first.

Ibid
Min.26

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Ibid
Mins. 27/28/29

The new proposals were then referred to the C.A.S. and the Secretary of State for Air who gave their full consent to the plan on the strict understanding that the objectives should not be used as freshmen targets and that they should only be attacked in favourable weather by experienced crews who were to be instructed to bring their bombs back unless the targets could be identified with a reasonable degree of accuracy. The Secretary of State added that he hoped that the new list would not prejudice the attack of the remaining French targets. Many of his colleagues in the Government and the House of Commons were persuaded of the importance of Gien and while he would not allow this to weigh with him against the opinion of the Air Staff he noted that they, too, had included it in the original list approved by the Cabinet. Under the circumstances he hoped that Gien would be attacked at the earliest opportunity. In point of fact, the Air Staff view on Gien had not changed since its exclusion from the original Directive but, as will be seen from the next Section, it was already receiving further consideration in a new review of other suitable objectives in France.

Min. 29

Ibid
Encl. 33A.

Meanwhile, the above principles were embodied in a Directive to Bomber Command on 25 May with the instruction that the new targets of which all but those in Norway and Denmark were within Gee range, were to be considered as supplementary to the list of targets in France already issued. One target in each country was to be attacked in the first instance, special priority being given to Eindhoven.

Ibid.
Encl. 40A

On 9 June, the Foreign Secretary queried the proposed attacks with the Secretary of State for Air pointing out that when the question of extending bombing to other occupied countries had first arisen he had emphasised the importance of obtaining the approval of the Governments concerned. He sought assurance that that had been done particularly with regard to the Netherlands. Sir Archibald Sinclair replied that all the targets had been cleared by their respective Governments with exception of Denmark which had no longer any official connection with this country since the Danish Minister in London had been dismissed from his post.

Encl. 41A

Ibid
Encl. 42A

In view of the political implications, however, it was decided to postpone attack on the Dutch targets while the Secretary of State sought the approval of the Prime Minister, then in Washington, pointing out at the same time that, during the light nights in June and July, attacks on closer, more lightly defended targets might well do more to hasten the decline of German war production than targets in the Reich itself.

Ibid
Encl. 48A
and 50A

The Prime Minister's official sanction was received on 21 June and the Dutch targets finally cleared with Bomber Command on 25 June 1942.

In point of fact, despite these elaborate precautions, the new targets received no serious attention from Bomber Command until 6 December 1942, when a large scale low level attack was made on the Phillips Radio Works at Eindhoven by aircraft of No.2 Group. A number of objectives had also been included in a revised list of Circus targets in June 1942, and the Ghent - Terneuzen Canal Installations received

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considerable attention in that connection from small forces of one and two aircraft. Low level attacks were also made by Mosquitoes in daylight against Liege on 2 October and Copenhagen on 27 January 1943.(1)

(viii) Anglo-American Co-ordination. (2)

In the meantime, American bombers based in this country had begun operations against short range fringe targets in August. This was in accordance with Phase I of their planned offensive, which was designed to cover the initial period before the arrival of American long range fighters enabled the bombers to undertake operations against deeper penetration targets and ultimately against Germany itself.

At the first Meeting of the Committee for the Co-ordination of Current Air Operations, it had been agreed that the current list of objectives for Circus operations would be suitable for Phases I and 2 of the development of American operations. That list included among other targets selected for the special operations in occupied countries, the Port area and Shipyards at Rotterdam which were attacked by the Eighth Bomber Command on 27 August and 7 September 1942.

At a further Meeting of the Committee on 25 September, D.B.Ops. suggested that a number of targets included in the list of priority objectives in occupied territory might be suitable for the Americans. The suggestion was welcomed by General Spaatz who said that he was already considering undertaking deeper penetration as far as Paris but asked that the new targets should be carefully reviewed from a strategic standpoint.

A revised list of objectives was sent to the Americans on 19 October, giving first priority to the submarine bases in the Bay of Biscay in accordance with the current emphasis on anti-U-boat warfare. It was the intention that all suitable targets allotted either to R.A.F. Bomber Command or the U.S. Bomber Command should be attacked by either force by agreement between the two Commanders in accordance with the system of co-ordination already well-established between Sir Arthur Harris and General Eaker. This intention was officially confirmed on 9 November.

In the meantime, General Spaatz had ordered that every effort of the VIII Bomber Command should be directed to obtaining the maximum destruction of the French submarine bases and the industrial targets were consequently not attacked during the period covered by this Narrative.

(ix) Further Targets in Occupied France.

During April and May 1942, preparations were being made at Bomber Command to stage a heavy attack on the important Schneider Armament Works at Le Creusot. These Works were regarded as the French equivalent of Krupps at Essen and consequently warranted attack on the heaviest scale. It was the C.-in-C's intention to carry out a daylight operation with the object of destroying the main power station and putting down marker bombs to assist identification of the target in a subsequent night attack.

/ Although

(1) See Chapter 22 which described these and other operations by No.2 Group during 1942.

(2) This Section should be read in conjunction with Annex II,

AHB/
ID4/385

Ibid 6th
Meeting
25.9.42.

C.S.16536
11A

Ibid 20A.

Ibid 14A

AHB/T4/241/3/75-3
BC/S.26587

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S.46369/Vol.III.
23A. 18.4.42.

Although permission had been given for a daylight attack on Le Creusot on 18 April, owing to its close proximity to built-up areas and the consequent danger of inflicting severe casualties on the French population, it had not yet been cleared for attack by night. The matter was referred to the Prime Minister and Foreign Secretary by the Secretary of State for Air in May, but after discussion it was decided that, in view of the existing delicate political situation vis a vis Vichy and the importance of not jeopardising the strategic situation in the Mediterranean at that time, the question of night attacks should be deferred for a few weeks until the position had eased.

Ibid Min. 31.

The C.-in-C., when informed of this decision, replied that he did not propose to proceed with his project until the required sanction had been given. The maximum force he could launch in daylight was about 12 Lancasters which was not heavy enough to inflict reasonable damage on a target of that size. The only effect of such a raid would be to strengthen the defences against further operations.

Ibid.

Ibid.
Min. 50

In July, the Air Staff in conjunction with M.E.W. and Intelligence again turned their attention to a review of priorities in occupied France. M.E.W. and the Intelligence Branch were of the opinion that repair and re-establishment of the Plants already attacked at Billancourt, Poissy and Gennevilliers was not sufficiently far advanced to warrant further attention for the time being. They recommended however, that operations should continue to be directed against factories associated with the French A.F.V. and Motor Transport Industry. Excluding Le Creusot which was sufficiently important to warrant special consideration, there were only two targets of intrinsic importance left in that category which also met the political and tactical principles already laid down. These were the Citroen Plant at Quai de Javal, Paris, and the Tank Depot at Gien. The former, although closely surrounded by a built-up area presented a very favourable target under good conditions which allowed precise aiming. It also included one of the principal thermal power stations in the Paris area, the importance of which had been accentuated by the destruction of the only other important power station during attacks on Gennevilliers.

Ibid

Encl. 54A

Gien had already been cleared for night attack in February 1942, but special authority would be required for the Citroen Plant. It was accordingly decided to seize the opportunity to press at the same time for permission to carry out a night attack on the Schneider Works at Le Creusot. Urging the Prime Minister and Foreign Secretary to sanction the operations during the coming moon period, the Secretary of State for Air pointed out that the importance of Le Creusot required an attack on the heaviest scale which could only be made at night. Although some casualties among the French would have to be accepted, he maintained that in good weather these could be kept to the minimum.

Ibid 55A
and 56A

The new targets were approved on 17 July, on condition that only experienced crews were employed, that the targets were attacked only in really favourable weather and that crews were ordered to bring back their bombs if they could not identify the target with a reasonable degree of accuracy.

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Ibid 61A These conditions were embodied in a Directive to Bomber Command on 20 July, listing French targets in the following revised order of priority:

- (a) Le Creusot
- (b) The Citroen Works
- (c) The Gien Ordnance Depot

The C.-in-C., was urged to combine operations against either of the last two plants with an attack on the Ford and General Motor Works at Antwerp which had been cleared for night bombing in May.

Ibid 62A It will be noted that, once again, Gien came at the bottom of the list. On 29 July, the C.-in-C., advised the Air Ministry that recent photographic cover of that target had shown only a very small number of tanks present. In view of the tactical difficulties involved, he did not consider the Depot worth attacking. This view was very similar to that held by the Air Staff and it was agreed that, pending further investigation, attacks on Gien should be held in abeyance.

63A Ibid 37B In the meantime, however, the C.-in-C., had sought and obtained authority for aircraft of Nos. 138 and 161 Special Duty squadrons to carry out normal bombing operations on nights when they were not required to pursue their Special tasks and on occasions when the two could be combined. The Air Ministry ruled that objectives were to be selected from any of the existing targets lists and, in view of their special training and the fact that such attacks would be normally made by isolated aircraft from low altitude, the special industrial targets in occupied territory could be considered in that category.

AHB/1
II/70/272(c)
S. of S. to
P.M.
23.10.42.

As a result, Gien had been attacked by small numbers of Whitleys on 28/29 and Whitleys and Halifaxes on 29/30 July with marked success. Photographic reconnaissance confirmed that very considerable damage had been inflicted on the buildings which were considered by the Secretary of State for Air to be a more profitable target than the tanks themselves. Nevertheless, these attacks aroused a storm of criticism implying that, in the first instance, the Air Staff had been tardy in authorising the attack of such an important target and, in the second, that when it was finally cleared, the attacks were not made until most of the tanks had been dispersed. There followed an exchange of Minutes between the Secretary of State for Air and the Prime Minister who himself supported this view but the Secretary of State firmly stated his "complete accord with the assessment of its value as a target (in comparison with other selected objectives) and the difficulties of attacking it on which the C.-in-C., the Air Staff and the Target Committee agree". There the matter dropped and Gien received no further attention from Bomber Command during 1942.

(x) Daylight Attack on Le Creusot

In point of fact, the only one of the three new targets to receive serious attention was the Schneider Works at Le Creusot. Elaborate plans had already been made for a daylight followed by a night attack but during the summer months, increasing experience in daylight operations by heavy aircraft decided the C.-in-C. to give the target to Lancasters of No.5 Group. This was the largest daylight operation so far attempted by Bomber Command and since many of the crews had had comparatively little experience in

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formation flying, very careful preparations were made including training exercises by No.5 Group in order to determine the simplest formation which would give the required concentration over the target and afford the greatest protection to the bombers against the enemy defences.

Ibid and
A49

Eventually the following plan was evolved. In order to avoid entering known enemy fighter areas on return in daylight it was decided to attack at dusk. A strong force of 94 Lancasters, led by No. 49 squadron, flying in pairs for mutual support was ordered to make strict rendezvous at Lands End. The force was then to cross the sea in pairs in company flying below 500 feet in order to avoid detection by enemy R.D.F. until within 25 miles of the target. At that point, seven specially detailed aircraft were to leave the main formation and carry out a low level attack on the Transformer and Switching Station at Montchanin which formed a complete bottleneck in the electrical supply to the Schneider Works. At the same time, to prevent over congestion in the main target area, the remainder of the force was ordered to climb and open out on separate courses, ultimately converging on the target from various directions. Bombing was to be carried out from not less than 6,000 feet, which was above the effective range of light flak. After bombing, aircraft were to rejoin pairs and remain in company until dark when they were to return independently.

Ibid

The route followed, which involved a round trip of some 1700 miles, was carefully chosen to avoid by roughly 100 miles any known German fighter stations. It was assumed that little if any opposition would be encountered from French fighters, particularly as it was doubtful if any reliable reporting system existed between them and the Germans. Finally, in order to provide the maximum protection for the bombers, two diversions by Bostons were ordered in the Le Havre area; one a dummy and the other a fighter escorted attack on the Neumark raider. Unfortunately, the fighters failed to make rendezvous and the Bostons were recalled but the dummy raid was successfully completed and no enemy aircraft were seen.

Ibid

A49/II/39/1/4(a)
BC/O.R.S.
Day Raid
Report
No.102

The Schneider Works at Le Creusot fell naturally into two targets, the Processing and Fabrication Works and the Breuil Steel Works. The Le Creusot Steel Works were not included as an objective as reports had shown that they were not operative. The attack by the main force opened at 1809 hours on 17 October, dead on time and in conditions which were almost unique in the opportunities they offered for precise bombing. Weather was excellent, flak opposition negligible and no enemy aircraft were encountered.⁽¹⁾ Navigation by the leading squadron was stated by other crews to be excellent and all crews were enthusiastic in their accounts of the success of the raid. At Montchanin, several direct hits from low level were claimed on the Station and subsequent reconnaissance confirmed that at least one and probably four or more were in fact scored. A report from a ground source afterwards stated that the Transformer and Switching Station had been put out of action causing complete immobilisation of the entire Schneider Works.

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(1) One of six Lancasters forced to turn back before reaching the target was attacked by three fighters, two of which were shot down while the Lancaster returned safely to base but not undamaged.

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At Le Creusot, the results of the raid were less remarkable. P.R.U. disclosed that a considerable proportion of the bombs destined for the Processing and Fabrication Works overshoot and fell on a lightly built-up suburban area on the eastern side while many of those destined for the Breuil Steel Works fell in woods to the south of the target. In both cases there appeared to have been a tendency to overshoot. This inaccuracy was afterwards ascribed to a number of factors, particularly the bombing tactics employed, probable misuse of bombsights and the failing light. One of the features of the tactics laid down was that before attacking crews should disperse and climb to bombing height which varied from squadron to squadron and ranged from 6000 to 8000 feet. In practice, the majority of the aircraft went over the target in close company and while there was some dispersion in height, this was haphazard and in general was lower than that ordered. It was assumed that this miscarriage of plan led to mutual interference manifesting itself in a general lowering of the standard of bomb aiming. Similarly, the failure to bomb from the correct height would upset the pre-set A.B.S.,⁽¹⁾ and although last minute adjustments may have been made, these were probably inaccurate. Finally, the light was not as good as it might have been and the exact aiming points may possibly have been obscured until too late to enable crews to make a really good run up.

AHB/II/24/13/753
BC/S.25587
49A

Despite the disappointing nature of the operation, some serious damage was revealed by reconnaissance, particularly to a large locomotive machine shop, bar stores and warehouses. Many other buildings had had their roofs stripped over large areas and repair work was seen to be already in progress on many of them. All ground reports told of the severe damage and destruction caused but from photographs it was clear that a large part of the works was still standing and the target had by no means been "written off". This was very disappointing since from every other point of view, including navigation to the target and freedom from losses, the raid was an outstanding success. Only one aircraft was missing from the entire effort.

AHB/II/39/11/3(a)
BC/O.R.S.
Night Raid
Report
No.102

(xi) Consolidated Bombardment Instructions and Revised List of Objectives

During 1942 considerable extension had been made in our bombing policy in relation both to Germany and German Occupied Countries. In October, 1942, all existing instructions on the principles governing aerial warfare were revised and consolidated into one Directive,⁽²⁾ As far as Occupied Territory was concerned this did no more than reiterate the principles already enumerated in previous Sections of this Chapter and elsewhere. Bombing was to be confined to military objectives subject to specific conditions but might be extended to include other objectives the destruction of which had become an immediate military necessity. The exception to those rules were the Channel Isles which were not to be attacked unless such action was necessitated by operational considerations of real importance. Consequent upon the enemy's adoption of unrestricted aerial warfare, however, and the Cabinet's authorisation of morale bombing,

/ rules

- (1) Automatic bomb-sight.
- (2) Appendix 12

AHB/II/24/13/621
BC/S.23746/
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rules governing the attack of occupied territory were not to be applied to the conduct of air warfare against German, Japanese and Italian territory except in so far as the provisions of the Red Cross Conventions required.

So far as France was concerned, authority had only been given for the day and night attack of targets in the Occupied Zone. On 11 November 1942, the Germans marched in Vichy France and the position had to be reviewed. On 1 January 1943, the Bombing Targets Committee was informed that existing bombardment rules had been extended to include the whole of France and M.E.W. in consultation with A.I.3(c) were reviewing existing priorities in the light of the new developments, taking into account those targets which had already been bombed but were sufficiently recovered to warrant further attack. After due consideration it was decided that there were no factories and Plants in former Vichy France of sufficient importance to be included in the revised list on the same level of priority as the others which had been selected.

A.H.B./IIG/86/6A
80th Mtg.
1.1.43.

S.46368/Vol.III
86A

The new Directive of targets in Occupied Europe which was issued to Bomber Command and Eighth Air Force on 16 January 1942, included three new targets in France and also asked for repeat attacks on the Renault Works at Billancourt, the Schneider Works at Le Creusot and the Gnome and Rhone Works at Gennevilliers all of which had now recovered sufficiently to require further attention.

(xii) Conclusion

No further attacks occurred during the period of this Narrative. In considering those already made, it would be an exaggeration to assume that they represented a major diversion of the Bomber effort from the main offensive against German Industry and Morale. It was never the intention that such attacks should take place except on occasions when weather and other tactical considerations made it desirable to operate in areas outside Germany proper. As the main offensive gathered momentum such operations ceased entirely as far as heavy and medium bombers were concerned with the exception of the daylight raid on Le Creusot in October. By that time, the U.S. VIII Bomber Command had entered the operational ring and responsibility for targets in occupied territory was shared by them. In any event, other and more pressing commitments had arisen in connection with anti-submarine Warfare and the offensive against Northern Italy and as far as industrial targets were concerned "the rest was silence".

There is another aspect of these attacks which must be mentioned. Operations against targets in Occupied Europe which were designed to deny the use of major industrial plants to the Germans, to discourage the Nationals from working for the enemy and to raise the morale of peoples overrun by the foreign invader, were in a very real sense complementary, although subsidiary, to the main offensive against economy and morale in Germany itself. Although never allowed to interfere with the offensive proper, they served to increase Resistance generally and lend

/ weight

weight to the "go slow" movement already being fostered in factories; quite apart from the crippling damage inflicted on industrial plants which formed key points in the German subsidiary economic system in occupied countries. Thus the growing menace of the bomber offensive was slowly but surely casting its shadow across the whole of Europe wherever and whenever the enemy sought to turn the resources of our Allies to their own use or relaxed their defensive vigilance under the mistaken impression that either tactically or politically or both they would be safe from heavy air bombardment.

C H A P T E R 2 0

THE EMPLOYMENT OF AIR POWER: A PERIOD OF CONTROVERSY

(i) Introduction

While Bomber Command were battling against considerable odds to justify the faith of the Air Staff in the heavy air bombardment of German industry and morale as a profitable offensive policy, the whole future of the bomber offensive and the employment of air power in general was in danger of vital readjustment as a result of certain discussions being held during the spring and summer of 1942 at a high level.

In February 1942 the Secretary of State for Air had placed before the Cabinet a series of arguments in favour of a lifting of the conservation ban and a renewal of the strategic bomber offensive against Germany. Replying to that Paper, the First Lord of the Admiralty had expressed his agreement in principle with the aims set forth subject to certain immediate requirements of the Admiralty for the provision of aircraft for the war at sea. The extent to which those claims were met has been discussed in a previous Chapter.⁽¹⁾ He also, however, struck a solemn note of warning when he emphasised that those requirements were purely short-term and constituted only a part of the Admiralty's final requirements for air allocations to meet the ever increasing threat to the security of the vital sea lines of communication.

That warning was fully justified. In the next two or three months a series of demands for air support were put forward by both the Navy and the Army which, if met in toto, would have materially affected the whole course of the strategic offensive and undermined the principle of an independent air force. At the same time, there was doubt in many quarters as to the ability of the existing bombing policy to achieve the ends laid down for it. These two factors taken together led to an extensive enquiry into the possible effects of the bombing offensive and the extent to which the needs of the Army and Navy justified the diversion of a large proportion of that effort to other theatres and other offensives.

This in turn led to detailed discussions of future strategy as a whole, which gathered impetus with the decision in the late summer to mount an offensive in North West Africa and the doubts which this threw upon the ultimate build up of British and United States Forces in the United Kingdom for a re-entry into the Continent in 1943.

Agreement on future strategy was not reached until the Casablanca Conference in January 1943 which is properly the subject of the next volume. In this Chapter it is proposed to examine as briefly as possible the claims of the Army and Navy for air support, and since these claims were a factor contributing to the prolonged enquiry into the possible effects of the bomber offensive against German industry and morale an examination of this controversy logically follows. Finally, the whole position will be set in the perspective of global strategy discussions which culminated in the decisions

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(1) Chapter 15 Section (iv)

taken by the Prime Minister, the President and their respective staffs at their momentous meeting in January 1943.

(ii) Claims of the Navy

DO(42)14
DO(42)15
14.2.42

Commenting on the Secretary of State for Air's Paper on Bombing Policy in 1942, the Chief of the Naval Staff, Sir Dudley Pound had given solemn warning that the requirements he was then setting out on behalf of the Admiralty for long range G.R. aircraft were not final and constituted only their immediate needs to deal with the increasing U-boat attack and the extension of the war to the Indian Ocean.

DO(42)23
6.3.42

Less than a month later on 6 March that warning was made good in a Paper by the First Sea Lord setting out the long term requirements of the Navy to enable it to meet the increasing threat to those sea communications which were the life-lines of the British and American war effort. Working from the basic assumption that "If we lose the war at sea we lose the war. We lose the war at sea when we can no longer maintain those sea communications which are essential to us," the First Sea Lord pointed out that such a situation could be created by one or more of the following:-

- (a) The enemy obtaining control by means of surface ships.
- (b) The reduction of British and American Merchant tonnage to the extent that it could no longer maintain the minimum essential supplies, and
- (c) The reduction of tanker tonnage to a degree which would seriously immobilise the armed forces.

As far as the threat at (a) was concerned, the First Sea Lord maintained that, since it was on the main fleets with adequate air support that control would ultimately depend and since both the present and prospective strengths of the British and American Capital ships and carriers in comparison with Germany, Italy and Japan showed only a barely adequate margin to deal with the situation, the position was very dangerous and made more so by the following considerations:-

- (a) The ever increasing number of German U-boats was now augmented by Japanese as well as Italian U-boats while the fact that our major Units were more frequently at sea than those of the enemy made them more liable to be sunk or damaged.
- (b) There was evidence that the Axis powers had well-trained air forces which could locate ships at sea, accurately direct bombers, dive bombers and torpedo aircraft onto ships located by reconnaissance aircraft and finally, could make successful attacks on ships because their aircraft were trained in effective methods of attacking moving targets.
- (c) The Italian fleet under German control would become more and more a factor to be reckoned with.
- (d) The possibility of the French fleet joining the Axis could not be ignored.
- (e) The whole of the enemy capital ships which might be ranged against the Allies were either of modern construction or had been re-constructed

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and were accordingly less likely to be destroyed by U-boats or air attack, than their British equivalents.

While the Admiralty were doing all in their power to cope with this situation, the measures were insufficient in themselves to redress the dangerous position which would arise should the enemy make greater efforts to reduce Allied Naval strength by attrition. It was accordingly necessary to subject the enemy to similar treatment which could only be done by increasing the strength of the land-based airforces working over the sea.

As regards the threat to merchant shipping generally and tanker tonnage in particular, the U-boat war against British and American shipping must inevitably create a most dangerous situation in view of the increase in the German U-boat fleet by some 20 U-boats a month which far outbalanced the rate of sinkings; the "irruption" of Japanese U-boats into the Indian Ocean and Australasian waters; and the ever increasing areas in which Axis U-boats as a whole were operating.

The First Sea Lord maintained that this danger could only be mitigated by the provision of the necessary shore-based aircraft for the adequate protection of convoys and shipping and for attacking U-boats and by intensive bombing of U-boat building yards. It was particularly vital that the Torpedo-bomber striking force be built up as quickly as possible. This would inevitably take time which could not be afforded and he proposed that, in the interim, the deficiencies should be made good by the allocation of the requisite squadrons from Bomber Command.

Finally, and the sting of this Paper was undoubtedly in the tail, he stated his conviction that "If we are not to conduct the war at sea at a disadvantage we must have Naval operational control of all aircraft employed on sea operations on lines similar to those now in force with the Coastal Command in Home Waters."

(iii) Claims of the Army

The Air Staff had scarcely had time to digest the threat to the independent air forces in general and the strategic bombing force in particular which was implicit in the First Sea Lord's Paper than they were faced, only four days later, by a second threat in the shape of a Paper by the Chief of the Imperial General Staff setting out the Army's dissatisfaction with the Air Ministry's failure to make good their alleged earlier promises of allocations of aircraft to Army Air Support and urging that immediate steps be taken to rectify the position.

The basis of the C.I.G.S.'s argument was that one of the outstanding lessons of the war had been that land forces inadequately supported from the air were doomed to failure when opposed by a modern enemy equipped with suitable types of aircraft and adequate air forces trained for close co-operation with land forces. He claimed that this argument had been reinforced most strikingly by events in the Far East. Fighting in that theatre had shown clearly that the land forces had had insufficient air support. As for the Air Ministry's contention that No. 2 Group would be available for army support, he maintained that this had now been

COS(42)164
10.3.42

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disapproved in that the Group, at the time of writing, had practically disintegrated and the training of pilots during the past year in an army support role had "apparently been wasted."

The General Staff considered it essential to ensure that in future no land forces be employed without adequate air support and that such support was dependent on the provision of suitable aircraft designed solely for close co-operation with the land forces and not, as was then the case, on types originally intended for other purposes or which had proved unsuitable for other roles. Furthermore, the organisation and training of air forces intended for co-operation with the Army must be based on the requirements of the land forces they were to support.

It was recognised that any attempt to provide for the full requirements of land forces through the medium of air forces permanently allotted to the army would be uneconomical and, in putting forward their requirements, the General Staff had limited them to the minimum necessary to ensure an adequate proportion of close and intimate co-operation with the Army while relying for any additional support on allotments from independent air forces. It was claimed that, so far the irreducible minimum had not been met in any theatre and the lack of air support had had a serious effect on the morale of the troops and had lowered their fighting efficiency.

Finally, the C.I.G.S. again emphasised the General Staff's view that it was a basic principle that all squadrons allotted for Army support should form an integral part of the Army; that the types of aircraft supplied must meet Army requirements; and that the squadrons must be organised and trained in their role of Army support. He added, in an evident attempt to sugar the pill, that these requirements in no way prevented the squadrons, once they had been equipped and trained, from being employed on tasks with R.A.F. independent forces when not required for their normal role.

(iv) The Air Staff reply to Naval and Army claims

The various proposals by the Admiralty and War Office to meet their immediate and long term requirements for air support were considered by the Chiefs of Staff Committee on 11 March. After a brief discussion on the strategical implications of the Papers before them, the Committee agreed to advise the Prime Minister that the Chiefs of Staff proposed to review the present agreed strategy for the conduct of the war to see what changes if any were required by events during the past three months and that since strategical considerations must govern the decisions arrived at on the Naval and Army proposals, they suggested that they should not be taken up by the Defence Committee until that review was complete. Implicit in this decision was a recognition of the need for an examination of the results which would be expected from a major bombing offensive in relation to strategic planning and the rival claims of naval and military requirements. This will emerge in due course.

Having thus gained more time in which to examine the implications of the Admiralty and War Office long term requirements, the C.A.S. set to work to prepare a considered reply to those demands from the Air Ministry view point. Working from the basic assumption that "the first principle of air warfare is to concentrate the maximum air strength on whatever task may be of decisive importance at the time,"

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COS(42)80th Mtg
11.3.42

DO(42)34
1.4.42

he pointed out that the recent extension of the war areas clearly called for "the utmost flexibility in the development of air power" if air superiority were to be achieved over the Axis powers and a situation created in which other forms of offensive effort would be effective. The proposals to segregate some 6000 aircraft in the form of specialised components, the greater part of which would be transferred to Naval and Army control, virtually called for the division of the air force into three parts to the "fatal prejudice of our capacity to concentrate and with disastrous consequences to the development of our offensive strategy."

With regard to the particular demands of the Admiralty, the Air Staff were fully in agreement with their statement that the recent changes in the war situation called for an increase in the numbers of aircraft working over the sea. Indeed, the demands for immediate additions to Coastal Command were already being dealt with while the full proposals set out did not differ materially from those already put forward by the Air Ministry and the C.A.S. (somewhat optimistically) anticipated little difficulty in disposing of outstanding differences.

The Army demands, on the other hand, particularly the 90 squadrons proposed by the C.I.G.S. for Army Support were, in the Air Ministry view, clearly excessive by any standard for permanent allocation to Army control. As C.A.S. pointed out, the delays in the proposed expansion of the Army Co-operation Command were due not to lack of goodwill but to disappointment in American supplies, the need to reinforce the Middle East and Far East and the provision of fighters and bombers for Russia. He added that when the time came that the army were seeking a decision on land, then they were entitled to and would receive full support from all available air forces. In the meantime and for home based operations he proposed that Army Support (other than that afforded by the Metropolitan Air Force as a whole) should be given by 20 squadrons of fighter and bomber reconnaissance aircraft from Army Co-operation Command, 20 squadrons of light bombers from No. 2 Group and 15 squadrons of day fighters from Fighter Command. Of those, the first would be allotted to Army formations and the rest would remain under their own Commands but would be fully trained in their Army Support role.

In conclusion, the C.A.S. emphasised that, as far as the Air Staff were concerned, the need for full scale air-co-operation with the Army and Navy was not in dispute but he reiterated their view that only a flexible force under Commanders whose profession was air warfare could offer the full assistance required.

COS(42)208
8.4.42

This attitude was substantially confirmed by the Prime Minister in a Minute to the Chiefs of Staff on 8th April in which he declared that "the requirements of the General Staff for the Army appear to be out of all proportion to existing or prospective resources and, if satisfied, would be destructive of the principle of an independent Air Force." There was no justification for their observations regarding the inadequacy of the air support in the Far East or the situation in No. 2 Group "None of us need to be taught these truisms" which although painful and obvious had arisen from the need to choose between various theatres in a "woeful shortage of supplies." The Prime Minister added that there would be enormous dangers

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in tethering immense proportions of the Air Force to Army Units, most of which would be waiting about for months and perhaps years without being engaged with the enemy.

It seemed that the General Staff were fighting a losing battle. Their case was rendered somewhat less plausible by the lack of any firm decision regarding land operations on the Continent of Europe in the immediately foreseeable future. Sledgehammer was still only a remote possibility in the minds of the Anglo/American Planners while all were agreed that the success of Roundup in the Spring of 1943 was dependent on a break in German morale. Everything hinged on the results of the German Spring offensive in Russia and the strategic air offensive over Western Europe. As the C.A.S. pointed out in the course of a further exchange of Papers with the C.I.G.S. a new situation would be created by a firm decision to mount Sledgehammer or similar operation involving air support of land forces on the Continent as opposed to diversionary bombing of enemy aerodromes and towns in conjunction with small scale raids. In that event he would certainly recommend the withdrawal of No. 2 Group from active operations and arrange for it to be employed entirely in training for Army support. Despite further urgent representations from the General Staff, he could not agree to the squadrons forming part of Army Co-operation Command because "No. 2 Group is playing an indispensable part in the air operations which afford us the only means at present available for reducing German pressure on the Russian front."

COS(42)246
2.5.42 and
COS(42)263
14.5.42

COS(42)271
Draft
20.5.42

By 20 May 1942, agreement had been reached by the C.A.S. and C.I.G.S. on the following points:-

- (a) Army Co-operation Command to be built-up to 20 squadrons.
- (b) No. 2 Group to be built up to 20 squadrons (depending on American supplies) which would be available for Army Air Support and would train regularly with the Army.

A final decision as to whether No. 2 Group should be under the control of Bomber or Army Co-operation Command was still outstanding at that juncture but in practice it was not until twelve months later on 1 June 1943, that it was transferred to Fighter Command in anticipation of its ultimate inclusion in the Second Tactical Air Force which was to be formed in preparation for Overlord.

(v) The Air/Sea Controversy - U.S. Pressure

The claims of the Army had been comparatively easily disposed of partly because, in the absence of any firm decision regarding the mounting of land operations at that time, they were of less immediate importance to the conduct of the war. Those of the Navy, however, presented a much more intricate problem. There is no doubt that the dangerous situation which had arisen at sea was of vital concern both to the Americans and the British. The Americans in particular, faced with the problem of moving large quantities of men and materials to Britain through the dangerous waters of the Atlantic, were pressing continuously for an extension of the anti-U-boat campaign. On 19 May 1942, Admiral King, the Chief of the U.S. Naval Staff tabled a memorandum at the Combined Chiefs of Staff Meeting in Washington in which he stated that the contemplated large-scale movement of American troops to the United Kingdom would impose heavy

JSM/239
20.5.42

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responsibilities for the protection of the convoys. Pointing out that at that time German submarines were sinking shipping faster than it could be replaced and, what was more important, German submarines were being built faster than they could be destroyed, he urged that the R.A.F. and the U.S.A.A.F. when they were established in Britain should institute a concentrated and unremitting offensive against enemy submarine bases and building yards and against heavy ships both in port and within range of shore-based aircraft.

COS(42)156
26.5.42

This Memorandum was examined by the British Chiefs of Staff who replied on 26 May that, while they fully agreed with Admiral King's appreciation of the situation in the Atlantic and shared his views on the vital importance of effective air action against enemy U-boats in operation and building and surface forces in harbour, there were a number of qualifying considerations which must be taken into account.

For one thing, day bombing was rarely practicable and night bombing could not be relied upon to affect, seriously, the operation of U-boats which were small targets in well-protected shelters. Nevertheless, attacks on U-boat bases were being carried out whenever there seemed a reasonable chance of success. Attacks on building yards, on the other hand, were already considerable and were being increased. Once again only night bombing was practicable and while the effect on morale might be great, the available effort was unlikely to inflict decisive material damage. Weather and other factors limited the choice of targets from day to day with the result that not more than 30 per cent of the total bombing effort was likely to apply directly to U-boat construction even if such targets were granted overriding priority.

The Chiefs of Staff pointed out that attacks at sea disposed not only of submarines but also of trained crews. Even if they were only forced to dive, such action would restrict their operations and affect the morale of crews. They believed, therefore, that the extension of the zone in which aircraft operated at sea would greatly increase the protection afforded to shipping and the chances of a powerful offensive against U-boats. The focal point was the Bay of Biscay and steps were being taken to intensify attacks in that area. This was a practical operation but it was essential to extend the area by the use of long range aircraft, of which there was a serious shortage in the United Kingdom, so that submarines would be forced to surface within the zone of Allied air action. While the Chiefs of Staff agreed that the offensive against building yards was very important, in their view the air action required to meet the immediate menace was sustained and intensive attack on U-boats near their objectives and on leaving and returning to base. Finally, they declared that no reasonable opportunity of attacking surface forces was being neglected.

J.S.M./247
27.5.42

This slightly ambiguous statement of British policy was accepted by Admiral King as adequately meeting the points raised by him in his Memorandum.

(vi) The Problem Examined

In their reply to Admiral King, the Chiefs of Staff had said, in effect, that while they fully agreed with his appreciation of the situation and advocated in principle a

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definite course of action to mitigate the danger, in practice there was very little they could do about it. The problem, from the British point of view, was indeed two-fold. Taking into account the general all-round shortage of aircraft, could a balance be struck between the strategy already agreed between the British and American Chiefs of Staff for a steadily increasing bombing offensive against Germany and the allocation of only the minimum forces for maintaining the safety of the main sea routes; or was the danger to the latter so great as to warrant a reversal of Allied strategy and the employment of the air forces in a purely defensive role?

It was this problem which the British Chiefs of Staff now set themselves to resolve. The Admiralty had taken the view that, while the bombing offensive against Germany must take a prominent place in the allocation of available forces, the situation at sea was so dangerous as to require immediate and drastic steps to deal with it. The Air Staff, on the other hand, while appreciating the gravity of the position, were still not convinced that it was so immediately critical as to necessitate a reversal of agreed strategy.

Assuming for the moment that the Air Staff view was correct, the vital element in resolving the problem was clearly an assessment of what results could be expected from an intensification of the recently inaugurated bombing offensive against Germany. For this reason, the Chiefs of Staff instructed the Joint Intelligence Committee on 25 March to prepare a report estimating the probable effect on the German war effort of air attack on Germany and German occupied territory with particular reference to assisting Russia in the summer of 1942.

Unfortunately, the J.I.C. were in much the same position as the Chiefs of Staff. The possible success of the offensive could only be judged after first taking into account a number of imponderables. The chief of these were the weight of attack which could ultimately be brought to bear on German targets: the accuracy which could be achieved when, if ever, suitable bombing defences became available; the effect of weather and the casualty rate on the continuity of effort: and, the extent to which the available effort might have to be diverted to other purposes. In their report the J.I.C. stated that, given conditions of success over a period of six months, air bombing was capable of reducing Germany's war effort by an appreciable and increasing percentage but they could not translate this into more precise terms. They pointed out that they could not forecast whether the prerequisites of success would be realised and, in any case, so long as visual bombing remained an essential of night attack, weather conditions must inevitably introduce an entirely unpredictable element. In view of the vast amount of information available regarding the scale and effectiveness of German attacks on this country, however, they recommended that an independent enquiry be undertaken to relate the lessons learned from past attacks on Britain to future operations and their estimated scale.

Under the circumstances, the inconclusiveness of the J.I.C. report was only to be expected. In March 1942 the area bombing of Germany had only just begun, Gee and the new tactical methods recently evolved for its use were still in their infancy and while rapid progress was being made in the

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GOS(42)95th Mtg
25.3.42

JIC(42)117(0)
Final
6.4.42

field of technical devices, the bombing aids under development had still to be tried out under operational conditions. It was not surprising, therefore, that the J.I.C. found it impossible to provide a firm forecast of the results which could be expected.

DO(42)47
20.5.42

Their recommendations regarding an independent enquiry were adopted by the Prime Minister and Chiefs of Staff and Mr. Justice Singleton was requested to undertake this formidable task. His report, which examines the pros and cons of the situation from every angle and at some considerable length, is yet another example of the general lack of clarity at that time as to the ultimate outcome of the new bombing policy. The main theme was that everything depended on the accuracy which could be achieved with bombing. This had not been encouraging in recent months despite a certain amount of optimism in some circles but, if it could be improved to the necessary extent, the desired effect on German morale might be attained. Summing up, Mr. Justice Singleton stated that he found it impossible to say what the results of current bombing policy would be in twelve or eighteen months time, without reference to the course of events in Russia. In any event, having regard to all the factors involved, he did not think that great results could be hoped for within the next six months. This period, he suggested, should be looked upon as leading up to and forming part of a longer and more sustained effort than as one expected to produce results within such a limited time. The effects on Germany of a reverse or of failure on the Russian front would be greatly increased by an intensified bombing programme in the autumn and winter and if that were coupled with the knowledge in Germany that the bombing would be on an increasing scale and that the G.A.F. could not again achieve equality, this might well prove the turning point. But he was again forced to emphasize that success of that kind was dependent on a great increase in bombing accuracy which could not at that time be forecast with any degree of certainty.

It is evident from both the J.I.C. and the Singleton reports that it was as yet much too early in the bombing programme to reach any firm decision on its ultimate effects. Despite exhaustive analysis, the problem of offensive versus defensive bombing was no nearer solution and the ball was, to all intents and purposes, back in the Chiefs of Staff court. Indeed, the scarcely avoidable ambiguity of the Singleton report is only too clear from the ease with which both the Chief of the Air Staff and the First Lord of the Admiralty were subsequently able to use it to support their respective and very divergent views.

COS(42)171(0)
16.6.42.

The First Lord took the line that the report held out no immediate hope that continuous air attacks at the greatest possible strength would seriously undermine during the ensuing months the power of Germany to wage war at maximum intensity. To support this contention he quoted extracts to show that although in the more distant future, provided that Germany failed in Russia and provided that greater accuracy were attained than hitherto, intensive bombing would have a greater effect, the report gave no grounds for optimism that that accuracy would be achieved. On the other hand the gravity of the position at sea and the threat to the sea lines

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of communication on which depended the very existence of the British as well as ultimate victory was increasing daily and he called for an immediate increase in the land-based air forces working with the Navy as "a matter of urgency."

COS(42)183(0)
23.6.42

The C.A.S. on the other hand maintained that the First Sea Lord had cited extracts from the Singleton report which, to put it mildly, were "highly unrepresentative." Other extracts, of which he listed a number, could be quoted to prove quite different conclusions. While the Air Staff did not dispute that the submarine position was grave, the First Sea Lord's paper was not conclusive and the C.A.S. considered that "unassailable arguments" should be produced before a severe curtailment of the bombing offensive could be accepted.

(vii) Recommendations by the Chiefs of Staff

The situation had now reached an impasse. Although the latent possibilities of current bombing policy were apparent to all, it was obviously still too early to attempt any firm forecast of the effects of that policy on the German war effort. Meanwhile, the Chiefs of Staff had still to reach a conclusion on which to base their recommendations to the Defence Committee regarding the allocations of aircraft essential for the maintenance of the vital sea lines of communication.

COS(42)188th
Mtg
24.6.42

On 24 June 1942, they appointed a small Naval Staff - Air Staff Committee, comprising the Assistant Chief of the Naval Staff (Home) and the Assistant Chief of the Air Staff (policy), to review and advise them on the general policy for the employment of the Air Force on the basis of the strategy contained in the Memorandum W.W./1 prepared during the Washington Conference in January 1942. This was to be interpreted as requiring commitments to be met in the following order of priority:-

- Minimum necessary fighter defence of the U.K.
- Minimum necessary allocation for securing vital communications and interrupting those of the enemy.
- Maximum possible provision for the offensive both direct and in support of land operations.

Since the enquiry was primarily concerned with the anxiety felt by the Admiralty regarding the shipping situation, the Committee was not to concern itself with provisions for the offensive.

COS(42)332
2.7.42

In their subsequent recommendations to the Chiefs of Staff the A.C.N.S.(H) and A.C.A.S.(P) stated that they were in complete agreement on the vital importance of sea communications and were convinced that ships alone were no longer able to maintain command of the seas, a responsibility which must in future be shared by both naval and air forces. Having examined the requirements of the Admiralty in detail they had agreed on the forces necessary to meet them and, in fact, the Air Ministry's expansion programme actually provided for overall numbers of aircraft in excess of the Admiralty's minimum requirements. They were in no doubt that those requirements would ultimately be met but the point for decision was whether that programme, even if accelerated, would provide the essential minimum in time. If not then it could only be met by drawing on Bomber Command which in turn raised the question of whether the situation at sea was sufficiently dangerous to warrant a further

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retardation of the bomber offensive. The Admiralty were convinced that drastic steps should be taken at once; the Air Staff while admitting the gravity of the situation did not feel that it was so immediately critical. Nevertheless, "the plain fact is that the submarine campaign against our shipping has reached a point beyond our capacity to control; this is not only having a very damaging effect upon our economy but is a serious handicap to our strategy. Moreover, lack of air support is restricting the offensive action of the Fleet and the proper exercise of the blockade."

Under the circumstances, both A.C.N.S. and A.C.A.S. were agreed on certain specially urgent requirements for which a minimum essential provision should be made without waiting for the accelerated programme: viz:-

Long-range anti-submarine and blockade work
in the Bay of Biscay.
Home Fleet Reconnaissance.
The provision of an "air-controlled zone"
in Ceylon.

To meet these essential needs they made a number of recommendations of which those immediately affecting Bomber Command were the temporary transfer of two Lancaster squadrons to Coastal Command to meet the needs of the Home Fleet, Western Approaches and the Bay and, in order to reduce the rate at which the enemy submarine fleet could be increased, the placing of the most important building yards such as Hamburg, Kiel and Bremen, where over 60 per cent of the submarines were built, on a high order of priority for the bomber offensive. Also, after consultation with C-in-C Coastal Command, it had been agreed that two of the Wellington and Whitley squadrons on loan to Coastal Command should be returned to Bomber Command as soon as possible.

COS(42)341
14.7.42

These recommendations were submitted to the Chiefs of Staff on 2 July 1942 and examined by them in preparation for the submission of their views to the War Cabinet. On 14 July, C.A.S. sought the agreement of the Admiralty to drop the proposal for the transfer of two Lancaster squadrons to Coastal Command. Instead, arrangements had already been made between Bomber and Coastal Commands for aircrews in Whitley O.T.U.s about to pass out to operational squadrons to carry out long range flights on anti-submarine patrols as part of their passing-out tests. The C-in-C Bomber Command had also agreed to arrange for a certain number of Lancasters to be taken off normal duties every month and to be used for long-range anti-submarine patrols. This would normally be at the expense of the minelaying effort. These proposals were accepted in general by the First Lord of the Admiralty and were subsequently ratified by the Chiefs of Staff in their recommendations to the Cabinet.

COS(42)342
14.7.42

WP(42)302
18.7.42

After full consideration of the various proposals which had been made, the Chiefs of Staff submitted their agreed views to the War Cabinet on 18 July 1942. After making it clear that the enquiry had originated entirely in the concern felt by the Admiralty about the shipping situation they stated that, in reaching their conclusions regarding the provision of aircraft for the war at sea, they had taken into account the following factors. The Navy was already stretched to

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the utmost: shipping losses were dangerously high; those losses not only menaced the import situation in the United Kingdom but also absorbed a high proportion of the productive capacity of the United Nations: they most seriously restricted ability to nourish and reinforce the forces overseas; and, finally, they hampered dangerously future strategy. It had been agreed that the R.A.F. shared with the Navy the responsibility for securing sea lines of communication within the range of shore-based aircraft and the only points at issue were in what numbers and how and when should the necessary forces be provided.

Having regard to all the factors, the Chiefs of Staff informed the War Cabinet of the various steps which they proposed to take. Of these the ones most directly affecting Bomber Command have already been mentioned. In addition it was intended to supplement the resources of Coastal Command to meet the requirements of long-range reconnaissance for the Home Fleet by the employment of Bomber Command aircraft with General Reconnaissance Observers whenever the situation warranted.(1)

WM(42)III Concl.
12.8.42 and
WP(42)326
31.7.42

These views and recommendations were considered by the Cabinet on 12 August in conjunction with a Memorandum by Mr. Bruce, the accredited Representative of the Australian Government, who maintained that the Chiefs of Staff had not followed the priorities which they had laid down for themselves but had made additional action for the defence of sea communications subsidiary to the requirements of Bomber Command. He suggested that the Cabinet should formally adopt those priorities and call for a further detailed report to be submitted. Until they had the facts and figures before them it would be impossible to arrive at any proper decision. With the facts before them they could decide on the relative claims of security and the offensive against Germany and determine their policy so as to achieve the best results. Mr. Bruce added that, once the position had been clarified, the United States should be approached with a view to laying down a common policy for maintaining the security of the sea routes which should be implemented by a common effort.

WM(42)III
Concl.
12.8.42.

As a result, the Cabinet called upon the Secretary of State for Air for a fuller statement of the facts, his terms of reference taking the form of four questions:-

- (a) The target figures and present strength of the R.A.F. and their Allies on a functional and geographical basis.
- (b) The present policy for the allocation of resources as they became available.
- (c) To what extent the aircraft at present devoted to "the offensive both direct and in support of land operations" were capable of being diverted to the fighter defence of the U.K. or to securing vital lines of communication and interrupting those of the enemy.

/(d) What

(1) A Table showing the Admiralty requirements as a whole and an estimate of the rate of provision of aircraft for the various areas was attached as an Appendix to WP(42) 302.

- (d) What steps had been taken to ensure that aircraft in production were being equipped with the necessary fittings to enable them to operate as effectively as possible over the sea and in tropical climates.

WP(42)388
2.9.42

The Secretary of State's reply to the first question was in the form of statistical tables.⁽¹⁾ He was careful to emphasize, however, that the figures given for future strengths represented only a Target Programme for planning and provisioning and there could be no definite guarantee that they would be met in full.

As regards existing policy for the allocation of resources, he stated that this was in accordance with the strategic policy of the United Nations which was that the defeat of Germany was the key to victory and that only the minimum force necessary to safeguard vital interests in other theatres should be diverted from operations against the Reich. As far as the application of that policy to the effort of the British Armed forces was concerned, this was best summarised in the terms of reference already quoted by the Chiefs of Staff as having been given to the A.C.N.S. and A.C.A.S. for their Report. He added that, barely a month before, the Combined Chiefs of Staff in a report dealing with operations in 1942/43 had placed in the forefront of their recommendations "that Allied Air strength continue to be built up in the United Kingdom to provide a constantly increasing intensity of air attack on Germany."⁽²⁾

As to what could be done by the bomber force in the defence of the United Kingdom and of sea lines of communication, the Secretary of State for Air reminded the Cabinet that the light bomber squadrons in Bomber Command were used for intruder operations against enemy aerodromes and could be so used on an extensive scale in the event of really serious air attack on Great Britain. As an alternative role they could be, and in the past had been, used to take heavy toll of enemy shipping in Home Waters and the Mediterranean. Quite apart from the recently instituted system referred to by the Chiefs of Staff whereby first line and O.T.U. aircraft of Bomber Command were used for anti-submarine patrol, convoy escort and attack on enemy surface vessels, eight squadrons⁽³⁾ had been transferred or loaned from Bomber to Coastal Command since the beginning of the year and a further two formed in Coastal Command at the expense of Bomber Command. None of this took account of the indirect contribution of Bomber Command to the war at sea by the attack of naval bases and building yards on the German Baltic and North Sea coasts and the factories elsewhere in Germany engaged in the manufacture of submarine components. He added that Bomber Command had laid many thousands of mines since the inception of the scheme in 1940 and in the past three months alone had laid over 3000.⁽⁴⁾

/(viii) Views

(1) See Annex A to WP(42)388

(2) CCS 94

(3) See Appendix 4

(4) The Secretary of State's detailed reply to the fourth question in his terms of reference has no bearing on this Narrative and has therefore been omitted.

(viii) Views on Bombing Policy

After eight months of argument and counter-argument, a compromise had at last been reached on the provision of aircraft for the war at sea. The Admiralty requirements had been at least partially satisfied and a somewhat shaky balance maintained between the needs of offensive and defensive operations. But in the process, Bomber Command had been denuded of eight squadrons and its expansion delayed.

WP(42)374
28.6.42

The diversion of striking power to other purposes had been strongly opposed by the C.-in-C. in a Paper on the Role and Work of Bomber Command prepared in June at the request of the Prime Minister. Much of the Paper was devoted to a review of the successes that the Command had already achieved and was still achieving in its offensive against Germany and the large part which it was also playing in the war at sea. The main theme, however, was that Bomber Command provided the only offensive action so far pressed home directly against Germany. The C.-in-C. claimed that every other effort was defensive in its nature and defensive action could never do more than enable the Allies to exist in the face of the enemy. The bombing offensive provided the only means of bringing assistance to Russia in time and of physically and nervously exhausting Germany to a point where subsequent invasion would become a practical proposition. If the heavy and medium bomber force were distributed between the many claimants for favour, none of those claimants would receive more than a morsel towards their alleged requirements while the only offensive weapon to hand would be destroyed.

WP(42)399
28.8.42

This view was strongly supported by Lord Trenchard in a note on War Policy prepared in August. Upholding the C.-in-C's statement that the aircraft of Bomber Command was the only force which could carry war operations into German territory, he maintained that the Allies had in their possession the opportunity of producing decisive effects if they realised immediately that air power had already been proved to be the "dominant deciding and final power in the warfare of to-day and in the future." The Allies were growing daily stronger in the air and Lord Trenchard claimed that there were "no realisable limits" to what could be achieved. But, the Americans and British were already in the course of organising huge armies which would tax their resources to the full. The policy of victory by land forces entailed stupendous drains on material and manpower. Air, the new dimension and the new power in military science, had provided the great alternative. If it were used with determination and concentration, not only would millions of lives be saved but the war shortened by months and perhaps years. Air was the weapon which the Germans had banked on but failed to use in the right way. They had allowed their air power to become enmeshed in their land campaigns and, in Lord Trenchard's view, the Allies were in danger of falling into the same error. By trying to go down two roads at once, there was the risk that air power would be inextricably entangled in the large schemes and protracted operations of two-dimensional warfare. With the force available Bomber Command had already achieved outstanding successes but, so far, the Command comprised only a very small proportion of the total air strength and was regarded as "a pool for all other operational Commands and for side shows, minor raids and experiments."

/Both

WP(42)405
9.9.42

Both the above Papers were circulated to the War Cabinet by the Prime Minister at the beginning of September. In his covering note, Mr. Churchill emphasised that while he himself did not adopt or endorse the views expressed which fell into the error of spoiling a good case by overstatement, the Papers were written with force and vigour and served as a "considerable answer" to those who attacked the usefulness of current bombing policy.

WP(42)311
21.7.42

It appears, however, that the Prime Minister was himself strongly predisposed towards the intensification of the bombing offensive against Germany either as an independent offensive or as an essential preliminary to land operations on the Continent. This comes out very strongly in his review of the war position in July 1942, in which he attempted to place its salient features in their true proportion. The first of these was the immense power of the German military machine and he gave a solemn warning against the danger of underestimating its strength in 1943 and 1944 or of counting upon the collapse of German military power on the European Continent. The second main feature was seaborne tonnage. Although the current year could only be got through by running down stocks heavily, there was no reason to suppose that the year could not be got through or that there would not be a steady improvement in 1943 as a result of the "prodigious" American shipbuilding. On the other hand the position must not be allowed to deteriorate to an unmanageable degree before reaching an understanding with the Americans and coming to a solemn compact as to the share of their new building which the British would get the following year. Existing stocks in the country should not be reduced to a dangerous level without knowing what the position would be in 1943, nor should the British start with the assumption that they should make a greater sacrifice of their pre-war standard of living than the American people.

The Prime Minister added that it might be true to say that the issues of the war depended on whether Hitler's U-boat attack on Allied tonnage or the increase and application of Allied Air Power reached their full fruition first. The growth and spread of U-boat warfare was to be expected to a formidable degree but against that could be set the increase in Allied anti-submarine craft and an improvement in methods. This, said Mr. Churchill, was a struggle in itself.

On the other hand, the Allies had the Air power. In the days when Britain was fighting alone she had answered the question as to how she was going to win the war by saying "We will shatter Germany by bombing." Since then, Russian successes and the accession of the manpower and munitions of the United States had opened up other possibilities, particularly a mass invasion of the Continent by liberating armies and the general revolt of the populations against the Hitler tyranny. But Mr. Churchill pointed out that it would be a mistake to cast aside the original thought which was also strong in America that "the severe, ruthless bombing of Germany on an ever increasing scale" would not only cripple her war effort, including U-boat and aircraft production, but would also create conditions intolerable to the mass of the German population.

It was at this point that the Prime Minister observed "with sorrow and alarm the woeful shrinkage of our plans for

/Bomber

Bomber expansion." He pointed out that Bomber Command had borne exclusively the brunt of the needs of the Navy and of the Middle East and India. Shortfalls in the British production programme and the natural wish of the Americans to fly their own bombers coupled with the inevitable delay in their machines coming into action had all prevented the fruition of hopes for the summer and autumn.

"We must," said Mr. Churchill, "regard the bomber offensive against Germany at least as a feature in breaking her war-will second only to the largest military operations which can be conducted on the Continent until that war-will is broken." To that end, therefore, renewed and intensive efforts must be made by the Allies to develop during the winter and onwards ever-growing, more accurate and more far-reaching attacks on Germany. In this way alone could the conditions be prepared which would be favourable to the major military operations on which they were resolved. Provision must be made to ensure that the bombing of Germany was not interrupted except perhaps temporarily by the need to support military operations.

(ix) Proposed Bombing Policy for Round-up

The Prime Minister's insistence on an uninterrupted and intensified bombing effort during the winter of 1942/43 was the logical outcome of the basic strategy agreed at the Washington Conference in December 1941 and January 1942 and thrashed out in subsequent exchanges between the representatives of the two Nations. An "ever increasing bomber offensive" was indeed already mutually accepted as an essential preliminary to the joint military operations on the Continent planned for 1943.

So far (i.e. August 1942) no particular policy had been inaugurated in direct preparation for military operations and the bombing offensive against Germany was being conducted on the general lines laid down in the February Directive. On 14th August 1942, however, the Combined Commanders (C.-in-C. Home Forces, A.O.C.-in-C. Fighter Command and the Commanding General E.T.O.U.S.A.) in accordance with instructions from the Chiefs of Staff produced their recommendations for the particular bombing policy to be adopted at an early date in preparation for Roundup. In their view the main requirements were for:-

- (a) Allied Air Forces to be overwhelmingly superior to the G.A.F.
- (b) The reduction of the effectiveness of the transportation system in Western Europe.
- (c) The reduction of the threat of U-boat attack on sea lines of communication.

To meet those requirements they recommended that the bombing policy adopted should aim at the maximum devastation of German centres of industrial population, the reduction of their war potential and the undermining of their morale. Aiming points selected should be key points in the German submarine and aircraft building industries and the transportation system, the latter taking precedence as the date for the mounting of the land campaign approached. Finally, if and when precision bombing by day became a practicable and economical operation, targets selected should be points of particular importance

/within

within the systems already mentioned but unsuitable for night attack and centres of population, the latter being chosen with a view to magnifying the morale and disruptive effects of night bombing.

Meanwhile, American proposals for a smaller operation on the Continent in 1942 (Sledgehammer) which had been stoutly opposed by the British Chiefs of Staff on the grounds that it was not "a sound proposition of war," had been abruptly abandoned in July in favour of a campaign in North West Africa. This meant that a large proportion of the resources of both Nations were diverted from the United Kingdom and although planning for Roundup continued on a reduced scale, the mounting of such a major undertaking would obviously be conditioned by events in North Africa and the rate at which the joint forces in the British Isles could be built-up to the necessary strength. This particular problem inevitably led to lengthy discussions on future strategy on a long term basis in which the part to be played by the bombing offensive from the United Kingdom became a major consideration. The remainder of this Chapter will be devoted to setting out the various views expressed by the American and British Planners and the ultimate resolution of the problem at the Casablanca Conference in January, 1943.

(x) The Place of the Bombing Offensive in Future Strategy

By October, 1942, preparations for Torch were well under way and, inevitably, had overshadowed planning for Roundup and Bolero. Although the Allies were still in mutual agreement about the necessity of defeating Germany before Japan and were agreed that, ultimately, this would have to be achieved by the occupation of Germany once her resistance had been broken, the steps by which that final stage would be reached were becoming obscure. As will be seen, the Prime Minister and the American C.O.S. were still, at that time, thinking in terms of a Roundup in the summer of 1943. The Combined Commanders in this country on the other hand had announced on 3rd October that, provided operations were mounted in North West Africa, any major offensive on the Continent in 1943 would be impossible.

CC(42)82
3.10.42

COS(42)288(0)
30.9.42.

On 30 September, the C.A.S. circulated a note to the Chiefs of Staff urging that the time had come for them to agree among themselves on the general lines of strategy to be pursued in order to persuade the Americans to accept a definite policy for winning the war against Germany. There were already, he suggested, certain basic strategic considerations which were common ground with the Americans and therefore non-controversial. Chief among these were the need to secure Britain and the United States against aggression; the securing of sea lines of communication; the necessity for keeping Russia as an active participant in the war: the safeguarding of oil at Abadan and preventing Germany and Japan from effecting a link-up across the Indian Ocean; the securing of British Pacific Dominions; and finally, the maintenance of sufficient land and air forces to enable Germany to be occupied once her resistance was broken.

Against that background there were three possible policies which might be adopted:

- (a) to build-up sufficient land and supporting air forces to enable a decision to be gained by invasion and /the

the defeat of the German Army before German industry and economic power had been broken.

- (b) .to build-up a bomber force in the United Kingdom strong enough to shatter German resistance.
- (c) a compromise whereby an attempt could be made to build up simultaneously strong land and air forces on a scale unrelated to any specific task or without any clear intention of attaining a definite object within a definite time.

The C.A.S. was in favour of the second of the three courses of action. He believed that a force of heavy bombers rising to a peak of 4/6000 could by 1944 achieve the object of shattering the industrial and economic structure of Germany to a point where an Anglo-American force of reasonable strength could effect an entry into the Continent from the West and, coupled with the Russian Armies advancing from the East, could enter Germany and enforce capitulation. Provided that the Allies were really determined to provide the means and to afford necessary priorities, he believed that a bomber force of that size could be achieved without prejudice to capacity to build the shipping and landing craft necessary to put the Army onto the Continent or to provide the necessary aircraft for participation in the war at sea.

006(42)137th
Mtg.
5.10.42

This Paper was circulated to the Chiefs of Staff who, on 5 October, asked the C.A.S. to prepare a full statement setting out the facts and arguments supporting the Air Staff views.

006(42)379(0)
3.11.42

He replied that, for an appreciation of that kind, it was necessary to arrive at a reasonable estimate of the results likely to be achieved by a given weight of bombs. Although it was possible to form a very good idea of the effects of the bombing effort on Germany, the information was necessarily far from complete and the only really satisfactory and comprehensive analysis of the results of bombing was derived from the German attacks on this country in the twelve months ending 30 June, 1941.

In that time the Luftwaffe dropped 55,000 tons of bombs of which 36,000 tons were directed at industrial areas and about one quarter of that figure actually fell within built-up zones. As a result, 350,000 houses were rendered uninhabitable for the duration of the war and one million people displaced from their homes. In addition there were some two and a half million incidents to houses all requiring repairs and the majority causing temporary displacement of the occupants. In all, the attacks caused 41,000 deaths and 45,000 serious injuries. Beyond this, the destruction caused to factories, power plant, harbour facilities and public utilities had a direct reaction on the war effort but was not susceptible of exact numerical assessment. Nevertheless the Air Staff claimed that, in comparison with contemporary bombing standards, the Luftwaffe attacks were inferior and the results in terms of damage in ratio to effort were far less satisfactory than the contemporary concentrated R.A.F. raids employing the latest incendiary technique. Any estimates of the damage which could be effected by a great Anglo/American bomber force of the size proposed made on the basis of German attacks on this country would therefore be likely to fall far short of what in reality could be achieved. The C.A.S. also reminded the Chief of Staff that "responsible authorities" during the Battle of Britain had viewed the bombing with grave concern and many, in close touch with events then, would now support the view that had even that small scale of attack been more

/concentrated

concentrated and persistent, the effect on the British war effort and on civilian morale might have assumed a most serious character.

Assuming that the Anglo/American bomber force based in Britain expanded to a first-line strength of 5000 by June and a peak of 6000 by the end of 1944, the C.A.S. estimated that such a force could deliver a monthly scale of attack amounting to 50,000 tons of bombs by the end of 1943 and reaching a peak of 90,000 tons by December, 1944. In other words, one and a half million tons of bombs would be dropped on Germany during 1943 and 1944. On the basis of results achieved by the German bombing in England, the Air Staff had estimated that, quite apart from the destruction of industries and public utilities, an attack on that scale would destroy 8 million German houses or, having regard to the decreasing proportion of houses left undamaged, six million would be rendered permanently uninhabitable and a further 60 million damaged. Civilian casualties could be estimated at about 900,000 killed and 1,000,000 seriously injured. Altogether, some 25 million Germans would be rendered homeless and many millions more temporarily evacuated.

The C.A.S. then turned to the effect of such raids on German industry. Taking the thousand raid on Cologne at the end of May 1942, as a unit of measurement, he claimed that, during 1943 and 1944, every industrial town in Germany with a population of over 50,000 would receive, in proportion to its size, ten attacks of Cologne intensity. Expressed in other terms, such a scale of attack would render homeless three-quarters of the inhabitants of all German towns with a population of over 50,000. In practice, attacks would be more concentrated and the C.A.S. presented a list of fifty-eight towns which, he said, comprised between one quarter and one third of the total urban population of Germany. He assumed that it was safe to conclude that they also contained more than one-third of the total German industry and the method of selection had been such as to ensure that this was the most important third. If the proposed attacks were directed against those selected towns each in turn would receive in proportion to its size, 17 raids to Cologne intensity during the period.

The Air Staff considered that Germany was in no condition to withstand such an onslaught. The heavy strain of the campaign in Libya, of the Russian war and the existing offensive and blockade were all contributing to a progressive attrition. The German economic structure was stretched to the limit and could not be further reduced. The loss of one-third of her industry would involve either the sacrifice of almost the entire war potential in an effort to maintain her internal economy or else the collapse of the latter. Finally, while it was difficult to assess the morale effect of a scale of bombardment which would far transcend anything within human experience, there was little doubt that against a background of growing casualties, increasing privations and dying hopes it would be "profound indeed."

CGS(42)478 (0)
26.12.42

The reactions of the General Staff to the ambitious programme were on the whole dubious. While not questioning the important role which a bomber offensive could and should play in wearing down German resistance, the C.I.G.S. expressed concern on a number of points. In the first place

/he

he pointed out that such an offensive should be fitted into its proper place in long term strategy and since it was intended to pave the way for the Army, the resources devoted to it should not be so great as to prejudice the availability of the necessary land forces or, in particular, of their minimum requirements in air support. In this connection he added that the Air Staff appeared to be assuming that the whole of the 4/6000 bomber force would be available for bombing Germany and had not taken into account the necessary diversions which would be required to meet the claims for air action against Italy and Occupied Europe or of sea warfare and Army Support.

More specifically, the C.I.G.S. pointed out that if each of the 58 towns postulated by the Air Staff was to receive 17 attacks on the Cologne scale, approximately 1000 such attacks would have to be made in the next two years. Not all of those could be carried out in good weather which through the onus for success on improved blind navigation and target finding devices. He doubted whether those devices would prove as effective as was hoped. Nor did he agree with the Air Staff's "optimistic assertion" that the German defence system would be more than counteracted by the developments in weight and method of air attack. Moreover, the Americans had still to prove their ability to bomb by day and time would be lost if they were forced to change over to night bombing. Finally, he suggested that administrative and other repercussions might make the creation of such a force by 1944 quite impracticable.

Despite the grave doubts expressed by the C.I.G.S. it is evident that the Air Staff proposal for a vastly increased Anglo/American bomber force operating from the United Kingdom was generally acceptable to the Chiefs of Staff and it was, in fact substantially confirmed by them on 30 October, 1942 in the first of a series of Papers setting out their views on the strategy to be adopted for the future conduct of the war. On the basic assumption that Germany was the prime enemy, they concluded that the destruction of the foundation of her military power should have absolute priority of Anglo/American production subject only to meeting the minimum requirements for security and holding Japan. All resources left over from those aims should be devoted to the build-up of forces in the European Theatre for a re-entry on the Continent when German morale and power of resistance had been sufficiently shaken. To this end, priorities in the spheres of manpower, material and production should be adjusted accordingly.

More specifically, the Chiefs of Staff proposed that the Allied bomber forces should be expanded to a target figure of 4000 - 6000 heavy bombers by April, 1944. The air offensive should be backed up by a tightening of the blockade, arrangements for sabotage in Europe on a steadily increasing scale and main amphibious operations in the Mediterranean conducted with the object of stretching the enemy forces to the greatest possible extent. In addition, it was proposed that small raids on the North West Coast of Europe should be undertaken with increasing frequency together with large raids to destroy one or more U-boat bases and provoke air battles. Finally, in so far as they did not conflict with any of these primary aims, plans and preparations should be made for re-entering the Continent with all available forces in the United Kingdom in the event of a break in German morale and powers of resistance.

This document leaves no doubt that, by the end of October, the Chiefs of Staff had virtually adandoned the idea

COB(42)345(0)
Final
30.10.42

of a major land offensive in 1943 in favour of striking at the under-belly of the Axis in the Mediterranean and leaving the main offensive against Germany to be carried out by a vastly expanded Anglo/American bomber force operating from the United Kingdom. In fact, the steadily increasing bomber offensive for so long advocated by the Air Staff was at last beginning to come into its own in the realms of strategic planning. Although the policy advocated by the Chiefs of Staff at the end of October was subsequently amplified and altered as to detail, the main principles for the conduct of the war remained unchanged throughout the later discussions until ultimately ratified at the Casablanca Conference in 1943.

It appears that the proposals to abandon Roundup came as a shock to the Prime Minister who was still thinking in terms of a major offensive the following year. In his view, Torch was no substitute and there was also in the forefront of his mind the fact that the Allies had already given Stalin to understand that the great attack on the Continent would take place in 1943. In view of the strategic importance of keeping Russia in the war, he was not unnaturally concerned at what Russia's reactions would be when she was told of the proposals to abandon a land offensive on which she had been counting and to concentrate on an increased air offensive instead. On 18 November he drew the attention of the Chiefs of Staff to this dilemma and firmly stated that as far as he was concerned, he was still planning on a Roundup retarded until August 1943. This he was not prepared to give up without a "massive presentation of facts and figures which prove physical impossibility". Nor was he prepared to commit himself to a target of 4/6000 British and American heavy bombers without knowing in advance just what that would mean in terms of shipping.

COs(42)399(0)
18.11.42.

Only the day before, 17 November, the Prime Minister had circulated his views on future operations in the Mediterranean, Middle and Near East as a result of the swift successes gained in French North Africa. The gist of his argument is summed up as follows:

COs(42)397(0)
17.11.42.

"to conquer the African shores of the Mediterranean and set up there the necessary installations to open it effectively for military traffic; and secondly to use the bases on the African shores to strike at the under-belly of the Axis in effective strength and in the shortest time".

On this matter both he and the President were clearly in accord as may be seen from the following extract from a Presidential telegram to Mr. Churchill:

"It is hoped that you with your Chiefs of Staff in London and I with the Combined Chiefs here may make a survey of the possibilities including forward movement directed against Sardinia, Sicily, Italy, Greece and other Balkan areas and including the possibility of obtaining Turkish support for an attack through the Black Sea against Germany's flank".

(xi) Concern over American Daylight Bombing Policy

COs(42)412(0)
24.11.42.

A week later, the Chiefs of Staff issued a shorter version of their Paper on Future Strategy re-iterating their belief that, apart from the minimum diversions for security at sea ("The defeat of the every increasing U-boat fleet should be a first charge on our resources") the necessary /priorities

priorities in shipping, manpower and munitions production should be accorded to the build-up of the Anglo/American bomber force and, in particular, the American Air Forces should have priority of transportation over the American Army.

C0s(42)421(0)
29.11.42.

Once again the Prime Minister's reaction was immediate: "Are we really going to give supreme priority to the arrival in this country of masses of American Air groundsmen while the United States Air Forces have not shown themselves possessed of any machines capable of bombing Germany either by night or day ? ... It is the greatest pity to choke up all our best airfields. Surely it would be much better to bring over half a dozen extra divisions ... and to encourage the American Air effort to develop mainly in North Africa ?."

C0s(42)423(0)
30.11.42.

To this the Chiefs of Staff replied that to encourage the American Air effort to develop in North Africa and bring divisions to Britain instead would not solve the shipping problem and also had the disadvantage of playing into the hands of that section of responsible American opinion which advocated the diversion of their effort to the Pacific. They pointed out that the failure of the Americans to bomb Germany either by day or by night was due in the main to lack of training and numbers. It was expected that when those limitations were remedied, they would achieve their "fixed determination" to bomb Germany by day. In the meantime the Chiefs of Staff remained convinced that better value would be got from the limited shipping resources by using them for U.S. Air Forces in the first instance as they had already suggested. Finally, they added that while there was no intention to abandon any effort to form a Second Front in 1943, they were bound to point out that resources would be totally inadequate to mount Roundup and at the same time to meet the needs of Torch, to re-open the Mediterranean for military traffic and to carry out the operations in that area contemplated for 1943.

WP(42)580
16.12.42.

It is clear however that the Prime Minister was still in very grave doubts as to the ability of the Americans to carry their daylight bomber offensive successfully into Germany and that these doubts were seriously affecting his attitude to the proposed build-up of the Anglo/American bomber force. On 16 December 1942, he warned the Chiefs of Staff that it would be wholly disastrous to proceed with the gigantic commitment such a course involved without being absolutely certain that the Americans were capable of sustained attack on Germany without incurring disproportionate losses. Nor must they allow their purely technical and military judgement to be clouded by fear of what might happen if the Americans were told what the British believed to be the truth.

Mr. Churchill reminded the Chiefs of Staff that so far the United States bombers had rarely gone beyond the limits of strong British fighter escorts and had not dropped a single bomb on Germany. Even after a year of war, the effect of the American bombing effort in Europe and Africa, if judged by the very large quantities of men and material involved, was very small indeed. On the other hand, it should not be overlooked that their bombing force in Britain had been depleted for Torch; that when they had operated

/without

without escort they had given a very good account of themselves against enemy fighters;(1) and, finally, that the accuracy of their high level bombing was remarkable.

Nevertheless, the Prime Minister, after listening to all he could hear from every source during the past two months, had become extremely doubtful of the daylight bombing of Germany by the American method. He expressed grave concern at the consequences should the American plan prove a failure. In the first place it would be a serious shock to public opinion in the United States. In the second, American industry was already largely and was becoming increasingly committed to the production of bombers which were unsuitable for night attack. Thirdly, large numbers of personnel would have been brought to this country and maintained on the best airfields thus adding to the length of British bombing sorties without the R.A.F. being able to count on any corresponding return from their assistance in the air offensive against Germany.

While Mr. Churchill agreed that the Americans should be given every encouragement and help in the experiment "which they ardently and obstinately wish to make" they ought also to be persuaded to give as much aid as possible to sea work and to night bombing and to revise their production and training for the sake of those objects.

Finally, he reminded the Chiefs of Staff that "the bombing offensive against Germany and Italy must be regarded as our prime effort in the Air". It was of the utmost importance that it should not fall away during the winter months when the strain of the Russian and Anglo/American offensives would be heavy on the German and Italian peoples. To maintain a steady crescendo was an offensive measure of the highest consequence and to facilitate this, arrangements had already been put in hand for raising Bomber Command to 50 squadrons by the end of 1942.

Although the Americans appreciated and even sympathised with the cautiously expressed British doubts of their daylight bombing experiment, they were undeterred in their original conception of a combined bomber offensive in which they would play the day and the British the night role. It is true that the poor weather so far experienced by their bombers in the West European theatre had come as something of a shock and for a short time they had themselves contemplated the advisability of shifting the base of their operations against Germany from Britain to North West Africa during the winter months. This idea was soon abandoned, however, and indeed during the months preceding the Casablanca Conference, the American Planners were faced with far more controversial problems.

(xii) American views on Strategy in 1943

As in Britain, so in America the decision at the end of July to mount operations in North West Africa had left the Planners with no very decided views on the best war-winning policy to be adopted for 1943. During the spring and early summer opinion had been tuned to the Bolero build-up in preparation for Roundup in 1943. The decision to mount

/Torch

- (1) Already by the end of November, 1942, the Americans had decided to abandon their policy of fighter escorted bombing operations and in the future to make their bombers responsible for their own defence on deep penetration raids.

QHB/IIH/241/3/679
BC/S. 28150
Encl. 7A
28.11.42.

Torch, although not intended to do more than temporarily postpone a continental invasion, in fact raised a whole new set of strategic problems. During the late summer and early autumn the American Naval Staff had taken advantage of the general uncertainty to press strongly for a transfer of the main strategic emphasis to the Pacific theatre. This controversy raged for weeks until ultimately settled by Presidential intervention. Thereafter, never again were the claims of the Pacific to impinge so closely on the basic strategic concept of Germany as the prime enemy.(1)

Meanwhile, the success of the Torch campaign had opened up new possibilities. Any exploitation of those successes would mean committing the Allied forces to further efforts in the Mediterranean theatre. This had already been urged by the Prime Minister and British Chiefs of Staff but was viewed by the Americans with profound misgivings. Apart from the Pacific controversy, it had remained a cardinal principle of American strategic doctrines that Germany was the prime enemy, that her defeat necessitated a cross-channel invasion and that the bomber offensive from the United Kingdom was an essential preliminary to the success of that undertaking. Roundup had been postponed once already and with operations subsequent to Torch under consideration it looked as if it would again have to be postponed in favour of a campaign which, although tempting, by not striking directly at Germany herself must be indecisive as regards the primary aim.

C66(42)475(0)

These views were expressed in a J.C.S. Paper on Strategy in 1943 which was circulated as a C.O.S. Paper on 25 December. From a study of this Paper it is evident that, while the Americans were in full agreement with the British Chiefs of Staff on fundamental principles, they differed in one important respect. While the British had been advocating the vigorous exploitation of Torch accompanied by as large a Bolero build-up in the United Kingdom as was consistent with that aim, the Americans wished the main European effort to be Roundup while limiting the exploitation of Torch to air action against Germany and Italy from bases in North West Africa. Any forces in excess of those required to secure that area were to be brought back to Britain for employment there as part of the build-up for the invasion of Western Europe in 1943.

C66(42)452(0)
31.12.42.

(xiii) The Strategic Problem Resolved

C66(42)466(0)
Final
31.12.42.

Although on 31 December, the British Chiefs of Staff re-affirmed their views in a further Paper on future strategy it was evident that a deadlock had been reached which could only be resolved by a joint examination of the basic problems involved.

C66(43)33(0)
28.1.43.

In the latter half of January, 1943, the Prime Minister, President Roosevelt and their principal advisers met at Casablanca, where they undertook a comprehensive survey of global strategy and successfully eliminated the differences of opinion which had been manifested in the preceding months.

It is not proposed to set out in this Volume their detailed conclusions which have already been incorporated in other Narratives.(2) It is sufficient to say that they achieved complete accord on matters of global warfare /and

- (1) For further details on the Pacific controversy and American discussions on future strategy, reference should be made to "The A.A.F. in World War II" Vol. 2.
- (2) See Vol. V and "The Liberation of North West Europe" Vol. 2.

and restated as their primary aim the defeat of Germany in the shortest possible time. Apart from the U-boat menace which was to remain a first charge on the resources of the United Nations, this aim was to be achieved by two main offensives:

- (a) In the Mediterranean by the occupation of Sicily with the object of making the Mediterranean line of communication more secure; of diverting German pressure from the Russian front: and of intensifying the pressure on Italy.
- (b) From the United Kingdom by the heaviest possible Anglo/American bomber offensive against the German war effort: by such limited amphibious operations as was practicable with the resources available: and by the assembly of the strongest force possible after meeting the needs of the Mediterranean theatre in constant readiness to re-enter the continent when German resistance had been weakened to the required extent.

The British Chiefs of Staff had, in fact, won the day and it now only remained to state the primary aims of the Bomber Offensive in 1943 in Directive form and to set up the necessary organisation in the United Kingdom in preparation for a re-entry into the Continent when German resistance had been sufficiently reduced. This is the subject of the next Volume.

(xiv) Conclusions

From a post-war standpoint, the meeting of the two great Leaders and their advisors in January, 1943, must be regarded as one of the most important Conference of the war years. In the course of its discussions, the tangled threads of world strategy were unravelled and the United Nations set firmly on the course from which they were never again to deviate until victory over Germany had been won and they were free to turn their whole attention to the Pacific and the defeat of Japan.

At Casablanca, too, the great Anglo/American bomber offensive finally and irrevocably came into its own and on it was placed the responsibility for beating Germany to her knees and enabling the Allied armies to free the oppressed peoples of Europe and to march triumphantly into the heart of the German Reich with the minimum cost in bloodshed.

Nor, after January 1943, was the principle of an independent air force or the development of the strategic bomber force ever again to be so closely threatened as in the summer of 1942. From the foregoing it will have been apparent that the rights of the Navy and Army claimants to air support were never disputed in principle. Indeed the Chiefs of Staff themselves contended, and it was re-affirmed at Casablanca, that the needs of anti-U-boat warfare must be a first charge on available resources. It was the extent of those demands and the threat implicit in them to the fundamental conception of the flexibility of Air Power and the "ever increasing bomber offensive" that was so bitterly opposed by the Air Staff,

/There

There was, too, another aspect of the controversy which raged in the summer of 1942. It has been stated elsewhere that the bomber offensive had been subjected to much criticism in both official and unofficial circles. It was as much in answer to that criticism and to justify current bombing policy that the attempt was made to forecast the effects which that policy would have on the German war effort during the remainder of 1942 and in 1943. As has been seen, the attempt failed for the simple reason that, with tactical and technical developments still in their infancy and the ultimate application of air power an uncertain quantity, it was as yet much too early to forecast with any degree of accuracy what might be done when the still young force had gained further experience and if and when it was provided with the means to overcome the limiting effects of weather and other tactical considerations.

Nevertheless, in spite of criticism from many quarters, the original conception of the bomber offensive as an essential preliminary to a re-entry into the Continent and the ultimate defeat of Germany was never at any time abandoned. This comes out very clearly in the later statements of future strategic policy and was finally and irrevocably confirmed at Casablanca.

Meanwhile, the decision to mount Torch which had necessitated a comprehensive review of global strategy in January, 1943, had also had a more immediate effect on the course of the bombing campaign in the remaining months of 1942. The initiation of attacks on Italian targets, and attempts to maintain the bombing offensive against Germany together with policy discussions regarding the bombing of U-boat bases and an all-out attack on German oil supplies will form the subject of the next Chapter.

C H A P T E R 21

THE WINTER OFFENSIVE(i) Introduction

British Bombing Policy between October, 1942 and the issue of the Combined Bomber Offensive Directive in January 1943, was governed by three main considerations:

- (a) Maintaining the pressure on Germany.
- (b) Operations in North West Africa
- (c) The U-boat menace.

It has been seen that, by the autumn of 1942, the bombing offensive against Germany was already accepted as an essential factor in strategic planning for 1943. It was, therefore, as the Prime Minister had emphasised, particularly important to maintain the pressure on Germany during the intervening months in order to deny her any time for recuperation either industrially or morally, to keep her defences spread and to contain her resources in men and munitions away from the campaigns in Russia and North West Africa. This much was agreed.

It had also been mutually accepted by Britain and the United States, and was later to be officially confirmed at Casablanca that the security of sea communications and the defeat of the increasing U-boat menace to shipping must be a first charge on Allied resources. In this Chapter it will be shown that, as 1942 drew to a close, the possibility of intensifying the anti-U-boat campaign not only by increased patrols but also by area bombing of submarine operating bases and construction yards became a major consideration in offensive planning.

During this period, too, the perennial problem of Axis oil was again to achieve pre-eminence and although a decision regarding an all-out offensive against the enemy's oil supplies was eventually deferred until the Spring of 1943, some account must be given here of the discussions which took place at this time.

In October, 1942 however, the most pressing need was the provision of air support for the Allied campaign in North West Africa. As far as Bomber Command was concerned, this commitment was chiefly limited to minelaying, daylight Circus and harassing attacks on Occupied Territory and the initiation of night attacks on targets in Northern Italy. Although the latter were originally intended as a temporary measure to support the opening phases of Torch, the possibility of an all-out air offensive against Italian targets in exploitation of the successes so swiftly gained in North West Africa and with the object of knocking Italy out of the war once and for all, subsequently figured very largely in considerations of British bombing policy for 1943.

It is proposed, therefore, to examine in this Chapter the policy regulating the bombing offensive against Italy, together with the competing claims of Germany, anti-U-boat warfare and oil and to describe, as briefly as possible, the actual course of operations from the United Kingdom between October 1942, and January 1943.

(ii) The

(ii) The Bombing Offensive Against Italy: Policy.

With the decision to mount a major offensive in North West Africa the strategic emphasis, temporarily at least, shifted away from Germany and during the autumn of 1942 planning for Roundup and Bolero inevitably faded into the background. Although the importance of maintaining the pressure on Germany was not lost sight of, attention during October and November, 1942 was naturally focussed on Torch and the air action which could be taken by forces based in Britain to ensure the success of that undertaking.

Early in October, the Prime Minister had ruled that, during the opening period of the Campaign, large scale air diversions should be carried out with the object of containing the German Air Forces away from the Torch area. The U.S. Bomber and Fighter Commands agreed to co-operate fully and on 16 October, the R.A.F. Bomber and Fighter Commands were ordered to initiate such operations on the largest scale possible as from 1 November. In the absence of more specific instructions as to the exact form these operations were to take, the C-in-C Bomber Command ruled that No. 2 Group should continue its daylight Circus and harassing raids over Occupied Territory, minelaying on the West Coast of France would be increased and, if opportunity offered, that the mainforce would attack Italian and South German targets by day. (1) Orders to increase the No. 2 Group effort were received subsequently and their action in this respect will be discussed in a later Chapter. (2)

On 22 October, the first convoy left British shores for North Africa and on the same night, Bomber Command began the series of attacks on Northern Italy which were to constitute a major feature of the bombing offensive during the remainder of the year.

Operations by home-based and Middle East air forces in support of Torch had already been requested by the Allied Commander-in-Chief in general terms which were amplified by the Naval Commander-in-Chief in a Memorandum to the Chiefs of Staff on 19 October, 1942. As far as home-based bombers were concerned, Admiral Cunningham asked that they should carry out minelaying in the ports of Genoa and Spezia from D minus 5 and bombing attacks on targets in Northern Italy from D minus 10. The object of the latter was to distract the Italian air forces, lessen the existing Axis concentration of fighters in South Italy and lend colour to the proposed false diversion against Sardinia. Since D Day had been designated 8 November, this meant that bombing would start on 29 October and mining on 3 November 1942.

The CAS promised to examine these proposals and, on 29 October, he reported that minelaying would be possible in good weather and although it would necessarily be at the expense of the bombing effort, he would arrange for this to be done if the Chiefs of Staff approved. Operations against targets in North Italy would also be practicable provided that

/good

(1) In support of Torch, Bomber Command were also required to undertake special leaflet dropping operations over France on top priority. 17,000,000 were dropped by No. 3 Group on 8/9 and 9/10 November and a further 4,000,000 by aircraft of No. 4 Group and No. 91 Group on 16/17 and 17/18 November.

(2) Chapter 22.

CS 16536
Encl 9A 10A
and B and
15A

BC/S. 27899
Mins. 4, 5
and 6

COS(42) 154th
Mtg (0)
Annex II
20.10.42

COS (42)
346 (0)
29.10.42

good weather were available over the whole route and he was arranging for such attacks to be made if conditions proved suitable.

COS(42)167th
Mtg (0)
31.10.42 and
BC/S 27899
Encl. 7A

The Chiefs of Staff accepted these proposals and Bomber Command was advised by signal on 2 November that, during the next seven days, minelaying of the ports of Genoa and Spezia and bombing attacks on Genoa, Milan and Turin up to the scale of their recent effort against those targets, were to take priority over their normal offensive commitments.

COS(42)397(0)
17.11.42

The first landing in North West Africa took place according to schedule on 8 November 1942, and thereafter, successes followed swiftly. As a result, strategic planning for 1943 was immediately concentrated on the best means of exploiting Allied victories in that area. On 17 November, the Prime Minister had proposed the use of bases in North Africa to strike at the under belly of the Axis and to that end had urged that the bombing weight of British night attack should be brought to bear on Italy whenever weather was more favourable in that area than over Germany. He had recommended that everything possible should be done to make Italy feel the weight of the war and, in particular, that all her industrial centres should be intensively bombed in order to render them uninhabitable and to "terrorise and paralyse" the population.

In fact the possibility of knocking Italy out of the war either literally by the conclusion of a separate armistice or virtually by so undermining her morale as to make her a liability rather than an asset to the Axis was a matter of prime concern to the Planners at this time. Taking into consideration Allied successes in North Africa, Axis defeats in the desert and the moral effects of heavy air bombardment, there seemed every likelihood that one or other of those aims might be achieved.

COS(42)545
20.11.42

On 20 November, however, the Secretary of State for Foreign Affairs reported that as a separate armistice presupposed the overthrow of the fascist party it was unlikely that they would allow anyone to treat for it, nor would the Germans be likely to permit an internal collapse to engender peace but would inevitably occupy Italy. This latter possibility was of great importance. If an internal collapse could be brought about, it would force the Germans to divert men and resources to maintaining control not only in Italy but also in the Balkans in order to prevent serious disaffection among the Italian troops following news of a collapse at home. Occupation would impose a heavy burden on the Germans and would be intensely unpopular among the Italians. He therefore recommended that such a situation should be promoted by every available means.

WP(42)585
15.12.42

This view was later supported by the JIC Sub-committee who reported on 15 December that although Italian morale had sunk very low as a result of Allied military successes and heavy air bombardment, so long as their fear of repression was greater than their fear of the R.A.F. or the extension of military operations in Italy, it was unlikely that they would be ripe for seditious movements. On the other hand, a

/general

general collapse of the internal administration of the country was a practical proposition if military reverses and heavy bombing were continued.

These reports serve to indicate the general trend of official opinion in this country at the end of 1942. Already on 9 November, the Prime Minister had called for an estimate from the CAS of the action which could be taken by Bomber Command against important objectives in Italy in the event of that country becoming a No.1 target for attack. The offensive was to be considered in three stages:

- (a) Immediately - i.e. from home bases.
- (b) Later, when Malta had been relieved and refuelling and re-arming facilities became available to aircraft of Bomber Command and the Middle East.
- (c) Ultimately, from bases in Malta and the Middle East.

These proposals were considered independently by the Air Staff and C-in-C Bomber Command who differed in their basic conclusions in only one respect, namely, the possible detachment of two or more squadrons to North West Africa as advocated by the Air Ministry.

The Air Staff recommendations were summed up by the Secretary of State for Air in a Note to the War Cabinet on 17 December, 1942. In this he pointed out that, in order to maintain the flexibility of the bomber forces so that they could at any time be switched to German targets, it was necessary that as much as possible of the offensive against Italy should be carried out from home bases. As home-based bombers would only be able to cover Northern Italy, their effort would have to be supplemented by aircraft based in North Africa. The plan called for by the Prime Minister had been prepared on those assumptions but he warned the Cabinet that it would depend for full implementation on the seizure of the enemy bridgehead in Tunisia.

Bearing these considerations in mind, the Air Staff proposed that the heavy bomber squadrons based in the United Kingdom should normally operate against objectives in Northern Italy when weather permitted, at the same time neglecting no opportunity of striking at important German targets under favourable conditions. This effort would be supplemented by the heavy and medium squadrons in the Middle East which would concentrate on targets in South Italy, using Malta as an advanced base as far as possible. Eventually, the effort of the American bomber groups in North Africa which would be available for the attack on Italy might be supplemented by two or later possibly four Wellington squadrons detached periodically from Bomber Command to the extent that airfields and maintenance facilities in North Africa allowed.

By these dispositions it was expected that all important Italian towns would be brought within effective range and it was estimated that a total of 4000 tons of bombs per month could be dropped on Italy of which approximately 2000 tons would be delivered by Bomber Command. The Secretary of State reminded the Cabinet, however, that operations in winter were severely limited by weather both at bases and

/over

WM(42)151st
Concl. 9.11.42

WF(42)598
17.12.42

Ibid

Ibid

over the target and it would be improvident to count on more than four or five nights in a month as suitable for large scale raids. Since weather was more likely to be suitable over Italy than over Germany, it followed that the greater majority of good nights would be taken up with attacks on the former leaving only a few for bombing Germany. On those grounds it had been estimated that the effort against Germany would be reduced to some 500/1000 tons a month as opposed to the 2000 tons which would be dropped on Italy, but an improvement could be expected in the spring as a result of better weather and increased strength.

The Prime Minister had already approved these proposals on 3 December, stating that "the heat should be turned on Italy but Germany should not be entirely neglected." In the latter connection he added that he was looking forward to a major raid on Berlin in December if conditions proved suitable. To this suggestion the Secretary of State for Air replied that the C-in-C Bomber Command considered that a minimum of 300 sorties would be necessary if such an attack were not to result in disproportionate losses and he thought it unlikely that he would be able to raise the required effort before the end of the year.

While these decisions were being taken, Bomber Command had continued during November and December the attacks on North Italian targets initiated in support of Torch. It is not clear from the documents studied why the original period of seven days laid down for these operations was extended over a matter of two months. In a Minute to the VCAS on 27 November, ACAS (Ops) referred to this discrepancy and assumed that it was the result of direct instructions from the CAS. Weather, too, which was consistently poor over Germany was probably a contributing factor coupled with the policy, as yet in embryo, which has been discussed above. In any event, it was not until 17 January, 1943, and then at the suggestion of the Secretary of State for Air, that Italian targets were given a definite priority and the Prime Minister's instructions to "turn the heat on Italy", crystallised in Directive Form. On that date the C-in-C was advised that, while the Directive issued in February 1942 should continue to guide his offensive against Germany, the Prime Minister had ruled that, for the time being, first priority of the strategic bombing offensive was to be given to the attack of the industrial centres of Northern Italy when weather permitted. This was to be subject to the proviso that no opportunity of attacking important German targets in good conditions was to be missed. In other words, attacks on Italy were not to prejudice any raid which might be planned against Berlin or any attack of 200 or more sorties which could be made on important German targets in suitable weather.

Within those limits, attacks on Italy were to be concentrated on the industrial centres of Milan, Turin and Genoa which were of primary importance and accessibility. At the same time the C-in-C was to examine the feasibility of extending operations to include Spezia provided that this could be done without violating Swiss neutrality. To this latter point the C-in-C replied that such an operation would be possible and authority to include Spezia in the list of Italian targets was given on 29 January, 1943.

/(iii) Operations

AHB/IIJ11/15
M.580/2
3.12.42

Ibid
S. of S. to
P.M. 15.12.42

AHB/IIJ11/14
27.11.42.

CMS.330
Min.87 and
S.46368/Vol.III
Min.85
AHB/IIH/2413/621.
BO/S.23746/
Vol.IV Encl.
117A

Ibid

(iii) Operations Against Italian Targets

The bombing offensive against Northern Italy started on 22/23 October with an attack on Genoa by 112 aircraft. Apart from a small and comparatively ineffectual raid against the same target by 18 Whitleys of No. 4 Group in April, this was the first time that that country had been visited by home-based bombers since 28/29 September, 1941. Between October and December 1942, approximately 2786 tons of bombs were to be dropped on towns in Northern Italy during the course of 15 attacks involving some 1809 sorties.

Genoa, which as well as being the centre of the Ansaldo industries was also of particular importance in relation to Torch, was attacked six times during this period. On the night of 22/23 October, 105 Lancasters of No. 5 Group, led by eight Pathfinders, opened the offensive under exceptionally good conditions. The new Southern Gee Chain was used operationally for the first time with excellent results and with no cloud and the moon almost full, all but 12 aircraft succeeded in locating and bombing their target. Opposition was very slight and the whole force returned safely to base. PR cover was not obtained until after a repeat attack the following night but as the presence of 9/10ths cloud made positive identification of the target very difficult on that occasion, the majority of the force attacking Savona in mistake for their primary objective, it may be assumed that most of the damage shown was the result of the first attack. Altogether 77 acres in the target area were seen to have been devastated, almost entirely by fire, and although the Ansaldo Works and the western part of the docks were untouched, the eastern docks suffered very severely and many important industrial buildings were destroyed. These included the Ansaldo fitting yards, four very large dock houses and the eastern railways station. It appears from Italian documents that fires started in the port on 22/23 rd. were still persisting the following night.

AHB/II/39/1/3(B)
O.R.S.
G.A.S/B.C
Night Raid
Report No.
180

AHB/6
Translations

Genoa was not attacked again until 6/7 November, but on 24 October eighty-eight Lancasters of No. 5 Group carried out a moderately successful daylight raid on Milan. Apart from being a main industrial and commercial city and the political centre of Northern Italy, this target was also an important railway junction. The exact results of the daylight attack cannot be estimated owing to its being followed by a night attack on 24/25 October but subsequent reconnaissance showed that although there were no large areas of devastation, points of damage were scattered throughout the town. The most significant of the buildings affected was the Stazione Genoa (railway station) which suffered considerable damage while a number of small sheds of factory type were destroyed. Ground sources reported serious rail dislocation at Lambrate affecting the traffic to Bologna, Genoa and Venice. A surprising feature of the attack was the comparative immunity enjoyed by residential property in the town. Despite the large number of 30lb and other incendiaries dropped during the afternoon raid, fires apparently failed to take hold, presumably due to the fact that the chief building material in Milan is stone. Unfortunately no details of damage are given in Italian documents but reference is made to the town being encircled by a "ring of fires" after the daylight raid during which 135 people were killed and more than 300 injured. They also state that, during the night attack, most of the bombs fell on the outskirts of the city.

AHB/II/39/1/4(a)

AHB/6
Translations

Following the signal to Bomber Command on 2 November giving temporary priority to Italian targets, four more

/attacks

attacks were made on Genoa in the first half of the month, bombing in each case being combined with leaflet dropping on the town. Weather on all occasions was good and further very heavy damage was inflicted on the town and docks(1). Italian documents confirm the evidence of night photographs and daylight reconnaissance that Genoa suffered very severely during the course of the six attacks made on the town although no details of damage are given. In addition, ground sources reported that after the first raid on 22/23 October, there was a very definite wave of panic among the population which spread to Milan and as a result, many of the inhabitants of that city had already moved away before the daylight raid on 24 October. It was also reported that the Genoa authorities had begged the King of Italy to visit the city to calm the people, a request which was acceded to.

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AMTR Manual
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AHB/TI/39/1/3(B)

ORS/BC
Night Raid
Report, No.
199.

On 18/19 November, Bomber Command turned its attention to Turin and thereafter, the full weight of the bombing offensive against Italy was directed against that city. The first attack was made by a comparatively small force of 77 aircraft of which 25 Lancasters of 5 Group were given the Fiat Works as their primary objective. Daylight reconnaissance revealed that most of the damage inflicted was industrial. In the Fiat Works a large block of workshops, the factory railway station and three small buildings connected with the transformer and switching station were seen to have been seriously damaged.

Ibid No. 201

Following this cautious beginning, two very heavy attacks were made on Turin on 20/21 and 28/29 November, respectively. On 20/21 November 232 sorties were despatched and a concentrated and well-timed attack was delivered on the town. PR cover revealed extensive damage, mainly to the south and west and 25 factories were seen to have been wholly or partially destroyed. Serious damage was inflicted on the State Railway Works and the Fiat Works which suffered more severely than on the previous raid while public buildings sustaining major damage included the College of Music and the History Museum. Italian documents confirm that the centre of Turin was badly hit but state that military buildings were not seriously affected,

AHB/6
Translations

AHB/L/39/1/3(B)

ORS/BC Night
Raid Report
No: 208 and
209.

A further heavy and concentrated attack was made on Turin on 28/29 November when 228 sorties were despatched. On this occasion, No. 3 Group were detailed to bomb the Fiat Works immediately prior to the start of the main raid on the town. The Fiat Works were also the primary target for an attack by 36 aircraft the following night, but severe icing was encountered en route and only 18 aircraft reached the target area where they experienced great difficulty in locating their aiming point owing to thick haze. This was one of the very rare occasions when poor conditions obtained over Italy and it may be presumed that most of the damage revealed by subsequent reconnaissance was inflicted the previous night. This showed very heavy damage to five of the Fiat Plants and two of the Lancia plants producing military vehicles, A.F.Vs and tanks as well as to other industrial plant devoted to aircraft components and typewriters. The State Railway Works again suffered

/severely

(1) For details of these raids see ORS/^{6c} Night Raid Reports Nos:- 189, 190, 195 and 196.

AHB/6
Translations

severely and public buildings hit included the Gas Works, Municipal Water Works, Tramway Offices and the railway station. In addition about 25 acres of the residential districts were devastated. Italian documents confirm hits on industrial targets and also mention damage to Ministry of War and Finance buildings, military stores, barracks and the military hospital. Only one aircraft was missing from this operation but two more crashed on return including one piloted by F/Sgt. Middleton who was posthumously awarded the V.C.

AHB/11/39/1/3(B)
ORS/BC
Night Raid
Report Nos.
216 - 217.

P.R. cover of two subsequent attacks on Turin on 8/9 and 9/10 December, respectively, revealed further extensive damage to the target. Altogether 40 acres of residential property were devastated, six more of the Fiat plants were severely damaged, the State Arsenal was seen to have been partially gutted and hits were also obtained on military barracks in various parts of the town. Italian documents confirm that heavy damage was inflicted on military industrial and residential buildings.

AHB/6
Translations

A final raid on Turin on 11/12 December was comparatively unsuccessful owing to poor weather. This was the last operation over Italy by home based bombers during the period under review, but there is no doubt that during the course of the 15 raids described, widespread and heavy damage was inflicted on the industrial built-up areas of Genoa and Turin and, to a lesser extent, of Milan. Opposition, although strengthening after the early attacks, was slight in comparison with that normally encountered over German targets and of the 1809 sorties despatched only 31 were missing from the whole offensive. Apart from the numerous reports received of the panic created among the Italian population, Intelligence sources also claimed that the operations had caused "serious disorganisation" and had affected production. It was stated that, as soon as enemy aircraft crossed the Italian frontier, air-raid alarms were sounded throughout Piedmont, Lombardy and Liguria, causing almost all activity to come to a standstill. That the Air Ministry considered this information sufficiently reliable to be followed up is evident from a signal sent to Bomber Command on 2 December suggesting that the situation might be further exploited by small scale harassing raids on Italian targets when adverse weather precluded heavier attacks. This suggestion, however, was not adopted by the Command.

AHB/11/4/24/3/62
BC/S. 23746/
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102A

(iv) Major Attacks on German Targets

Italy undoubtedly bore the brunt of the bombing offensive between October and December, 1942 although no opportunity was neglected of striking at Germany when conditions promised to be reasonably good. The importance, so frequently emphasised by the Prime Minister, of denying her any period for recuperation and of containing and spreading her defences was in any case a policy dear to the heart of and persistently followed by the C-in-C from the moment he took over command of the Bomber Force. Nevertheless, weather which, as had been expected, was normally much better over Italy than over Germany, remained the overriding factor during the winter months. This, coupled with the importance attached to the offensive against Italy, and, in January 1943, the high priority given to the attack of the German U-boat bases, all combined to reduce very considerably the effort expended against Germany between October and January. Indeed, only nine attacks of any size (i.e. over 100 sorties) were made on German targets during that time although a persistent harassing effort was maintained by single or small groups of aircraft operating both by day and by night over a wide area.

/On the

On the other hand, the period is not without interest as containing the early experimental operations with Oboe and H2S and, in January, 1943 the first major attack on the German Capital since November 1941.

AHB/10/39/1/3(B)

ORS/BC
Night Raid
Report No. 192

After the attack on Cologne on 15/16 October 1942, there were no further large scale raids on Germany until 9/10 November when 212 sorties were despatched to Hamburg. Unfortunately, the target was found to be covered by dense cloud and under the circumstances aircraft could do no more than bomb flak defences on E.T.A. The bad weather also hindered enemy night fighter operations but the flak defences, although inaccurate, were intense. Fifteen aircraft failed to return from this raid of which 10 were attributed to "causes unknown", four to flak and one to night fighters. The Eastern Gee Chain was in use but jamming was experienced and the average range obtained was of the order of 309 miles. The failure of this attack is confirmed by German sources which mention only two houses destroyed, four damaged and three industrial buildings slightly affected.

Ibid No. 203

After this inauspicious beginning, there were no further large scale attacks on Germany until 22/23 November, when 222 sorties were despatched to Stuttgart. Despite haze in the target area, a considerable proportion of the force claimed to have bombed their primary and numerous fires were started in the built-up area of the town. Crews reported a big explosion in the east-north-east which was believed to be the gasworks and many large buildings including the Town Hall were seen to be ablaze. Bombing was combined with leaflet dropping and, in addition, many aircraft shot up trains in Germany and France on the return journey. Night photographs suggest that a proportion of this attack was drawn away to the south-west but although P.R. cover of the raid is incomplete, German documents indicate that it was at least moderately successful. One hundred and twelve houses are stated to have been destroyed and a further 220 severely damaged. The main railway station was hit and traffic interrupted for several days. Many hotels and business houses were also damaged and a brewery, publishing house, textile factory and the gasworks at Hetchingen were destroyed. An interesting feature of this attack (from which 10 aircraft were missing) is that it was the first using the Southern Gee Chain over German territory, an average range of 347 miles being obtained although there was evidence that the enemy were attempting to jam.

A.H.B.6
Translations

AHB/10/39/1/3(B)

Ibid
No. 211

A small force of 32 aircraft detailed for Stettin on 27/28 November was recalled owing to deteriorating weather and for the same reason a heavy attack planned against Frankfurt on 2/3 December had to be considerably reduced. One hundred and twelve aircraft eventually took off for the target where bombing was hampered by darkness and very poor visibility. As a result, the Pathfinder flares were of little use and the attack was scattered, much of it falling in open country. A point of interest is the task allotted to one Pathfinder aircraft of transmitting a running commentary over the target area to assist main force crews to locate the position of the aiming point in relation to fires. This appears to be a very early example of what, in the later stages of the war, became known as the "master bomber" technique.

/A heavy

Ibid
No. 214

A heavy attack on Mannheim on 6/7 December was hardly more successful. Dense cloud obscured the target and although a high proportion of the attacking force claimed to have bombed on estimated position, it seems probable that there was little or no concentration. This is borne out by German police records which report only 500 incendiaries dropped on Mannheim in the whole month.

AHB/6
Translations

AHB/II/39/1/3(B)
ORS/BC
Night Raid
Report No. 226

Slightly better results were obtained by two operations towards the end of December. On 20/21 December, 232 sorties were despatched to Duisberg where crews found conditions well above the average for that area. The plots of night photographs indicate that very good concentrations were achieved round the aiming point and from later P.R. there appears to be no doubt that the town was badly hit. Six acres of the Kabelwerk Duisberg and 17 acres of industrial property are shown as completely devastated, mainly by fire. German documents record the destruction of 50 houses and damage to 1232 more. They also state that hits were obtained on 17 industrial buildings and that 8 hits were made on the railway, the track being destroyed. A further hit on the water main was reported as hindering A.R.P. activities, thereby allowing the fires to gain a stronger hold.

AHB/6
Translations

AHB/II/39/1/3(B)
ORS/BC
Night Raid
Report No.
227

The last attack of the month was directed against Munich on 21/22 December. Unfortunately, despite reasonable forecast weather, the target was found to be obscured by a thin layer of cloud and many crews were forced to bomb on a timed run which resulted in a somewhat scattered attack. Nevertheless, one crew which bombed 45 minutes after the close of the period of the raid reported 17 "really red" fires, including a large one in a factory and German records also mention damage to a gasworks, two tramway depots, 17 workshops, 8 air-raid shelters, a military building and three P.O.W. establishments.

AHB/6
Translations

(v) Early Oboe Operations (1)

As expected, weather had severely hampered bombing operations over Germany during November and December but already the new devices were on their way which were materially to assist Bomber Command in overcoming the difficulties of navigation and target finding in poor conditions.

The first of these to come into operational use was Oboe. Following a calibration raid on the Power Station at Lutterade on 20/21 December, the six Oboe-equipped Mosquitoes of No. 109 squadron which had been affiliated to the Pathfinder Force in August 1942, carried out a number of test operations over Germany during the remainder of the month. (2)

It had already been decided that, in view of the small number of aircraft initially equipped with the device, Oboe should be used in the first instance for Target Finding in conjunction with the mainforce. By the same token, the latter was necessarily limited to between 20 and 80 sorties on any one operation.

Weather

(1) For a full account of the development and introduction of Oboe see Chapter 10 Sections (i) and (ii).

- (2) 22/23 Dec. Hamborn and Rheinhausen.
23/24 Dec. Essen, Rheinhausen, Hamborn and Meiderich.
24/25 Dec. Ruhrort and Essen.
29/30 Dec. Ruhrort and Essen.
31/1 Jan. Florennes.

AHS/II/39/1/3(B)

ORS/BC
Night Raid
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233

Weather at the end of December and during most of January was unfortunately unsuitable for ground marking but on 31 Dec/1 Jan, eight Pathfinder Lancasters acting as "main force" and led by two Oboe-equipped Mosquitoes, carried out a test of the sky marking technique in an attack on Dusseldorf. Although the operation went according to plan and was, technically, very successful, P.R. cover failed to disclose any fresh damage to the target but this may well have been due to the small numbers of aircraft operating.

Ibid Nos.
235-242

In any event, it was decided that Oboe had shown itself sufficiently accurate to be used as a target marking device and it was used for the first time in that capacity in conjunction with the main force on 3/4 January, 1943.

During the month, ten such operations were carried out, of which no less than eight were directed against Essen. The sky marking method used on each occasion was practically identical. Preliminary and secondary warning flares (red or green steady) were dropped by the Oboe Mosquitoes at Zero minus 4 and zero minus 2 respectively and these were followed by bomb-release-point flares (red with green stars) at zero hour. Main force aircraft were instructed to bomb the marker flares while flying on a predetermined flight and heading. Unfortunately, the only occasion on which sufficient night photographic evidence was obtained for analytical purposes was during an attack on Essen on 9/10 January but these clearly indicated that the percentage of aircraft bombing within three miles of the aiming point was three times greater than the best percentage previously obtained on that target.

Ibid No.
239

Daylight cover of Essen was not provided until after the seventh attack on 13/14 January when damage was seen to be scattered all over the town. A large building in Krupps Works, believed to be an open-hearth steel working shop was completely destroyed by H.E. while serious damage had been inflicted on a saw-mill, a glass works, a brick works and a coke-oven. Military and public buildings had escaped fairly lightly but about 100 commercial or residential buildings had been wholly or partly devastated.

Ibid
No. 253

A first attempt at ground-marking with Oboe was made on 27/28 January 1943, when 162 sorties were despatched to Dusseldorf. Red and green marker bombs were dropped by the Oboe Mosquitoes at frequent intervals from zero to zero plus 12 minutes but unfortunately heavy cloud obscured the target and they soon disappeared into it. Their glow remained visible for several minutes, however, and the majority of crews were able to bomb on this. Although the glare of fires was seen reflected on the cloud and crews were unanimous in their reports of a good bombing concentration, P.R. cover was incomplete, including only strips of Dusseldorf in the North and East where little fresh damage was revealed. Intelligence sources reported that hits had been obtained on the main railway station and the line had been completely blocked. The Opera House was also said to have been gutted.

(vi) Attacks on the German Capital.

Two heavy raids were made on Berlin on 16/17 and 17/18 January. This was the first time since 7/8 November, 1941 that the German Capital had been subjected to a full scale night bombardment but, unfortunately, both operations were considerably marred by cloud and poor visibility.

AHS/II/39/1/3(B)

ORS/BC
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Report No. 245

On 16/17 January, 201 sorties were despatched but 10/10ths cloud was experienced to within 10 miles of Berlin and the target itself was partially obscured by heavy haze. The Pathfinders had been briefed for an elaborate system of "finding" and "Marking" but found it almost impossible to pinpoint owing to snow and cloud in the target area. Most of them were unable to identify the town centre and brought their flares back and two aircraft which did drop flares appear to have been to the S.E. of the town. Their markers attracted a small concentration of bombing, however, which seems to correspond to the concentration in the Tempelhof district revealed by subsequent reconnaissance. Contrary to expectations, enemy opposition was slight and only one aircraft failed to return.

Ibid
No. 246

Defences were far more active the following night intense opposition being encountered, mainly en route, from both flak and fighters and as a result, 22 aircraft were lost. Altogether, 187 aircraft were detailed for the operation. Pathfinders were divided into "finders" and "illuminators" both finders and illuminators being instructed to release single red flares over Neuwarp to act as navigational aids to the main force. Thereafter, three PFF Lancasters acting as "finders" were to release flares in a long stick across the target area and were to be followed by marker aircraft dropping red marker bombs on the aiming point which would cascade to the ground and burn there as points of fire. To ensure concentration, flight plans for the whole force were to be based on a common forecast wind.

Ibid

As on the previous night, the bombing force approached Berlin from the Baltic over snow covered ground and frozen lakes. Patches of fog near the target landmarks made pin-pointing difficult but the Pathfinders had no difficulty in locating Berlin itself which was free from cloud. Nevertheless, night photographs confirmed by daylight reconnaissance indicated that the attack was scattered and P.R. cover showed points of damage, mainly by fire, all over the southern part of the city and the suburbs, extending as far south as Marienfield, eight miles from the city centre. Four fairly large sheds in the Daimler-Benz aero-engine works were destroyed and, in all, damage was caused to 10 factories while 13 buildings in the hutted camp near the Daimler works were seen to have been partly or wholly gutted. Damage to residential property was relatively slight and mainly confined to urban districts.

Ibid

Reports from Intelligence sources gave additional details of damage inflicted by the two attacks which seemed to indicate that they had been, on the whole, rather more successful than had at first been thought. Heavy damage was reported in the district of Neukeln and between Nollendorfer Platz and the Kurfuersten Strasse and damage to domestic property was stated to be extensive in several districts, particularly in the south where, in many cases, tramways services were said to have been out of order for three days and debris clearance was still continuing in February. Hits were reported on the Borsig Rheinmetallwerke in Mariendorf where the administrative buildings were stated to have been damaged by fire and a large building completely burnt out. Serious damage was reported to the Lorenz Radio Factory and the Riedel Chemical Works near the Tempelhof aerodrome and also to the electricity and gas-works in the western part of Berlin. A point of added interest, although unconfirmed, is the statement that repair work was less efficient than on previous occasions and that there was a notable decline in the speed of rescue work.

AH8/II/391/3(B)
 ORS/BC
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 Report No.
 255

(vii) H2S Operation on Hamburg

The last attack of the month on 30/31 January 1943, which was also the last operation carried out during the period covered by this Volume, is mainly notable as the first occasion on which H2S, the latest radar aid to navigation, was used operationally.

The target was Hamburg and altogether 148 sorties were despatched on this attack which was led by 13 H2S-equipped Stirlings and Halifaxes of the Pathfinder Force. These aircraft were briefed for both sky and ground-marking, the method in each case being straightforward. To guide the main force, each H2S aircraft was ordered to release a single bundle of green flares 16 miles short of the target. Thereafter, if the weather was clear, each was instructed to release a salvo of four red marker bombs on the aiming point and, if cloudy, four bundles of red flares with green stars placed so that bombs aimed on them by the main force, flying on a given heading, would fall on the aiming point. The red flares were to be followed by green flares dropped by PFF Lancasters acting as "backers-up". (1)

Five of the 13 H2S equipped aircraft and four backers-up completed their task successfully using both marking methods and their flares were easily recognised by the main force. H2S Navigators stated that the target appeared exactly as expected and claimed positive identifications of the dock system. In particular, the H2S Stirlings whose Gee sets had been incorrectly tuned, navigated throughout by H2S and reported that many landmarks were easily identified. As this attack was followed by a second on 3/4 February, its exact effects cannot be analysed. Intelligence sources reported that considerable destruction had been caused, mainly in the harbour area. The Blohm and Vos and Deutsche Werft yards and several oil tanks were said to have been damaged but none of this is confirmed by P.R. cover of both attacks which revealed little fresh damage in Hamburg, apart from a large factory producing edible oils and fats which had been partly gutted and a block of flats which was disintegrated by an H.E. bomb. German reports are unfortunately not available.

(viii) Spreading the Defences

As has been seen, the number and effects of heavy raids on German targets had been severely restricted between October and January, mainly due to adverse weather but also in part to the current emphasis on other target systems. An account has already been given in an earlier Chapter (2) of the attempt during 1942 to maintain and increase the morale effect of heavy bombing by small harassing attacks by day (Scuttle) and night (Moling) under cover of cloud. On 18 November, the instructions already issued were consolidated into a new Directive to Groups in which they were reminded of the particular importance of increasing such operations when opportunity offered, particularly in view of the restrictions imposed on large scale raids by winter conditions.

/In the

(1) For details of the development and early marking technique with H2S see Chapter 10 Sections (iii), (iv) and (v).

(2) Chapter 18 Section (vi).

AH8/IIH/241/3488
 BG/S.25859
 Encl. 17A.

In the meantime, a new series of harassing operations under the code-name Batter, had been inaugurated in September, 1942. One of the problems facing Bomber Command at that time was the slow but steady increase in the loss rate during 1942. The long series of heavy attacks on vital targets in Germany had inevitably led to considerable strengthening of the enemy defensive systems in the important industrial areas. "Batter" operations were designed to spread those defences by attacking a large number of small and hitherto bomb-free towns over a wide area which had little or no defence against air attack. It was argued that not only would such operations increase the morale effect among large sections of the German population resident in or evacuated to such towns who had hitherto believed themselves immune from bombardment but, in doing so, they would create a public demand for heavier defences which must inevitably place a great strain on German resources as a whole. In addition, it was hoped by such methods to exploit the enemy's transportation and housing difficulties which Intelligence had suggested were already becoming acute.

Unlike Moling operations, which were the responsibility of Group Commanders, it was intended that Batter attacks would be laid on by Command Headquarters on nights when large scale raids were not feasible. Targets would be passed to individual Groups by name under the code-word Batter and were normally to be attacked by small forces ranging from 6 to 12 aircraft flying at low level. Where aircraft had difficulty in finding the allotted target, they were free to attack any other small town in Germany as an alternative, and all such operations were to be combined with machine gun attacks on trains sighted en route to and from the target in accordance with current bombardment instructions.

"Batter" instruction were issued on 24 September, 1942 but although approximately five such operations were ordered between that date and the end of the year, all but one were cancelled. On 17/18 December 28 Lancasters of No. 5 Group were ordered to attack a number of small towns in N. Germany and 22 aircraft of No. 3 Group to attack the Opel Works at Fallersleben. In all five aircraft of No. 3 Group and nine of No. 5 Group claimed to have attacked their primary targets while a further 15 aircraft from both forces bombed other small towns in Germany as alternatives. Seventeen bombers failed to return from this very costly operation and an enquiry into the causes of the heavy loss rate indicated that a number of aircraft had failed to adhere rigidly to instructions regarding low flying, thereby falling victim to flak and night fighters in probably equal proportion.

The experiment was not tried again although whether due to force of circumstances or design is not clear. In any event, it is doubtful whether this type of operation would have had any appreciable effect on the defences. Apart from keeping the crews occupied during the otherwise long periods of inactivity due to winter conditions, it is probable that the most that would have been achieved would have been a measure of additional discomfort inflicted on the German population.

(ix) Area Bombing of U-boat Bases: Policy.

Meanwhile, the Admiralty's growing concern over the increase in the enemy's submarine operations had at last resulted on 11 January, 1943, in War Cabinet approval of a policy of area bombing of the important U-boat bases on the West Coast of France. This decision was not arrived at without much soul-searching on the part of all concerned.

/It will

AHS/TIH/241/3/572.
BC/S.28152
Encl. 4A

AHS/D/39/1/3(B)
O.R.S./BC
Night Raid
Report No. 224

It will be remembered that, under the current bombardment instructions issued in October 1942 (1) the attacks of French targets was only to be made when conditions favoured precision bombing. This had been agreed in order to avoid the adverse effect on French morale and the political repercussions both during and after the war which would result from the apparently useless slaughter of the French civilian population. It was clear that such a policy could only be reversed under extreme military necessity.

CMS. 330/Pt. 1
Min. 50

Nevertheless, the possibility of hindering enemy U-boat operations by area bombing of the Biscay ports had been under close and constant examination throughout 1942. At the beginning of April, the C-in-C Bomber Command had himself sought authority from the CAS to blitz the ports, to which the CAS had replied that, in view of the current bombardment instructions, there seemed very little chance of the Cabinet agreeing to such a proposal until all the other possible methods of dealing with the situation had been given a fair trial.

Ibid
Min. 49

Less than two months later, the question was again raised, this time by D.B. Ops in a Minute to ACAS(Ops) in which he pointed out that to "Lubeck" each of the Biscay bases in turn would not only deny them power, water, light and transportation facilities but would make the housing of submarine crews and maintenance parties an immense problem. A really heavy scale of attack would so disrupt the port facilities as to make the task of re-establishing them almost impossible. He urged that the CAS should be asked to reconsider his views on this question.

Ibid
Encl. 51A
and 55A.

Three days later, on 1 June, the cudgels were taken up by the C-in-C Coastal Command who, in a letter to the CAS suggested that blitzing of the port facilities and towns of Brest, Lorient, St. Nazaire, La Pallice and Bordeaux constituted the best method of combatting the sinkings in the Atlantic, particularly in view of the fact that Coastal Command were unlikely to get sufficient long range aircraft to deal with submarines in the Bay really effectively.

Ibid Mins.
52 - 60
and Encl. 61A

After considerable discussion, the proposals were eventually placed before the Secretary of State for Air on 10 June 1942. He replied on 12 June that if the Air Staff were really convinced that by bombing the French submarine bases enemy U-boat activity would be reduced, he would feel compelled to ask the War Cabinet to consider whether it would not be worthwhile to incur the political odium of such operations in order to achieve a military object of great importance. If, however, the Air Staff were not convinced that this vital military object could be achieved by such methods, it would be useless to ask the Cabinet to embark on a policy of ruthless bombing of French towns.

Ibid Min. 62
and Encl. 65A

After further consultations between the CAS, VCAS and Bomber Command, it was decided that such attacks would not produce the military effect required and on 19 June, the C-in-C Coastal Command was advised that it was not proposed to proceed with the matter any further.

During the months immediately following this decision,

/the shipping

(1) Appendix 12

the shipping position continued to deteriorate while the Biscay ports increased in importance as the date for the projected operations in North West Africa approached. On 20 October, acting on instructions from General Eisenhower, the Eighth Air Force gave first priority to daylight precision attacks on U-boat bases in the Bay.

Throughout the remainder of the year, the question of area bombing of the ports was under constant review as a result of strong pressure from the Admiralty. On 9 December, the newly formed Anti-U-boat Committee (1) again examined the problem. Discussion centred round the possibilities of "blitz" bombing, the Admiralty arguing strongly in favour of such methods while the Air Staff maintained their earlier view that the political repercussions which would result would not be balanced by the ends achieved. Eventually the Prime Minister ruled that the matter must be referred to the Foreign Secretary before any decision could be reached.

On being appealed to Mr. Eden replied on 18 December that while he had no objection to precision attacks on the Biscay ports both by day and night since the French were known to react favourably to the attack of obviously military objectives, he was very reluctant to agree to their wholesale devastation unless it could be shown that such methods would materially help to keep down U-boat operations. The apparently unnecessary slaughter of the French civilian population would have a bad effect on the morale of the Fighting French in North Africa as well as adversely affecting public opinion in France both during and after the war. As the Air Staff appeared to be opposed to "blitz" bombing, Mr. Eden hoped that such drastic methods could be avoided.

These views were completely endorsed by the Secretary of State for Air who informed the Anti-U-boat Warfare Committee that he had no proposals to make regarding area bombing of the Submarine bases.

The Admiralty, however, were still convinced that area attack was the only measure which would afford immediate relief to the serious situation which had arisen at sea and on 7 January 1943 the First Lord circulated a note to the War Cabinet in which he pressed very strongly for their approval of such a policy and for a direction that the submarine bases should be given a definite order of priority during the next few months. He argued that the four bases, at which between 75 and 80 U-boats were already present, formed the backbone of the German submarine operations against Allied shipping. All normal repairs and refits were carried out there and there was evidence that the servicing facilities were already tightly stretched. In order to maintain so many submarines it was essential that the bases be kept running smoothly and

/to capacity

(1) This Committee was formed by the Prime Minister on 3 November, 1943, and, with Mr. Churchill in the Chair, was attended by :

The Lord Privy Seal
The First Lord of the Admiralty
The Secretary of State for Air
The Minister of War Transport
The First Sea Lord
The Chief of the Air Staff

The Committee was to hold weekly Meetings on the lines of those previously held on the Battle of the Atlantic.

CS.16536 14A
20.10.42.

A.U. (42) 6th
Mtg.
9.12.42.

C.M.S.330/
Pt.1.
Encl.70A.

Ibid
Encl.78A

W.P.(43)11
7.1.43.

Wp(42)505
3.11.42.

to capacity and therefore any interference with them would be likely seriously to hinder their turn round which would inevitably create a bottle neck. Some U-boats at sea would thus be forced to curtail their patrols in order to return on the longer route to Norway and Germany while dislocation at one base would result in overcrowding at another thus rendering the U-boats themselves more vulnerable to attack since they could not all be housed in shelters.

Although the Admiralty were agreed that the concrete shelters would probably preclude any serious damage to the submarines housed in them, they believed that the destruction of buildings and dockyard facilities would seriously impede their maintenance while experience had shown that even light bombing served to drive away faint-hearted labour from the docks. As the majority of the dockyard workers were Frenchmen working for the Germans, it was unlikely that they would have much stomach for heavy bombing. Spasmodic and comparatively light raids had already been carried out on these targets but they had not so far appreciably affected the operations of U-boats from the Biscay ports. The Admiralty were convinced that important results could only be obtained by sustained attacks over a definite period both with precision bombing when opportunity offered and area bombing whenever weather was suitable.

Finally the First Sea Lord emphasised that although sustained and heavy bombing such as he proposed would necessarily divert the effort from Germany over a specified period, the U-boat threat brooked no delay if offensive power was not to be seriously weakened by lack of shipping. During the past year four-fifths of the shipping losses had been due to U-boats and this was having an adverse effect on the morale of the merchant seamen. Moreover, the rate of destruction of submarines at sea was inadequate to check, let alone to reduce, the U-boat fleet and although it was admitted that large-scale bombing of the Biscay ports might not result in wholesale destruction of the submarines in them, this was the only means, apart from a seaborne raid, by which a far reaching blow could be struck and struck quickly at enemy U-boat operations. He added that the bombing of construction yards was no alternative since it would not have any material effect on submarine operations for at least six months during which time it was expected that the shipping situation would become most acute. In conclusion the First Lord pointed out that the fact that the bases were concentrated in four ports would enable the Allies to strike heavily at the whole Atlantic organisation without any dissipation of the air forces.

W M/43/6th
Concl.
11.1.43
A43/II4/291/3/621
BG/S-23746/VOL.4
Encl. 111A
14.1.43

In the face of such pressing arguments, the War Cabinet accepted the Admiralty view and on 11 January, 1943 approved in principle a policy of area bombing of the Biscay ports on high priority. The C-in-C Bomber Command was accordingly directed on 14 January that the bases were to be given first priority of the bombing offensive subject to the proviso that such operations should not prejudice any attack which might be planned on Berlin or any concentrated raid of 200 or more sorties which could be made on important objectives in Germany and Italy in suitable weather. The U-boat bases to be attacked were Lorient, La Pallice, Brest and St. Nazaire in that order, and the C-in-C was instructed

/to direct

to direct his operations initially against Lorient until he was satisfied that the desired results had been achieved. They would then be fully analysed and reviewed in the light of available evidence before proceeding with the attack of the other bases.

In order that there should be no doubt as to the extent of the bombardment, the Secretary of State for Air ruled that the C-in-C was to be at liberty to choose any aiming point even if the resultant bombing caused complete devastation of the inhabited areas of the town. Special warning was in any event to be given to the French population of the proposed operations.

Bombing of Lorient began on 14/15 January 1943 but it was soon clear that the controversy was not yet over. On 20 January, after further discussion, the Cabinet decided that, contrary to the original intention, there should be no pause to assess the effects of the raids on Lorient before proceeding with the attack of the remaining ports as opportunity offered.

Bomber Command were informed of this change of policy on 23 January and on 27 January the C-in-C wrote officially to the Air Ministry protesting at the whole conception of the plan which he regarded as a complete waste of effort. Pointing out that although some 4,000 tons of bombs had been dropped on Brest when the German battleships Scharnhorst, Gneisenau and Eugen were in port, the damage inflicted on the dock facilities had not been serious. The effort expended had served to keep the ships out of action but there was no evidence that the attacks had interfered in any way with their essential repairs or with the operations of U-boats from the port. On these grounds he declared that he "most earnestly and indeed flatly" refuted the contention that operations such as were now planned would in anyway contribute to the reduction of enemy submarine activity.

Although the Air Staff, were to a large extent, in sympathy with the C-in-C's views, they considered that in the light of the Casablanca Directive issued by the Combined Chiefs of Staff on 21 January, they were committed to giving the policy a fair trial. The CCS had quoted the Biscay Bases as objectives of great importance and had laid down that the day and night attacks recently inaugurated should be continued so that an assessment of their effects on enemy U-boat operations could be made as soon as possible. If it was found that the desired results were being achieved, the attacks should be continued for as long as and as often as was necessary.

Nevertheless, the Air Staff were convinced that it would be unjustifiable in an experiment of this nature with its inherent risk to French lives to extend operations to the remaining Biscay ports until there was sufficient evidence to prove that they were an essential military expedient. They therefore suggested to the Secretary of State for Air that the Cabinet should be approached with a view to obtaining a reversal of their ruling on the subject. The Secretary of State, although agreeing with the Air Staff in principle, suggested that before making a formal appeal to the Cabinet, one or two more attacks should be carried out on Lorient and that an attempt should then be made to produce the assessment called for by the CCS on the evidence obtained so far. Bomber Command was accordingly advised on 14 February that their operations against U-boat bases in the Bay were to be confined for the time being to Lorient and that the policy would be reviewed when further evidence as to the effects of their attacks was available.

/(x) Operations

Ibid
Encl. 112A
14.1.43

W M(43)12th
Concl.
20.1.43.

AHS/TH/2413/621
BC/S.23746/
Vol.4
Encl. 124A and
127A

CCS.166/1/D
21.1.43.

CMS.330/Pt. 1
Mins.94-97

AHS/TH/2413/621
BC/S.23746/
Vol.4
Encl.139A

AHG/II/39/1/3/13

O.R.S./BC
Night Raid
Report No. 243.

(x) Operations Against Enemy U-boat Bases.

The first raid on Lorient was carried out on 14/15 January 1943, when 123 aircraft with Pathfinders in the van were despatched to attack the town and docks with H.E. and incendiaries. Despite severe weather en route, at zero hour the target was clear and the Pathfinders were able to operate before it became obscured by cloud. On this occasion they used the flare and fire-raising technique, illuminating the area by releasing long sticks of flares across the town and when the target could be identified with certainty, marking the aiming point with 4 lb incendiaries. Despite the cloud which covered the town during most of the attack, crews were able, in the clear intervals, to pinpoint ground features in the light of the moon and flares. At first the incendiaries seemed to be falling mainly to the north but in the later stages the concentration shifted south and east and 30 minutes after the attack began at least 10 large fires could be counted in the town and incendiaries were taking hold in the dock area. Night photographs confirmed that a fair concentration had been achieved but daylight reconnaissance was not made until after the two attacks on 15/16 and 23/24 January.

Ibid
No. 244 and
251

On both occasions, a considerable concentration was achieved on the target and on 23/24 particularly, night photographic evidence showed that under clear conditions and in bright moonlight, no less than 93 per cent of the attacking force had bombed within three miles of the aiming point. Marking was particularly successful and main force aircraft found the town brilliantly illuminated in the moonlight by cascade marker flares. On all three operations only very slight opposition was met and in all, only 5 aircraft failed to return. PR cover which also included a daylight raid by U.S.A.A.F on 23 January, showed extensive damage, mainly by fire, throughout the whole town and especially in industrial works. The largest areas of devastation were in the old town and on both sides of the Bassin A Flot and the Port de Commerce which totalled 58 acres. A further 10 acres of the Arsenal were shown to have been gutted and many incidents were noted in the naval workshops, offices and barracks. The Frobault and Bisson barracks were partially demolished and damage was inflicted on the Power Station and Gas Works, the Labour Exchange, the Tax Office, the Public Works Department the Town Hall and the Forests and Rivers Department. In addition about 250 houses and small buildings had been partly or wholly destroyed.

Ibid
Nos. 252 and
254.

Two further attacks were made in January on 26/27 and 29/30 respectively. On neither nights were conditions as good as previously but daylight reconnaissance revealed that, in addition to damage scattered throughout the town, the control houses on the west side of the lock gates of the Bassin A Flot had been completely destroyed by fire. Photographs showed that, despite low tide, both lock gates were open and the dock partly empty of water. Altogether seven aircraft failed to return from these two operations and a further three were completely destroyed on landing.

There is no doubt that a vast amount of damage and destruction was inflicted on Lorient as a result of the attacks described and, indeed, by the end of March, there was very little left of the town and docks except the

/submarine

Bureau Scienti-
fique de
L'Armée
Ministère de
la Guerre,
Paris.

CMS.330/Pt.1
Min.101

submarine pens which were comparatively untouched. A report issued by the Scientific Bureau of the French Army states that following the raids between 14 January and 16 February 1943, 3,500 of the 4,500 - 5000 houses which constituted the town of Lorient had been completely destroyed and the majority of the remainder rendered uninhabitable. Nevertheless, by 3 February 1943, there was still no evidence that the raids had had any effect on the number of U-boats operating from the port and it looked as though the views shared by the Air Staff and the C-in-C were about to be vindicated. Indeed, approximately two months later on 6 April, Bomber Command were relieved of this doubtful commitment.

(xi) The Controversy over Oil

It has been seen that, between October and December, 1942, the bombing offensive from the United Kingdom was divided between attacks on Northern Italy and Germany and, in January 1943, was extended to include, on high priority, operations against the U-boat bases on the West Coast of France. Before concluding this Chapter something must first be said of the controversy over oil which also reached a peak about this time.

The question of an air offensive against Axis oil supplies was raised in February, 1942, (1) in connection with the new strategic bombing Directive. Although the position was, even then, believed to be critical, no action was taken at the time in view of an M.E.W. recommendation that attacks on the synthetic plants in Germany would be an uneconomic proposition until the group of six refineries at Ploesti, which were outside the range of home-based bombers, had been put out of action.

DO(42)9th
Concl.
26.3.42. and
COS(42)102(0)
16.4.42

In April, however, at the request of the Defence Committee, Colonel Stanley undertook an extensive examination of the problem of denying oil to the enemy. In considering the various means available, he took as a standard those which would result in the loss to the Axis of 500,000 tons in a period of three months. His conclusions as regards air attack were that the chances of effecting the requisite damage by night attack on the synthetic plants was negligible. Daylight attack was completely out of the question and the only feasible method would be to ensure the complete cessation of production for three months at the refineries near Ploesti.

COS(42)119(0)
1. 5.42

DO(42)46
11.5.42.

At the request of the Chiefs of Staff, an examination was made by the Air Staff of the practicability of attacking Ploesti with aircraft based in the Middle East. After consultation with the C-in-C Middle East, the conclusion was reached that the provision of the necessary force of heavy bombers to give a reasonable chance of success was impossible in the immediately foreseeable future, while British bombers could not at that time be operated from bases outside England. These conclusions were reported to the Defence Committee by the Chiefs of Staff on 11 May, 1942.

/On

(1) Chapter 15, Section (v)

WP(42)396
29.8.42

On 29 August, however, the Joint Intelligence Sub-Committee on Axis oil(1) reported that the strain on the enemy oil supplies was increasing and while Ploesti was still the most vital target, the synthetic plant at Poelitz, which was converting about one million tons of surplus tars and fuel oil a year into gasoline and oil urgently required by the armed forces, was an important as well as being a more accessible target.

S.46368/PtIII
Min. 65
31.8.42.

This suggestion was taken up by ACAS(Ops) in a Minute to CAS on 31 August in which he proposed that Poelitz should be included as a diversionary target in the current bombing Directive. CAS in turn sought the views of the Secretary of State for Air who replied that he was "delighted" at the proposal and recommended that an attack on Poelitz be followed by raids on the two synthetic plants at Gelsenkirchen.

Min. 67
1.9.42.
and Min. 68
2.9.42

Ibid
Encl. 71A
3.9.42
and
Encl. 73A
10.9.42

These proposals were forwarded on 3 September to the C-in-C Bomber Command who replied that he was arranging to deal with Poelitz as soon as opportunity offered but, with so many things "crying out to be done", he considered that an attack on Gelsenkirchen which was a very small target and difficult to find in the smoke and haze of the Ruhr, would be a waste of effort. This view was accepted by the Air Staff.

Mins. 74-77

WP(42)596
18.12.42.

Meanwhile reports on the increasing stringency of the Axis oil position continued to flow in. On 18 December the JIC stated that enemy stocks had fallen so low that the destruction of any one of the synthetic plants would give a valuable dividend while a crippling blow could be struck at his capacity to continue the war if and when Ploesti could be put out of action.

COS(42)489(0)
and COS(42)490

Finally, on 29 December, the Prime Minister himself called for a report by the Chiefs of Staff in the light of a Note by the Chairman of the Oil Control Board which stated that the opportunity had arisen to deal a smashing blow at

/the

WP(42)163
20.4.42

(1) On 20 April, 1942 and with the approval of the Prime Minister, arrangements for dealing with enemy oil questions were revised. It was decided that the JIC would draw up periodic reports on the enemy oil position for circulation to the COS. The technical information on which the reports were based would continue to be collated by a specialist body under Sir Harold Hartley, in future to be known as the "Technical Sub-committee on Axis Oil". The Secretary for Petroleum would remain responsible for the preparation of practical measures to deny to the enemy oil supplies in territories threatened by the enemy while M.E.W. would be responsible for advising on questions of policy affecting the denial of oil to the enemy. Finally, the Secretary of State for Dominion Affairs, as Deputy Chairman of the Defence Committee, would undertake the co-ordinating duties hitherto performed by Lord Hankey.

By these arrangements it became possible to discontinue the Hankey Committee on Preventing Oil from reaching Germany and the Lloyd Committee on the German Oil Position.

the enemy's fighting strength and urged that a review should be made of the operational position to see whether it had altered sufficiently to allow this to be done.

CCS(43)14(o)
11.1.43

After a detailed examination of the possibilities of an all-out attack on Axis oil and after taking into account the recent changes in the tactical and strategical situation with particular reference to Oboe and H2S which were just coming into operational use, the Air Staff eventually reached the conclusion that a decision to undertake any such air operations should be deferred until:

- (a) The land fighting in North Africa had finished and the whole of the Anglo/American heavy bomber resources there were available for a large scale attack on Floesti.
- (b) A full measure of experience with H2S and Oboe had been gained by Bomber Command and the accuracy obtainable and the technique to be employed with those devices had been established and proved.

These recommendations were circulated to the Chiefs of Staff on 11 January, 1943, and for further information on the oil controversy, reference must be made to Volume V of this Narrative.

(xii) Conclusions

As far as the bombing offensive against Germany was concerned, the four months October 1942 to January 1943, were, for Bomber Command, a period of marking time after the strenuous efforts of the summer and autumn of 1942 and the even more strenuous efforts which were to be made when the Anglo/American bomber force began its combined onslaught on German industry and morale in 1943.

During this time, much of the weight of the British bombing effort was diverted to the attack of Italy and the submarine bases on the west coast of France. Area bombing of the Biscay ports was undoubtedly a policy of desperation and it is doubtful whether even the Admiralty were fully convinced that it would achieve the desired results. The adoption of such a policy at a time when offensive planning was moving steadily towards an all-out air attack on German industrial economy and morale is a clear indication of the serious concern felt at all levels from the War Cabinet downwards at the rapid increase in enemy submarine warfare and the inability of the Allies to control it.

The offensive against Italy, although constituting a further diversion of the bombing effort, was less remarkable, subscribing as it did to the general trends of global strategy at that time. Moreover, Northern Italy provided useful alternative targets which could be attacked with a reasonable assurance of good weather when conditions over Germany were consistently unsuitable for large scale raids. Finally the success of the attacks on Italian targets provided a useful answer to any tendency to accuse Bomber Command of "slacking off" when opportunities for bombing Germany in any strength were few and far between.

Nevertheless, as far as the strategic offensive against Germany was concerned, this was not a time of material success apart from the increased discomfort suffered by the civilian population as a result of widespread though scattered bombardment.

/Weather

S E C R E T

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Weather was, of course and as always, the critical factor and, indeed, a comparison of the results achieved against Italy with those achieved against Germany was in itself a strong argument for the immediate provision of the promised radar aids to navigation and target finding which would enable the bomber force to overcome many of the limitations imposed on its activities by adverse conditions in the vital target areas. Thus the operational advent of Oboe and H2S at the end of the period marked the beginning of a new phase in bombing technique the effects of which will be clearly demonstrated by events to be described in the next Volume.

S E C R E T

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C H A P T E R 22

THE ROLE AND WORK OF NO.2 GROUP

(i) Introduction

There is often a marked tendency to regard No.2 Group as the "Cinderella" of Bomber Command. This is not entirely just. It is true that the tasks they were called upon to undertake were many and varied and the very small tonnage which could be dropped on important targets by the light bombers in comparison with Wellingtons or heavy aircraft rendered their bombing attacks less effective than those of the main force. But the effort of No.2 Group during 1942, although subsidiary was, as will be seen, in many respects complementary to that of the main force. As far as was possible within the limitations imposed by shortages of aircraft and a permanent commitment for Army Air Support, operations were designed to support the primary aims of strategic bombing policy at that time. To recapitulate, these were :

- (a) to destroy Germany's will and capacity to make war by area attack on large centres of industry and population
- (b) to assist the Russians by destruction of economic key-points, by reducing the G.A.F. and by containing German ground and air defences on the Western Front.

The part which No.2 Group was to play in these overall aims will be seen from subsequent Sections of this Chapter. During the first six months it was mainly confined to daylight Circus (1) and night Intruder operations, each in their way contributing to the aim at (b) above. As Mosquitos became operational they, too, added their contribution to the general effect of bombing attacks on German morale. With the elimination of the Blenheims in August, the Group passed to a new phase in which Circus operations and high and low level harassing attacks over the whole of Europe were their predominant activities.

By the Autumn of 1942, the time had at last come for the issue of new Directives, consolidating the "opportunist" instructions of the past months and laying down a more definite policy for the employment of the Group as a whole. During the autumn and winter, too, the part which it was called upon to play in supporting current strategic policy becomes more evident.

This Chapter, therefore, falls naturally into two main parts. The first describing the early opportunist policy and its implementation up to September, 1942: the second dealing with the new Directives for the employment of No.2 Group and its share in current strategy during the autumn and winter months. Except in specific cases, which will emerge, it is not proposed to describe individual operations in the detail accorded to those of the main force.

/(ii) Policy

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- (1) Fighter escorted raids with the primary intention of inducing the G.A.F. to combat.

S E C R E T

(ii) Policy for the Employment of No.2 Group

Until November, 1941, the primary role of the light bomber force had been the daylight attack of enemy shipping in co-operation with Coastal Command. The main effect of those attacks had been to force the enemy to provide strong flak and fighter defences for his ships with the result that the slow and unmanoeuvrable Blenheims could no longer sustain their offensive without prohibitive losses. In view of their increasingly heavy casualties and the recent Cabinet ruling on conservation of the Bomber Force, the C-in-C sought Air Ministry authority on 8 November, 1941, to terminate the Group's daylight anti-shipping offensive and to allow them to revert to a night offensive role until such time as the squadrons had re-equipped to a new type of aircraft. If this were agreed, he proposed that all the available effort of the Group should be employed primarily in low level attacks during the moon period on precise targets and, as a secondary role, in attacks on the enemy defence system in order to promote disorganisation and lessen the danger to the heavy and medium bombers of interception and destruction by German night fighters. In the non-moon periods, activities would be confined mainly to Circus and Ramrod (1) operations.

These proposals were accepted by the Air Ministry on 25 November, 1941, with the proviso that the secondary role should be extended to include occasional operations on the "intruder" principle against enemy night bomber aerodromes in Holland and an area east and south-east of Paris outside the existing range of Fighter Command Intruder operations. It was anticipated that four Blenheim squadrons would be re-equipped with Boston IIIs in the near future. While they would continue to fulfil the role previously undertaken by the Blenheims, the Command was requested to consider the practicability of their undertaking occasional daylight sorties against shipping with the object of forcing the enemy to maintain his existing considerable defences. Once squadrons had been re-equipped to Mosquitos, they would revert to a full daylight offensive, the primary object of which would be harassing attacks on built-up areas in Germany to such depth of penetration as experience proved feasible. Until such time as those aircraft became available in increasing numbers, however, their operations were to be strictly limited in order to conserve and build up strength. Finally, it was emphasized that No.2 Group still retained its responsibility for Army air support in the event of invasion and all squadrons must be trained in that role and participate from time to time in exercises with the Army. (2)

The new

- (1) Unlike Circus operations, the primary object of Ramrod operations was to destroy the target; Air battles between the fighter escort and the G.A.F. were only incidental.
- (2) In December 1941, No.2 Group's numerous Army support commitments included :
 - (a) Close support operations.
 - (b) Returning two squadrons to Northern Ireland on Alert No.1 or at the request of the War Office.
 - (c) Provision of two squadrons to reinforce Northern Ireland in the event of invasion.
 - (d) Returning two squadrons each for three weeks in every quarter for Army exercises.
 - (e) Providing over 50% of the total available effort for gas spraying.

At that time, No.2 Group's operational strength was so depleted that it was obvious that it would be unable to carry out the majority of its commitments and on 27 December, the C.I.G.S. was advised demi-officially that it would be unlikely to be in a position to meet them until after the Spring Offensive Season.

BC/S. 23746/2
Vol. II
94A

AMB/TIM/24113/619.
BC/S. 23746
Vol. III 73A

BC/S. 23746/2
Vol. II 107A

The new policy was summed up in a Directive to No. 2 Group on 30 November, 1941, as follows :

Primary Role : Night attacks during the moon period on precise targets in enemy and enemy occupied territory.

Secondary Role : (a) Night attacks on the enemy defence system.

(b) Intruder operations against enemy night bomber aerodromes in areas outside the range of Fighter Command Intruders.

Subsidiary Role: (a) Daylight Circus and Ramrod operations.

(b) Bostons to train for anti-shipping role by small scale daylight anti-shipping attacks when opportunity offered.

Army Support : All except No. 105 Squadron (re-equipping to Mosquitos) to train for and take part in Army exercises.

This policy was re-affirmed in the new Strategic Bombing Directive in February, 1942. Throughout the year, however, the extreme uncertainty surrounding the eventual expansion and re-equipment of No. 2 Group had its inevitable repercussions on bombing policy which, as will be seen, had to be amended as new types of aircraft became available and experience was gained in their operational ability.

Already in January, 1942 the Blenheims had gone over almost entirely to night intruder work against enemy bomber aerodromes. Hitherto this had been only a secondary role within the terms of the November 1941 Directive. By the end of that year, however, evidence of the enemy's increasing minelaying activity had suggested the advisability of concentrating the available Intruder effort against the aerodromes of Schipol, Soesterburg and Leeuwarden, then in use as German minelaying bases. Intruder operations against those targets were accordingly assigned to the Blenheims of No. 2 Group on 5 January 1942 as their primary task and one which they were to perform to the exclusion of almost everything else until the end of May.

By the beginning of March 1942, No. 2 Group had three Boston, one Mosquito and one Blenheim squadron of which the Mosquito and one Boston squadron was still non-operational. The ultimate role of the Mosquitos had already been broadly defined but the future of the Bostons was still undecided. The C-in-C envisaged their employment in daylight attacks on fringe targets, night Intruder operations and occasional raids on enemy reporting or supply vessels at sea. At the beginning of March, however, their activities were considerably restricted by lack of long range tanks and exhaust flame dampers which, respectively, reduced their range from 750 to 500 miles and made their employment at night nothing short of suicidal.

/This

BC/S. 23746/2
Vol. II 121A

Ibid
130A
24.2.42.

AHB/
UH/241/3/619.
BC/S. 23746/
Vol. III 136A

This was the situation, then, when on 13 March 1942 a new Air Ministry Directive was issued to Fighter Command (copy to Bomber Command) authorising the immediate resumption of Circus operations which, owing to the approach of winter and the Cabinet ruling on conservation, had been in abeyance since the autumn of the previous year. Even now Fighter Command was warned that, owing to the drain on fighter reserves, particularly overseas, there was still a great need to avoid heavy wastage as a result of operations such as were proposed in the Directive. They were to be conducted therefore so as to avoid high losses which should not normally be in excess of casualties inflicted on the enemy.

Much has already been said of the importance attached by the British and American Planners to assisting Russia by every means at their disposal, particularly in the crucial period after the launching of the German Spring Offensive in 1942, and of the part which the attack on the German Air Force was to play in that aim. By March, the reduction of the G.A.F. and particularly its fighter force was becoming a major issue, the more so as recent intelligence had indicated that German activity on several fronts simultaneously was placing a great strain on its resources already reduced by the British offensive in 1941.

The immediate outcome of this intelligence was the decision to resume Circus operations, the general policy being to send fighter escorted bombers to attack important objectives in enemy occupied territory with the double intention of causing damage to the target and of inducing the enemy fighters to accept combat with the British fighter escort. It was hoped that, in that way, not only would the Germans be forced to maintain their western air defences but that air battles would be precipitated under conditions favourable to Fighter Command and, at the same time, additional flying would be forced on the enemy thus increasing his normal wastage and fuel consumption. (1)

The decision to resume Circus operations undoubtedly solved the problem of the employment of the Bostons in No. 2 Group. Indeed they were the only suitable aircraft available

/for

(1) In theory, fighter escorted raids over enemy occupied territory were divided into several categories, each with its own code name thus :-

- Circus Operations designed to destroy the target and bring on an air battle.
- Ramrod Operations designed to destroy the target; air battles only incidental.
- Roadstead Bombing attacks on enemy shipping with fighter escort.

In practice, these fine distinctions tended to merge, as obviously in Circus operations it was necessary to attack and destroy important objectives in order to induce enemy fighters to accept combat while in Ramrod and Roadstead operations the importance of the target itself would force the enemy defences into action. For these reasons and because it is often very difficult to distinguish between them, all such fighter escorted operations have been included under the general heading Circus.

BC/S.23746/2
Vol.3 6A

for the task and on 17 March 1942, the C-in-C ruled that, thenceforward, Circus operations were to be regarded as their primary role and their training should be directed to that end. In addition they would from time to time be called upon to carry out daylight attacks on important enemy shipping within their radius of action. (1)

Thus by the end of March, practically the entire effort of No.2 Group was divided between night Intruder and daylight Circus operations. Indeed, with the Blenheims already obsolescent and nearing the end of their operational life in Bomber Command, the Group was already more than half way towards its reversion to the daylight role envisaged in the November, 1941 Directive.

COS(42)
21st(0)

Meanwhile, further attention was being given by the Chiefs of Staff to the question of the reduction of the G.A.F., as being the most immediate means at their disposal of assisting Russia to withstand the German offensive. On 8 April they invited the A.O.C.-in-C Fighter Command in consultation with the A.O.C.-in-C Bomber Command to prepare an appreciation under the following terms of reference :

"how to inflict by air action the greatest possible wastage of the German Air Force in the West immediately after the launching of the German Spring Offensive; to assess this wastage and to estimate the air situation resulting from it".

Something has already been said (2) of the conclusions reached by the two C's-in-C in their paper, but it is of sufficient importance as an indication of current opinion to warrant further examination here.

COS(42)
106(0)

Both their arguments and ultimate recommendations were based on the generally accepted view that, already, Germany was finding it difficult to increase or even to maintain the strength of her air forces in the face of operations on several different fronts at once. Losses sustained by German fighters on the Western and Mediterranean Fronts had been made good, it is true, but only at the expense of the Russian Front while the continued threat of invasion from this Country had forced the Germans to keep most of their F.W.190s (the best of their single engine day fighters at that time) in the west.

At an Air Ministry level it had been estimated that 200 German fighter casualties per month on the Western Front from all causes would result in a decline in strength while a further 50 casualties would necessitate a reinforcement of the West at the expense of single-engine fighters in Russia. To ensure the total fighter wastage of 250 aircraft per month as called for by the Air Ministry estimate, it would be necessary to inflict at least half of those losses in battle.

/Whether

(1) This extended from Cherbourg to Wilhelmshaven with the exception of the area Manston-Ostend-Dieppe-Beachy Head which was the responsibility of Fighter Command. In practice, No.2 Group were not called upon by Coastal Command for anti-shipping sweeps after May 1942, although they retained this commitment throughout the year. (See A.H.B. Narrative "R.A.F. in Maritime Warfare")

(2) Chapter 16 Section (X)

Whether this could be done by air action alone depended on enemy reactions. It was assumed that, taking everything into consideration, those would be as strong in 1942 as they had been in 1941. In order to provoke them to the utmost it would be advisable to strike at objectives the destruction of which would seriously embarrass them. Here a difficulty arose. Examination of the areas of enemy occupied territory within the radius of action of British fighters had shown there to be no targets vital to Germany's war effort as a whole. On the other hand, experience in 1941 and during March 1942, had shown that even so he was quick to react to a threat to those targets.

After a detailed examination of the available British Fighter and Bomber effort, and the reserves and replacements which would be required, the C-in-C recommended that, among others, (1) the following courses of action should be adopted:

- (a) Continuous intensified Circus and other operations on the lines of those carried out the previous year, of which an average of six sorties per day with a maximum of 30/36 sorties on any given day should be allotted to Circus operations.
- (b) Sporadic attacks by Mosquitos against targets in Germany in order to contain enemy fighters and force them to carry out a certain amount of ineffective flying.

In general it was concluded that, if offensive operations were carried out on the scale suggested, at least 125 fighter battle casualties would be inflicted on the Germans per month, forcing them either to re-inforce the west at the expense of the Russian Front or else to accept such fighter inferiority as would enable Bomber Command to press home their attacks in daylight.

These recommendations were discussed by the Chiefs of Staff on 21st April. The two main views expressed were (a) that the C-in-C Fighter Command had been over optimistic in his assumption that enemy reactions to Circus operations would be as strong as in 1941 and that more aggressive tactics might prove necessary and (b) that the effort being called for from Bomber Command was rather small and might have to be increased. In general, the advisability of keeping the enemy guessing as to British intentions was accepted and it was agreed to continue operations on their existing scale until after the German Spring Offensive had begun, when they should be increased.

/Thus

- (1) Although not strictly within the scope of their Paper, the C-in-C suggested that further wastage of German fighters might be effected by decoys in the form of assemblies of landing craft and troop concentrations on the South Coast which, giving the appearance of impending invasion, might attract air action on terms favourable to British fighters. They also recommended that increased sabotage by Resistance Groups in Occupied territories should be encouraged to further the same end.

Thus between March and May 1942 the No.2 Group effort was divided between night Intruder and daylight Circus activities with a bias towards the latter. By the end of May, however, three new factors had emerged which involved an extension of existing policy.

On 30/31 May, the Command launched its first thousand bomber attack on Cologne and the Blenheims of No.2 Group together with aircraft of Army Co-operation and Fighter Command were employed in direct support of the main force, carrying out Intruder operations against enemy night fighter aerodromes with the intention of holding down night fighters throughout the period of the raid. This procedure was repeated on the two subsequent thousand raids in June and, at the same time, the advisability of directing future Intruder activity of the Bomber and Fighter Commands towards enemy night fighter as opposed to bomber aerodromes in direct support of main force operations was discussed between the respective Staffs. The A.O.C., No.2 Group, in particular, was anxious to take advantage of the longer range of the Blenheims to attack night fighter aerodromes outside the range of Fighter Command activities. Agreement was eventually reached and on 1 July, No.2 Group was officially informed that, in future, Fighter and Bomber Intruder operations would be co-ordinated so as to make full use of the range of the Blenheims and that routes flown by the main bomber force would be taken into account when selecting targets for Intruder aircraft. From June until the Blenheims flew their last operational sortie on 17/18 August, all Intruder activities were planned in accordance with that policy.

In the meantime, Mosquitos of No.105 Squadron had operated for the first time on 31 May, when single aircraft carried out armed reconnaissance of Cologne as a follow-up to the thousand raid the previous night.

The ultimate role of Mosquitos in Bomber Command as laid down by the November 1941 Directive, was to be high level daylight harassing attacks against major built-up areas in Germany. Until they became available in increasing numbers and their resources were sufficient to meet a reasonable scale of wastage, they were to be strictly conserved in order to build up their strength.

By May 1942 No.105 Squadron had only seven aircraft with crews and had been non-operational for six months. The supply situation was then such that there seemed little prospect of Mosquitos coming forward in sufficient numbers to enable them to operate in any force before the next winter. Under the circumstances, the C-in-C decided on 6 May to agree to a proposal from the A.O.C., No.2 Group that, once the existing aircraft had been suitably modified, they should be allowed to undertake high level harassing attacks on large targets in Germany, preferably as follow-ups to main force raids. In addition, (1) two aircraft were to be fitted with special camera installations to enable them to carry out damage reconnaissance missions when required by Command Headquarters. Such sorties would be combined with bombing whenever possible. He ruled, however, that for the time being, low level attacks should not be made.

/During

(1) Two Mosquitos were also standing by for meteorological flights.

BC/S.23746/2
Vol.3.
37A.

Ibid. 55A

BC/S.23746/2
Vol.3
23A and 29A

Ibid
46A

During June and the early part of July, Mosquito activities were mainly confined to armed reconnaissance missions but on 23 June the A.O.C. again raised the question of low altitude work on the grounds that :-

- (a) There would be more chance of completing an operation successfully without being foiled by weather.
- (b) There would be far more chance of hitting a specific target and doing material damage.
- (c) There was a negligible risk of damage by enemy fighters while the danger from flak would not be very serious owing to the high speed of the aircraft and providing attacks were kept really low.
- (d) Crews were all in favour of low altitude work as being safer and more exciting.

Ibid
57A

These proposals were officially accepted on 4th July, subject to attacks being on a small scale and the need for strict conservation of crews and aircraft borne in mind.

AHB/TIH/2A1/3/522 (B) Meanwhile, Circus operations which had been in full swing since March were beginning to slacken off. By June, Fighter Command was forced to admit that, while their day offensive operations over enemy occupied territory had succeeded in holding down a considerable enemy fighter force on the Western Front which was absorbing the output of the most modern fighter types, the balance of casualties was turning against the British fighter. Analysis had shown that this unfavourable position was primarily due to the superiority of the F.W. 190, a situation which could not be restored until the Typhoon and Spitfire IX and VIII had proved themselves and were in use in adequate numbers.

AHB/6
Translations
No. VII/VIII

An interesting sidelight on this situation is contained in a review of Anglo/American Air Operations against the Reich and Western Europe from 1942 to 1944 prepared by the German Air Historical Branch and dated 6 October, 1944. It is evident from this document that the Germans assumed that the main object of Allied fighter operations in 1942 was to push the German fighter force back deep into Central France and, by means of operations by strong fighter formations against Belgium and Northern France, to entice the German fighters into battle with the aim of gaining tactical superiority and then dealing a crushing blow to the forces operating from the Coastal areas. According to their historical review, the G.A.F. at that time (i.e. in 1942) had at its disposal in Belgium, Northern France and Brittany, two fighter Geschwader whose ground organisation lay in the coastal areas. It is stated that their operations against the numerous Allied fighter sorties proved "somewhat ineffective" because, owing to the proximity of their airfields to the coast, the German fighters were flying at insufficient altitudes when contact was established and consequently had to fight from an inferior position. They suffered "heavy losses" and, as a result, the German High Command decided not to oppose purely fighter sorties in future but to employ their limited resources only against Allied bombers. However, if the statements in their review are to be believed, even this type of operation resulted in "great losses" owing to the strong escorts which formed an 'umbrella' over the attacking bombers and eventually the G.A.F. was forced to move its forward airfields further inland. This in turn made effective interception in the coastal areas impossible owing to the distance between the new bases and the coastline.

In view of the C-in-C Fighter Command's statement above that, by the middle of 1942, the balance of casualties was turning against his fighter forces, the foregoing is of considerable interest. It is evident from the tone of the review as a whole, however, that the German Air Historical Branch was attempting to excuse the failure of the G.A.F. to maintain air superiority and its comments on the difficulties experienced by their fighters must be accepted with some reserve. Nevertheless, the document substantially supports the British contention that the air offensive over Occupied Europe would seriously embarrass the German High Command by inflicting heavy losses and containing German fighters in the West. On the other hand, it is equally evident that, up to the end of 1942, they had failed in the second half of their aim which was to force the enemy to withdraw fighters from the Russian front in order to maintain or augment his Western Air Defences. This latter point emerges from a statement in the German Review that in the early part of 1943, the German Fighter Force in the West had "not yet" been reinforced but that its operational strength was reduced by losses and by the employment of young and inexperienced crews.

AHS/IIH/241/3
 EC/S.23767
 Vol. 2.
 31A

Meanwhile, in June 1942, Fighter Command, in accordance with the provisions of the Circus Directive, were preparing to draw in their horns and adjust operational policy to conform with the technical superiority enjoyed by the enemy. Without weakening the pressure to the point where the Germans would be able to reduce their defences, it was decided to restrict day offensive operations so as to avoid unnecessary risk and wastage. As far as Circus and other bomber escort duties were concerned, these were in future to be planned to avoid deep penetration except when the target to be attacked justified an adverse balance in casualties among the fighter forces involved.

The immediate result of these discussions was that the Boston squadrons of No.2 Group, for whom Circus operations were a primary commitment, were left only partially employed. During May, these operations had been restricted by bad weather and there now seemed little prospect of any increase in effort. As a result crews were becoming restive and on 21 June 1942 the A.O.C., No.2 Group urged the C-in-C to authorise his Boston squadrons to carry out low level attacks unescorted, against, in the first instance, eight major power stations in occupied territory and thereafter against suitable fringe targets. Although the C-in-C indicated his approval verbally to the A.O.C., it was not officially confirmed until 9 August when authority was given for Bostons to make low level attacks on any targets in the current Circus lists or contained in the recently approved list of objectives for Mosquito operations.

EC/S.23746/2
 Vol. 3.
 42A

Ibid
 78A and 84A

Thus by the beginning of August, Bostons and Mosquitos of No.2 Group were already fully established in their daylight roles and although, with the elimination of the Blenheim in the middle of the month, night Intruder work remained a secondary commitment, in practice the Group immediately reverted to a full daylight offensive.

Clearly the time was now ripe for a new Directive consolidating and bringing up to date the various instructions issued during the past six months and laying down a definite line of action for the whole of No.2 Group as a cogent force.

/Since

Since the beginning of the year, the employment of its squadrons had been dictated more by immediate expediency than by the provisions of the Air Ministry Directive of November, 1941. Although not yet officially cancelled, this was now virtually obsolete. By mid-summer 1942, a pattern had begun to emerge from the earlier obscurities engendered by shortage of aircraft and uncertainties as to the ultimate equipment of the Group. For a time, at least, the equipment position was to remain fairly stable with Bostons and Mosquitos already operational and Venturas and Mitchells due to make their debuts in November and January respectively.

New Directives for the employment of Bostons and Mosquitos, Venturas and Mitchells were in fact issued by Bomber Command in September and October respectively and will be examined in due course. It is now proposed to describe briefly the course of No.2 Group operations and the implementation of the policy already discussed during the seven months March to September, 1942.

(iii) Review of Operations (March to September, 1942)

The seven months March to September which are about to be reviewed may, for convenience, be split into two parts, namely: March to May during which the Group's main activities were divided between night Intruder and daylight Circus operations and June to August when Circus operations began to decrease and Bostons and Mosquitos began the unescorted daylight operations over Germany and Occupied Territory which were to become the main feature of the next period.

Between March and May 1942 practically the entire effort of No.2 Group was divided between Blenheim night Intruder operations against the aerodromes at Soesterburg, Schipol and Leeuwarden and daylight Circus operations by Bostons in co-operation with Fighter Command. Bostons also flew some 43 sorties on Air Sea Rescue Work and carried out five shipping sweeps without result. On 8/9 March, Blenheims made a high level attack on the docks at Ostend, one aircraft claiming hits on the submarine slipway and three claiming to have bombed the docks, but in each instance results were not observed. Towards the end of April a second Blenheim squadron became operational and carried out two high level attacks on the docks at Dunkirk and the Power Station at Langebrugge. Once again results were not observed but from crew reports and photographs taken with bombing it appears probable that in each instance some bombs were dropped on the targets. These were the only occasions between March and May when Blenheims departed from their normal role of Intruder work.

High lights of this phase were the low level attack by Bostons on the Ford Matford Works at Poissy on 8 March and Circus operations against targets near Calais, Rouen and Cherbourg on 17 April as diversions to the daylight attack by main force Lancasters on the M.A.N. Works at Augsburg.

The low level attack on the Ford Works at Poissy (forerunner of the many low level operations later to be carried out by Bostons) was made by 12 Bostons of which 8 reached and bombed their target dropping 7.2 tons of bombs. Hit were scored on the factory and a long line

/of lorries

AHB/II/39/1/3(a)
ORS/BC Night
Raid Report
No.22

Ibid
Nos.54 and 56

AHB/II/39/1/4(a)
ORS/BC
Day Operations
Final Report
No.16

of lorries and it was evident that, for the size of the operation, it was extremely successful. Fighter cover was to have been given over the return route but did not make contact with the bombers. Two diversionary Circus raids were made at the same time by 12 Bostons on the Marshalling Yards at Abbeville and the Comines Power Station. One aircraft was missing over Poissy.

A new feature was introduced into Intruder operations by the thousand bomber raids on 30/31 May, and 1/2 and 25/26 June. On each occasion Blenheims co-operating with Fighter Command carried out Intruder sorties against enemy night fighter aerodromes in direct support of the main force. On the 25/26 June and twice subsequently, the Blenheim effort was supplemented by Bostons. Thereafter, operations in support of the main force raids became a normal feature of Blenheim Intruder attacks until they flew their last sortie on 17/18 August. Thereafter, although Intruder operations remained a commitment of No.2 Group, actually Intruders of Fighter Command assumed sole responsibility for this type of operation.

In the meantime, Mosquitos of No.105 Squadron had carried out their first tentative operational sorties on 31 May, when five aircraft operating singly made a high level armed reconnaissance of Cologne after the thousand raid on that target. During June they continued to fulfil the same function over major German targets until, on 4 July, they received authority to carry out occasional low level attacks on precise objectives. The approved list of targets included, on first priority, the major German Submarine Building Yards and their associated industries and on second priority, other industrial objectives including oil targets, ball bearing factories, aero engine and armament works and a number of railway yards. Subsequently (30 August) it was decided that, in order not to compromise possible future operations against certain classes of targets and until the objectives allotted to the Americans had been clarified, Mosquitos should not attack Power Stations or aircraft factories in Germany. Their primary aim should be harassing attacks at high level against German industrial morale. This of course was in complete accordance with the Air Ministry ruling on the ultimate employment of Mosquitos. The intention was three-fold. Apart from the effect of such sporadic raids over a wide area on German morale as a whole, they would further reduce industrial output by exploiting the current German A.R.P. regulations (1) and, if carried out after a main force attack the previous night, would impede the work of German fire-fighting and other services. In the meantime, all Groups had been authorised to undertake daylight harassing attacks under cover of cloud. Between July and September, therefore, Mosquitos of No.2 Group were engaged on four types of operation :

- (a) High level attacks on German industrial morale.
- (b) Cloud cover operations.
- (c) Low level attacks on precise objectives
- (d) Weather reconnaissance Flights.

/Between

(1) See Chapter 18 Section (vi).

EC/S.23746/2
Vol.3.
84A

Ibid.
90A.

AHB/II/39/1/4(a)
ORS/BC
Day operations
final Report
No. 90.

Between July and September, the majority of their operations were high level or cloud cover sorties by single aircraft over the major German industrial areas. Of these, an attack by three out of six Mosquitos in the neighbourhood of Berlin on 19 September is notable as the first attempt to bomb that target since 7/8 November 1941.

Mosquitos also carried out a number of low level attacks during this period, the more spectacular being on 2 July against the submarine building yards at Flensburg and on 25 September against the Gestapo Headquarters at Oslo.

Ibid
No. 52.

The Flensburg raid was carried out by five Mosquitos flying in formation at sea level of which four attacked from 50/100 ft. Although incendiaries and high explosives fell in the target area, it is doubtful if the primary target suffered much damage but the town gasworks was badly damaged. Two aircraft were lost on this the first low level attack from which many useful lessons were learnt. A repeat raid was made on this target nine days later as a diversion to the attack on Danzig by 44 Lancasters of No. 5 Group.

The raid on Oslo on 25 September was much more spectacular. Intelligence had been received that a rally of Quislings and Hirdmen (Fascists) would take place on that and the two following days in celebration of the second anniversary of Quisling's succession to power. Strong representations were made to the Secretary of State by the Ministry of Economic Warfare that a daylight attack directed at the Gestapo or Hirdman Headquarters on any one of those three days but preferably the first would make a strong impression and "greatly encourage all loyal Norwegians in their struggle against Hitlerism". A Directive to this effect was received from Air Ministry on 15 September with strict instructions that no bombs were to be dropped on the Royal Palace a quarter of a mile to the north of the target.

AHB/IIH/24/3/663
BC/S. 23746
78A

AHB/II/39/1/4(a)
ORS/BC
Day Operations
Final Report
No. 92.

Four Mosquitos were detailed for the task and, although harassed by enemy fighters in the target area, three succeeded in bombing the Gestapo Headquarters from between 50 and 100 ft. The fourth aircraft came down in the Fjord with its engine on fire. Although P.R.U. photographs indicated that buildings on the opposite side of the road had suffered more severely than the actual target, this attack was remarkable as evidence of what could be done by low level precision bombing. Ground sources reported the encouragement given to the Norwegians by this attack and stated that it was the main subject of conversation in Stockholm next day.

AHB/IIH/84
A.M.W.R.
Manual of B.C.
Operations
1942.

Meanwhile, Bostons had also started low level bombing of targets in Occupied Territory. Reference has already been made to their first operation of that nature on 19 July when 20 Bostons flying in pairs attacked ten power stations in the Lille area. Between July and September they carried out a number of other low level or cloud cover raids, mainly against power stations although their primary commitment remained Circus operations in co-operation with Fighter Command. During May those had been severely curtailed by weather and after the Fighter Command "conservation" decision in June, Circuses were strictly limited throughout the remainder of the year although they took on a new lease of life in January, 1943 as will be seen later.

/Noto

AHS/II/39/1/4(a)

ORS/EO
 Day Operations
 Final Report
 No. 88

Note must be made of one such very successful effort by the Bostons on 15 September. On that date, 12 Bostons with fighter escort set out to attack the enemy whale oil ship Solglint at Cherbourg. Photographs taken with bombing and subsequently, showed that the ship had been very severely damaged. Most of her port side and part of her starboard side had been demolished to the waterline and she appeared to have been gutted by fire and to have settled down on the bottom of the basin.

Throughout this period, Bostons still retained their commitment for Army support of which something will be said in the next Section in particular relation to their major effort during 1942 in connection with the Combined Operation on Dieppe in August.

(iv) Combined Operations - The Dieppe Raid. (1)

Plans for a combined operation in the Dieppe area (code name Rutter) had been under discussion since early April. The two main purposes of the proposed raid were first to test the German defences at a point on the French coast within an area in which fighter cover could be provided by the R.A.F. and so gain practical experience on which to base future operations; and second to "lure as many German aircraft into the sky as possible". In other words, Rutter was to be a dress rehearsal for Sledgehammer and Roundup while by bringing on air battles under conditions favourable to British fighters it was hoped to inflict heavy wastage on the German Air Force, at the same time contributing to the general aim of pinning down the enemy's ground and air defences on the Western Front and affording some relief to the hard-pressed Russians.

An Outline Plan for operation Rutter had been approved by the Chiefs of Staff Committee on 13 May as a basis for detailed planning by the Force Commanders. It was to undergo considerable changes before Rutter was subsequently cancelled and the plan reissued under the code name Jubilee. In its initial form, the plan required that Dieppe be seized and held for a limited period by means of a frontal assault supported and preceded by two flank attacks and airborne landings. Full air support was obviously an essential and the air plan included a high level bombing attack on the docks area and the aerodrome in order to disorganise the defences, tire the garrison and inflict material damage on the aerodrome installations and aircraft. In addition, two squadrons of Blenheims from Bomber Command (followed by Hurricane bombers) were required to attack the beach defences from low level immediately prior to the main assault in order to cause a disturbance and keep the enemy's head down during the approach.

/This

- (1) For an extremely full account of this raid see the official Report contained in C.B. 04244 with particular reference to the Air Force Commanders Report at Annex 7.

C.B. 04244
 Para. 20

Ibid paras. 24
 and EG/S. 26864

74
 AHS/IIH/291/3/560
 end. 7A.

AHB/IIH/241/3/560
BC/S.26864
4A (Draft)
11.5.42.

This task was extremely unwelcome to Bomber Command who regarded a low level attack on an area defended by light flak and fighters in daylight without fighter escort or at night nothing short of suicidal and, under such conditions, unlikely to be effective. In a very strongly worded protest to the Chief of Combined Operations - a protest amounting almost to a direct refusal to jeopardise his aircraft in this way - the C.-in-C. Bomber Command pointed out that he had only two Blenheim squadrons available with little or no reserves and that to carry out such a task under those conditions would mean their virtual elimination at least until the autumn. This he was not prepared to accept. In the face of these arguments and with no guarantee that the attacks would be either accurate or effective but only very costly in aircraft, it was agreed to delete the Blenheims from this part of the plan.

Ibid 6A
13.5.42.

Ibid 9A
14.5.42.

C.B.04244
Para.21.

Nor was there any real certainty as to the advisability of carrying out the high level night attack on the docks. Existing bombardment instruction forbade the attack of targets in Occupied France except under good conditions when the military objectives could be positively identified and bombed with a reasonable degree of accuracy. This restriction had caused a considerable amount of inconvenience during the St. Nazaire raid in March 1942. On that occasion, although the bombers had arrived over their target and aroused the defences, they were unable to carry out the diversionary attack on the docks area which was an important part of the plan owing to low cloud which prevented them from seeing and bombing their objective. Similar conditions might occur on the Dieppe raid.

Ibid Para.21.

para; 359 and
BC/S.26864 4A
Draft AHB/IIH/241/3/560

Although the Prime Minister's authority for a relaxation of this restriction in regard to coastal raids was sought and obtained, there was still the danger that a night attack might jeopardise surprise on two counts; in the first place the attack would have to take place some time before the assault in order to let the bombers get away before daybreak which might lessen the effects of the disorganisation resulting from the raid and serve only to place the defences on the alert; secondly, to be effective, the weight of attack would need to be much greater than was customary against such targets from which the enemy might deduce that it was a prelude to invasion. Moreover, neither the C.-in-C. Bomber Command nor the Air Force Leader for Rutter were prepared to guarantee any degree of accuracy or any prospects of inflicting real damage on the defences or the row of houses on the sea front from which fire could be directed at the attacking forces. Indeed, the Military Commander foresaw that widespread damage caused by indiscriminate bombing might serve only to impede the passage of the tanks through streets choked with debris. Under these circumstances, it was agreed at a Meeting of the Combined Operations Executive and the three Force Commanders on 5 June 1942, to accept the recommendation of the Air Force Commander to delete the high level night attack on Dieppe from the plan and instead to have small diversionary raids against Boulogne, and the aerodromes at Crecy and Abbeville.

C.B.04244
para 27.

AHB/IIH/241/3/560
BC/S.26864
Min.22.

Bomber Command's commitments for Rutter were thus reduced to diversionary raids during the night preceding the assault; small Circuses by Bostons in conjunction with Fighter Command against enemy batteries and other targets in close support of the army; and paratroop

/dropping

dropping by Nos. 12 and 142 Wellington squadrons of 1 Group. (1)

O.B. 04244
paras. 33 - 37

But Rutter was destined never to take place. It had been decided that the earliest suitable date for the operation was 21 June but weather and other considerations necessitated a postponement and, finally, on 7 July with no prospect of an improvement in the weather it was decided to cancel the operation and disperse the forces which had been assembled in the Isle of Wight.

Ibid
paras. 38 - 40

One week later the Combined Operations Planners began to consider remounting Rutter in a modified form. This time D-Day was to be the first day between 18 and 23 August inclusive on which weather conditions were suitable. The new plan was issued on 27 July under the code name Jubilee. The main modifications affecting Bomber Command were the substitution of commandos for paratroops which released Nos. 12 and 142 squadrons from their parachute-dropping commitment and the inclusion of smoke-laying aircraft.

A.H.B./ID/12/37

It was intended that the Assault should begin at first light of dawn and that the whole force should be withdrawn for re-embarkation about 1000 hours. Military tasks during the period of occupation included the destruction of local defences, power stations, dock and aerodrome installations and the capture of prisoners and enemy secret documents. It was also hoped to capture and remove for British use the invasion barges and other craft reported to be present in the harbour.

Ibid and
C.B. 04244
para; 963(iv)

Air support for Jubilee under the command of Air Marshal Sir Trafford Leigh Mallory, C-in-C. Fighter Command, included a strong fighter 'umbrella' for the whole expedition together with close support bombing and smoke laying to neutralise the enemy defences. It was agreed between the Force Commanders that there should be no diversionary or preliminary bombing during the night so as not to jeopardise surprise although a diversionary raid on the aerodrome at Abbeville - Druvat should be made during the withdrawal. (2) Bomber Command's commitment was therefore limited to the three Boston squadrons of No. 2 Group operating from advance bases under the control of Fighter Command. Tasks were divided between bombing attacks on enemy batteries, troop movements and other targets as required by the Army and smoke-laying missions in conjunction with Blenheims of Army Co-operation Command. The latter task was allotted to No. 226 squadron supplemented by two aircraft from each of the other two Boston squadrons. These aircraft moved to their advance base at Thrupton on 15 August. Nos. 88 and 107 squadrons, detailed for bombing missions, were moved to R.A.F. Station Ford the following day.

A.H.B./I.H./241/3/560
BC/S. 26864
57B and
IIM/B2/2A
Appendix
B. 2049

OB. 04244
paras. 46/47.

On 17 August, despite somewhat indifferent weather, it was decided to mount Jubilee two days later on the morning of 19 August. At a final meeting between the Force Commanders and the Chief of Combined Operations on the same day the question of night bombing was again raised but the

/Military

A.H.B./I.H./241/3/560
BC/S. 26864
10A-11A.

- (1) These squadrons were withdrawn from operations and despatched to Army Co-operation Command for training between 7 June and 8 July 1942.
- (2) A very successful attack was made by U.S.A.A.F. Fortresses to whom this task was given.

Military Commander maintained his view that since inaccuracy rather than accuracy had been promised, the destruction which would result would make the passage of the tanks through Dieppe very difficult if not impossible. Under these circumstances, the decision not to have any preliminary bombardment was upheld.

Ibid
Passim and
BG/S.26864
57B and 60B
AHS/TH/
24/3/560

The following night (18/19 August) the expedition sailed from the area of Portsmouth Command in a series of Groups and in the early hours of the morning of the 19 August, the first landing craft nosed their way to the beaches. The main landings were timed to begin at 0520 hours and were preceded by bombing attacks on selected battery positions by Bostons of No.2 Group. It had been expected that the batteries would have opened fire immediately the flank landings began at 0450 hours and that the Bostons would be guided to their targets by the gun flashes. Unfortunately, the guns were very slow in getting into action and when the initial attacks were made in the half-light of dawn by aircraft of No.88 squadron, the silent batteries proved very hard to find. At 0509 hours the smoke laying aircraft prepared to screen the main assault from the two batteries to the east of the harbour entrance. This was most effective, the smoke from the bombs covering the eastern headland from 0510 to 0600 hours during which time the troops had some respite from those guns.

Ibid
60B

Throughout the morning and early afternoon Bostons of No.2 Group continued their bombing and smoke-laying missions in response to repeated requests from the Army. In all they flew 89 sorties, 62 on bombing and 27 on smoke-laying. The latter task, which was extremely successful, was divided into four missions; the first providing cover for the assault, the second and third covering the withdrawal to the beaches at mid-morning and the fourth providing a protective screen as the naval forces cleared the enemy coast line.

Ibid
60B

In his official report on the air side of operation Jubilee, Air Marshal Leigh Mallory stated that the bombing attacks on the batteries were virtually useless. It had also been intended to employ the bombers on small circuits against enemy reinforcements on the Dieppe-Rouen road as and when required by the Army but no such movements were sighted. Insistent demands were however made for attacks on the batteries a task for which, said the Air Force Commander, the Bostons proved "quite ineffective" although in the circumstances it was the only one for which they could be used. As against this, however, it must be remembered that the guns presented small targets which, in the haze in which the battle was being fought, were extremely difficult to find.

C.
A.B.04244

Nevertheless from the official Report on Jubilee prepared by Combined Operations Headquarters it is evident that from the air point of view the operation was considered to have been a "striking" success. Enemy air reactions had been very much as anticipated. In the early hours of Jubilee his effort was confined entirely to fighters patrolling the area in small numbers, between 25/30 aircraft in each sortie. As the morning wore on, the strength of his sorties increased to between 50/100 aircraft but it was not until 1000 hours, some six hours after the initial assault that British Patrols encountered the first German bombers. As the day wore on the numbers increased until eventually all the German Fighter Force between Flushing and Beaumont-le-Roger and all the bombers based in Holland, Belgium and France were in action. On the other hand, although heavy losses were

/believed

believed to have been inflicted on the German Air Force it was concluded that Jubilee was not of sufficient duration to deplete it to the point where it could not make good its losses by drawing on its reserves. Had the occupation of Dieppe continued for a longer period, it was thought that the enemy's air defences would have been severely strained.

Ibid
para. 318

AHB/6
Translations
G.B. 04244 para. 323
and BC/S. 2686
Encl. 57B (Copy)
AHS/IIH/2413/560

From the post war standpoint, it is apparent that there was undue optimism as to the extent of the wastage inflicted on the G.A.F. during this engagement. It was officially accepted that 91 aircraft had been shot down, 44 probably destroyed and a further 151 damaged. Reports subsequently received from France stated that the Germans themselves admitted to losing 170 aircraft. But none of this is confirmed by German documents so far translated. The latest available figures from this source are taken from the General Quartermaster's Department of the German Air Ministry. These show German losses in the Dieppe raid as 48 (23 fighters, 25 bombers) destroyed and 24 (8 fighters and 16 bombers) damaged. As against this the R.A.F. lost 106 aircraft of which 88 were fighters. No. 2 Group casualties included three aircraft missing, and a further 18 damaged. Crew casualties included ten missing (two picked up) one air gunner killed and one wounded. A passenger on one of the Bostons was also killed.

AHB/IIH/2413/511
BC/S. 2816

Nevertheless, Jubilee had proved that the German Air Force could be provoked into throwing all its available resources into the air by a coastal raid on that scale. The general satisfaction felt at that time with the air results of Jubilee led to the preparation in October of plans for a second operation (code name Aflame) in the form of a naval and air demonstration off the French coast north of the Somme to deceive the enemy into believing that a second "Dieppe" was intended and thereby bringing about an air battle on a large scale. No troops were to be landed. This time Bomber Command's commitment was to be extended to include sixty night bombing sorties in addition to smoke-laying by No. 2 Group. The demonstration was to have taken place on the most suitable date between 4 and 9 October but unfortunately weather forced a cancellation. Preparations for a further attempt at a demonstration early in November, this time in the area Fecamp to St. Valery-en-Caux, failed to pass the Chiefs of Staff Committee and were abandoned.

AHB/IIH/2413/508
BC/S. 28328
passim

These were only a few of the many occasions when No. 2 Group were asked to co-operate in Combined Operations which were subsequently cancelled. Mention must be made, however, of one other occasion on which the Group actually operated in support of such a plan.

AHB/IIH/2413/500
BC/S. 2471
passim

On 27 June, a signal was received from the Air Ministry requesting bombing attacks on the Norwegian coast on 29/30 June in co-operation with the Navy who were staging a demonstration in the Shetlands area to divert enemy attention from an important convoy leaving the Scottish coast for a Russian Port.

Ibid

Owing to the northern latitudes through which it must pass, the convoy would be without cover from darkness and it was expected that substantial air opposition would be encountered. The Navy were accordingly assembling in a Northern Port a second convoy composed of old merchant
/ships

ships etc. which was to act as a diversion to the main convoy and lead the enemy to suppose a landing was contemplated on the coast of Norway. This operation was to take place on 29/30 June under the code-name ES.

It was planned that Blenheims of No.2 Group should co-operate with a diversionary raid on the aerodrome of Herdla from low level and on 29/30 June, 12 aircraft of No.114 Squadron took off from their advance base at Lossiemouth. Unfortunately, although the Norwegian coast was twice crossed in an unsuccessful attempt to locate the target, lack of suitable cloud cover compelled the force to abandon task without dropping its bombs.

(v) The Employment of No.2 Group: Further decisions.

By the autumn of 1942, the earlier uncertainties as to the eventual equipment of No.2 Group had been, temporarily at least, resolved and, with Bostons and Mosquitos firmly established in their daylight roles and Venturas and Mitchells already on their way, the C-in-C decided to simplify the problem of target selection by issuing new Directives consolidating the various earlier instructions and laying down a definite policy for the employment of the various types of aircraft in the Group whether already operational or in prospect.

Under the new Directives Bostons (and Mitchells when they arrived) were to continue to regard Circus operations as their primary role. Secondary commitments would be; Intruder operations against enemy night fighter aerodromes in support of the main force together with attacks on trains when areas allotted for intruders operations lay within occupied France; and low level daylight attacks on goods trains or objectives contained in the current Circus lists. In addition, in common with Venturas, they would be called upon from time to time for attacks on enemy shipping and would retain their commitment for Army support operations.

The primary role of Mosquito aircraft was now finally determined in accordance with the Air Ministry Directive of the previous year. This was to be harassing attacks on industrial areas in Germany which were to be focussed on the morale of the German population and particularly the industrial workers. For this reason, targets selected for such high level operations had been chosen for their geographical position and relation to built-up areas rather than for their specific industrial importance. As their secondary role, however, Mosquitos were authorised to carry out attacks against a number of specially selected industrial targets which were arranged in three groups: those suitable for attack by six or more aircraft, those suitable for less than six aircraft and, finally, a number of transportation targets in Germany specially selected as suitable for low level attacks by small formations of Mosquitos. In addition, they were to carry out armed photographic reconnaissance or meteorological reconnaissances as and when required by Command Headquarters.

The role of the new Venturas, described by the A.O.C. No.2 Group as "slow steady and unmanoeuvrable aircraft" was in one sense much more circumscribed and in another covered a far wider field than any of the other types in the Group. Its primary role was to be intruder operations and attacks on trains as defined in the directions for Bostons; its secondary role the night attack of selected targets in North West Germany. From time to time, however, it was liable to be called upon for any of the following tasks:

/(a) Army

Ibid and
A.H.B./
IIM/B2/2
2 Group CRB.
1940

BC/S.23746/2
Vol.4.
1A and 15A

Ibid.

Ibid

Ibid

- (a) Army Air Support
- (b) Circus and Ramrod
- (c) Low level attacks on land targets in enemy occupied territory under cloud cover.
- (d) Enemy shipping.
- (e) As a transport aircraft or for carrying paratroops.

This was the situation then when, in October, 1942, the Command began what may be termed its winter campaign. A glance at the above roles will suffice to show how closely No.2 Group was allied to the primary tasks of the main bomber force in 1942. Its primary offensive against German industry and morale was to be maintained and intensified by Mosquito operations against populated areas and precise industrial targets; moreover such operations over a wide area would assist in spreading and containing the enemy's ground defences which, in conjunction with Circus operations designed to reduce the G.A.F., all contributed to the general aim of assisting the Russians.

In the following Sections it will be seen how, in the remaining four months described in this Chapter, No.2 Group operations were linked even more closely with the specific campaigns in which the main bomber force was engaged.

(vi) Support of Operation Torch

In October, 1942, the American and British Staffs were fully employed in last minute preparations for their joint landing in North West Africa in November. In order to give them every possible assistance and to leave nothing undone which would help to secure the success of this, the first major undertaking by the Allies, the Prime Minister ruled that, among other plans which have already been discussed in so far as they affected the main bomber force, large scale diversions should be undertaken during the opening period of Torch with the object of containing German Air Forces away from the Torch area. To the achievement of this aim the Commanding General, Eighth Air Force had promised full co-operation.

AHR/114/291/3/504
 BG/S.27899
 3A
 16.10.42.

A Directive from Air Ministry on 16 October, therefore, instructed the C-in-C to arrange with General Spaatz and the C-in-C Fighter Command for such operations on a scale consistent with Fighter Command's wastage ration during the month of November or longer should the current situation require.

BC/S.23746/2
 Vol.4.
 20A.

On 28 October, No.2 Group was informed that they should make a direct contribution to this general aim by increasing the effort devoted to unescorted daylight attacks by Boston squadrons and by providing Bostons for Circus operations on an increased scale in consultation with Fighter Command. Unfortunately, very poor weather in November restricted such operations to a minimum and only three Circus operations were carried out during the entire month. Other daylight operations were similarly restricted but the period was not without significance owing to the highly successful mass raid by No.2 Group on the Phillips Valve factories at Eindhoven. This will be discussed in more detail in the next Section but note must be made here of one other operation in direct support of Torch which was undertaken by Bostons in co-operation with Wellingtons of No.1 Group.

Something has already been said of the part which the attack of transportation targets was to play not only in disrupting the transportation system in German Europe and exploiting the enemy's existing shortage of rolling stock and locomotives but also in delaying German troop movements should the enemy attempt to move into unoccupied France or Spain as a result of the Allied Occupation of North West Africa.

In particular, intelligence had reported that a large proportion of the locomotives in Belgium were serviced in the roundhouses between 0130 and 0300 hours. On 10 November, Bomber Command was asked to co-operate with S.O.E. in a combined effort against certain selected roundhouses during the November moon period. The S.O.E. plan required initial action by a number of bombers flying over the specified towns and dropping bombs and flares to ensure that the air-raid sirens were sounded. The saboteurs would then take advantage of the confusion to place charges in the locomotives in the roundhouses and running sheds and withdraw. The operation would be completed by a bombing attack on the marshalling yards and railway installations at all the selected targets.

These proposals were accepted by the C-in-C Bomber Command who detailed 30 Bostons of No.2 Group and 20 Wellingtons of No.1 Group to undertake the first and second tasks respectively. The operation was finally planned for 29/30 November but unfortunately bad weather made it impossible to operate to the planned scale and the R.A.F. effort was reduced to six sorties by Mosquitos of No.105 squadron. Although conditions were considered to be totally unsuitable for finding and bombing targets it was hoped that they might set off air raid alarms which would be of help to the saboteurs. In all, seven towns were attacked, the Mosquitos completing their sorties without incident. Visibility was poor and pilots were unable to observe the results except at Liege where it was claimed that bombs were dropped parallel to the line and there were bursts in the Marshalling Yards. Ground reports stated that, at Monceau, an explosion resulted in the partial collapse of a building causing prolonged obstruction of the line.

(vii) Phillips Radio and Valve Factories, Eindhoven

The successful attack on the Phillips Radio and Valve Factories at Eindhoven on 6 December was undoubtedly one of the most outstanding operations by No.2 Group during the year, both in planning and execution. The target had already been included in the main force list of special objectives in Occupied Territory for attack by either the American or British Bomber Commands. The Works, which were believed to be responsible for about one third of Germany's supply of radio components, consisted of two groups of fairly closely packed buildings. The Main Plant covered some 70 acres and a separate group some three quarters of a mile to the south-east, was formed by the Lamp and Valve Factory which together covered about 15 acres. The surrounding district was made up of open fields and lightly built-up residential areas.

Following the instructions mentioned about regarding intensification of operations in support of Torch, a request was received from No.2 Group for permission to lay on a large scale operation against this target. It was explained that No.12 Group had asked for the Group's co-operation in providing bombers for joint operations in their area, which was mainly Holland. In view of the existing restrictions

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AHB [ILH/241/3/514

BC/S.28477

IIA
16.11.42. and
Ibid 3A
10.11.42.

Ibid
passin

CS.16536
11A and 20A

B.C. O.R.S.
Day Raids
Report
No.135.

BC/S.23746/2
23A
31.10.42.

on bombing over Dutch territory, worthwhile targets were hard to find but the Phillips Works provided a notable exception which was within easy reach of all No.2 Group aircraft. Moreover, since the target was well concentrated, it was thought to be ideal for a large scale daylight attack with incendiary and H.E.

Ibid 31A

A.H.B./
IIM/B2/2A
19A

2 Group ORB
1940 Appendix 19A

Command approval was given on 9 November and No.2 Group immediately embarked on an intensive training programme. It had been planned to use Bostons, Mosquitos, Venturas and the newly arrived Mitchells but it became clear that the latter could not be made ready in time and they had to drop out. Even so, the task of co-ordinating this motley collection of aircraft to achieve the desired concentration in time and space over the target was not easy. Range, speed and manoeuvrability were at a maximum in the Mosquito and a minimum in the Ventura. To avoid the many difficulties in timing which would arise from the use of too many routes and the possibility of an increase in navigational errors, all aircraft had to be subject to the limitations imposed by the Venturas.

Ibid

A number of plans were produced and exercises carried out to determine the best method of attack. Initially it had been decided to let the slower Venturas bomb first to give them the benefit of the shorter route and the element of surprise. Here a difficulty arose as it was realised that the smoke from the fires started by the early incendiary aircraft would hamper precise bombing by the later H.E. carriers. On the other hand, to place the Venturas in the rear would raise new problems of timing and routeing.

Ibid and *AHS/2/39/1/4(a)*
O.R.S. (BC)
Day Raid
Report No.
135

Eventually it was decided that the attack should be opened by Bostons, followed closely by Mosquitos. The Venturas, although making landfall at the same place and approximately the same time, would make good a longer track calculated to bring them over the target behind the H.E. aircraft. To avoid their being left behind on the return journey and so open to attack by enemy fighters, they were to take the most direct route from the target to the Dutch Coast, while the Bostons, being first away, would follow a longer route which would bring them out over the coast only seven minutes in advance of the Venturas. Mosquitos, being much faster, were to make their own way out from the target to the northward.

All this meant very careful and detailed timing and routeing and aircraft were warned to adhere strictly to the pre-arranged plan. They were to fly in pairs in company echelon to starboard, no formation exceeding six aircraft and, in order to avoid detection by enemy R.D.F. the flight to the target was to be made at low level and not above 50 ft. over the North Sea.

Ibid

Once in the target area, the force was to divide, 24 Bostons and 17 Venturas bombing the Valve and Lamp Factory and the remainder attacking the Main Plant. The first two Bostons on each target were ordered to bomb from low level, firing their machine guns; the remaining Bostons, followed closely by Mosquitos, were to climb to and bomb from 1,000 to 1,500 ft. Finally, at zero plus 6, the Venturas were to go in at low level with long-delay H.E.'s incendiaries and machine gun-fire.

Ibid

Cover for the return journey was to be provided by fighters patrolling off the Dutch Coast, while the U.S.A.A.F., escorted by fighters, and Mustangs of Army Co-operation Command were to carry out diversionary operations.

Ibid

The stage was now set but unfavourable weather intervened and the operation, originally scheduled for 3 December, suffered a day to day postponement until the 6th. On that day, zero hour was fixed for 1230 hours. Of the 93 aircraft detailed to attack, only two returned early, one due to technical trouble and the other to a faulty hatch. This was a noteworthy achievement on the part of the ground crews. In all, 78 aircraft completed their bombing missions. Losses sustained included 13 missing aircraft, of which five were known to have bombed, one Ventura crashed in the sea and a Boston crashed over this country.

Ibid

On the whole, the attack went according to plan, although the approach to the target was somewhat ragged due to Bostons and Mosquitos being harried by enemy fighters.

Ibid

Crews reported many fires, large columns of smoke and explosions in the target area including one particularly large explosion in the North Wing of the Lamp and Valve Factory. It is of interest that many of these fires were already burning by the time the Venturas, the only incendiary carrying aircraft, arrived. Photographs taken with bombing and subsequently, confirmed that considerable damage had been inflicted on both the targets and to other buildings in the area. The number of incidents outside the perimeter of each target, however, suggests that bombing was not as accurate as might have been expected, probably due to smoke, ground defences and mutual interference over the target. On the whole, the attack seems to have been remarkably successful, particularly in view of the many difficulties which had to be overcome and the fact that it was the first operation of its kind to be undertaken by No.2 Group. Losses at 16% (missing or Cat: E) although high were not as heavy as might have been expected in view of the continuous activity by fighters and light flak. Casualties included, however, 7.5% aircraft seriously and 50% lightly damaged.

Through its attack on Eindhoven, No.2 Group had proved its ability to plan and execute an operation on a major scale and there is no doubt that this was primarily responsible for the decision in January, 1943, to authorise them to undertake further attacks on the Eindhoven scale when opportunity occurred against all but two (Peugeot and Schneider Works) which were beyond range of the special targets in Occupied Territory contained in the new Air Ministry Directive of 16 January, 1943.

/Transportation

BC/S.23746/2
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22.1.43.

(viii) Transportation Targets

Until July, 1942 Cabinet authority for the attack of locomotives and rolling stocks in Occupied France had been limited, so far as Bomber Command was concerned, to daylight attacks on stationary goods trains. In addition, Fighter Command might attack moving goods trains. Passenger trains were not to be attacked nor moving trains at night.

In the meantime, the locomotive and wagon situation in German occupied Europe had become increasingly critical, so much so that the production of locomotives was believed to have been placed on equal priority with tanks and aircraft. ACAS (Ops) indeed minuted the CAS on 23 July, 1942 that "all expert opinion, including M.E.W., agree that there could not now be a better focus for sporadic attack, particularly over Occupied France, than locomotives in particular and rolling stock in general". He added that "most encouraging reports" had been received of the damage done to locomotives by low-flying fighters in daylight and urged that authority should be extended to include attacks on moving trains at night both by cannon-fighters and bombers. Types of aircraft which would normally be involved would be Intruders of Fighter and Bomber Commands and Nos. 161 and 138 Special Duty Squadrons which were under the control of ACAS(I). Although they would normally make their bombing attacks from low level with the object of destroying locomotives, it would not always be possible to discriminate between passenger and goods trains. Such attacks would, in his view, be justified nevertheless on the following grounds :

S.3319
Min: 52

- (a) They were likely to be very fruitful and would increase the scope of operations for the disorganisation of the enemy transport system.
- (b) Between 80% and 90% of the traffic at night was goods traffic and the number of passenger trains likely to be attacked would be small.
- (c) The French civilian population was not allowed to travel by night between the curfew hours of 2200-0400 without special permits. Those who did so might therefore be assumed to have collaborational tendencies.

S.3319
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WM(42) 96th
Mtg. Concl:

These proposals were put before the Prime Minister by the Secretary of State for Air and subsequently received Cabinet approval at a Meeting on 27 July. It was suggested that after the first night attack warning should be given by radio and leaflet that it was proposed to continue such operations.

S.3319
59A

Bomber Command were accordingly informed on 30 July that in future attacks might be made on:

- (a) Goods trains, by day, whether moving or stationary, by both fighters and bombers provided they could be identified as such.
- (b) By night, all trains, whether moving or stationary, by fighters and bombers.

It was also emphasized that the importance of the water transportation system would increase in relation to the success achieved against railway targets.

/Apart

AHB/WH/241/3/621
BC/S.23746/IV
Min. 69 and 71
BC/S.23746/2
Vol.3 83A

Apart from the special duty squadrons, these instructions were considered by Bomber Command to be mainly the concern of Fighter Command and No.2 Group, and the latter was advised accordingly. Subsequent instructions for operation Batter (1) (low level attacks on small German towns) to the Main force Groups, issued in September 1942 also included authority to attack trains on the route to and from the target in Occupied France and Germany.

S.3319
88A and
Mins.82-87

Just over two months later, on 7 October, this authority was extended to the attack of trains and rolling stock in Belgium and Holland. Agreement had been reached with the provisional Belgian Government subject to the attacks being confined to the period between 2300 and 0400 hours. Some difficulties were raised by the Dutch authorities who, while agreeing in principle, were opposed to bombing attacks at night and stipulated that such attacks should be confined to cannon-fire. They also pointed out that, although the main lines to Germany were steam, much of the transport system in Holland was electrified and specialised to local suburban traffic.

Ibid

In the view of the Air Staff, the restriction to cannon-fire would seriously limit the effectiveness of attacks against what was regarded as an important military route through South Holland which lay within the area of Intruder activities. A further difficulty was that of having different rules for contiguous areas (i.e. Holland and Belgium) between which there was no clearly defined dividing line. After further negotiations, it was finally agreed that attacks by day on goods trains only should be permitted over the whole of the transportation systems in Belgium and Holland and by night between 2300 and 0400 hours on the whole of the system in Belgium and that part in Holland lying to the south of the Rhine. This excluded the system north of the Rhine which was in the main electrified, suburban and of little military significance. As before, warnings by leaflet and broadcast would be made after the first attack.

This ruling had been included in the new consolidated bombardment instructions issued in October (2) and, as has been seen, were incorporated by Bomber Command into the new Directives to No.2 Group in September and October. Instructions for Batter and operations by the Special Duty Squadrons were also amended accordingly.

A.H.B./
IIG/886/6A
77th Mtg.

This was the position when, at its 77th Meeting on 20 November, the Target Committee discussed the advisability of concentrating the No.2 Group effort on transportation targets during the month of December, particularly in view of the comparatively poor results which had been achieved by attacks on Power Stations.

BO/S.23746/2
Vol.4.
34A

Agreement on this policy was reached and on 3 December No.2 Group were instructed that, in order to exploit the difficulties known to be experienced by the enemy as a result of shortages of rolling stock, low level attacks during the month should be directed primarily against such targets, particularly railway repair shops and running sheds in Belgium and Northern France. Although a number of such attacks were made during December, mainly by low flying Mosquitos, with very promising results, the Target Committee agreed on 1 January, that the effort had not been sufficiently intensive to give a fair picture of what could be achieved and voted for a continuance of the policy for the time being. (ix) January

A.H.B./
IIG/886/6A
80th Mtg.

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- (1) Chapter 21 Section (viii)
 - (2) Appendix 12.

2731 last leaf Spdm.

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BC|s. 23446

BC|s. 23460

BC|s. 22928

BC|s. 20953.

BC|s. 22204

BC|s. 23439.

BC|s. 22543/3.

BC|s. 25838

BC|s. 24635

B.C|s. 24586

BC|s. 28150

B.C|s. 29961.

BC|s. 26428

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(ix) January, an Increase in Sorties

The first month of the new year saw a great improvement in weather and a noticeable increase in Circus operations which had suffered a sharp decline since July 1942. During January, alone, Bostons and Venturas flew 286 sorties in co-operation with Fighter Command, mainly against enemy-occupied aerodromes, docks and transportation targets.

During the month, too, Mitchells operating for the first time in Bomber Command and escorted by fighters, made low level attacks on oil installations at Ghent. This was part of the concerted plan to counter the recent serious increase in the enemy U-boat offensive from the West Coast of France which has been referred to above. (1) At a Target Committee Meeting on 15 January it was suggested that one of the best ways in which this could be done would be by hindering the supply of Diesel fuel to Lorient and Brest. To this end, both Fighter and Army Co-operation Commands had been asked to direct their attacks on railway targets so as to cause the maximum dislocation of traffic between Ghent and the ports. In addition, the U.S. 8th Air Force had been asked to study the possibility of attacking viaducts on the route across the Brest Peninsula.

It was known that a considerable quantity of diesel fuel, in short supply in Axis countries and required for the submarine bases at Brest and Lorient, passed through the marshalling yards at Ghent which was the initial trans-shipment from the canal to the railway system. It was therefore proposed that No.2 Group should carry out a bombing attack on those yards and the oil storage installations nearby.

The task was allotted to the newly formed Mitchell squadron in the Group and on 22 January 1943 twelve of those aircraft set off to bomb objectives at Ghent, although crews reported much black smoke and debris, and photographs taken with bombing showed a salvo bursting very near the oil storage tanks, subsequent P.R.U. revealed very little damage. Three Mitchells were shot down, and the attack is of more interest as an example of No.2 Group participation in main strategic aims than for the damage inflicted.

Several very successful low level attacks were delivered by Mosquitos during January, however, notably a raid on Copenhagen on 27th and Berlin on 30th of the month. The Burmeister and Wain Diesel Engine Works at Copenhagen had at one time been included in the list of special targets for attack in Occupied Territory, but at a Target Committee Meeting on 4 December, it was agreed that they were not of sufficient importance to warrant a large scale diversion of effort, particularly since, when weather was good in that area, the same conditions were likely to apply to German primary targets such as Kiel and Flensburg. In view of the Danes open hostility to the Germans, however, and their extreme willingness to stay away from any work assisting the Germans on the slightest pretext, it was thought that a daylight attack on a harassing scale by Mosquitos might have the desired effect and give a fillip to Danish morale.

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(1) Chapter 21 Section (ix)

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81st Mtg.

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BC/S.23746/2
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4.7A AHB/II/39/1/4(a)
ORS/BC
Day Operations
Final Report
No.166

AHB/IIG/86/6A
78th Mtg.

AHB/II/39/1/4(a)
ORS/BC
Day Operations
Final Report
No. 171

This operation was eventually carried out on 27 January when eight of the nine Mosquitos which set out successfully bombed their target. The ninth aircraft crashed in the target area. P.R.U. photographs and intelligence reports indicated that the Diesel Engine Works were seriously damaged by direct hits and fire, while two wings of a nearby sugar factory were also seriously affected by fire.

Ibid and
A.M.W.R. AHB/IIH/84
Manual of B.C.
1942

The favourable impression which this attack made on the Danes was greatly enhanced by what was called the "considerate" use of delayed action bombs. A report from what was regarded as an "unimpeachable source" in Denmark confirmed the great extent of the destruction caused. It was estimated that it would take at least three months for repairs to be completed. The same source also mentioned the general satisfaction among the Danes at the success of the raid and their desire for repetition of such attacks.

AHB/II/39/1/4(a)
ORS/BC
Day Operations
Final Report
No. 174 and
2G/CRB/1943
Appendix D. 32.

Finally, on 30 January, came the two very spectacular raids on Berlin by Mosquitos of Nos. 105 and 139 Squadrons, which were timed to synchronise and interfere with morning and afternoon broadcasts by Goering and Goebbels respectively on the occasion of the anniversary of the Nazi rise to power. On the morning of the 30th, three Mosquitos of No. 105 squadron set out for Berlin, flying low but climbing to bomb from 20/25000 ft. The attack was delivered at 1100 hours, dead on time. The German populace, including the Reichmarshal were sent scuttling for the shelters and the speech was delayed for a considerable period. In the afternoon Mosquitos of No. 139 squadron repeated the process, arriving over the target at the time Goebbels was due to speak, but defences were much more active and one aircraft failed to return.

(x) Summary and Conclusions

In this Chapter, an attempt has been made to show that, although necessarily limited by considerations of expansion and equipment, No. 2 Group was vitally concerned in the strategic considerations which activated the operations of Bomber Command as a whole.

In March 1942 when this Volume opens, it was still, in theory at least, governed by the policy decisions contained in the Air Ministry Directive of November 1941 and re-affirmed in the strategic Directive issued in February 1942. It had been laid down that the primary role of No. 2 Group should be the night attack of precise targets in the moon period and daylight Circus and Ramrod operations in the non-moon period.

In practice, the Group was already passing to a new phase in which its main activities were divided between intensified daylight Circuses and night Intruder operations. By June 1942, however, the technical superiority of German day fighters and the need to conserve British fighters and to avoid heavy losses resulted in a considerable reduction of the effort devoted to Circus operations. This in turn, released Bostons for other work such as low level daylight attacks on precise objectives. At the same time, the thousand raids had introduced a new element into night Intruder operations which, from June until the Blenheims were taken off operations in August, were devoted to attacks on enemy night fighter aerodromes in support of main force operations.

/By June,

By June, too, Mosquitos had become operational and were contributing directly to the attack on German industry and morale by high level harassing raids over wide areas and low level precise attacks on industrial targets.

Thus by the early autumn of 1942, No.2 Group had outgrown the terms of the November 1941 Directive and with Venturas and Mitchells already in immediate prospect it became necessary to issue new Directives consolidating its position as a significant element in the strategic striking force.

During the winter, its activities were divided between continued Circus operations which increased considerably in the new year; intensified operations over enemy occupied territory in support of Torch; and an all-out attack on transportation in occupied Europe in an attempt to increase the difficulties under which the Germans were labouring in the face of their campaign in Russia and the Allied landings in North West Africa. At the same time, No.2 Group by its mass attack on the Phillips Radio and Valve works at Eindhoven in December, had established its position as a significant striking force in its own right.

Nevertheless, in considering the foregoing, there is one question which immediately presents itself. Apart from the Mosquito which was to prove itself a most valuable adjunct to the strategic bombing force, was the light bomber a really effective and economic part of the main bomber force or, alternatively, had it an entirely separate function distinct from but yet as an integral part of that force?

This is without doubt a controversial point and to attempt an answer it is necessary to consider the purpose for which the Light Bomber Group was formed. Originally it was designed for a purely offensive role in direct support of the British Expeditionary Force on the Continent. With the collapse of the British Army and the retreat from Dunkirk that role ceased to exist but No.2 Group, reverting to the defensive, continued to train and exercise with the Army in preparation for a possible German invasion of the British Isles. At the same time it was employed in attacks on enemy shipping within the range of shore-based aircraft. By 1941 the threat of a German invasion was receding and with no immediate prospect of a return to the Continent, the Light Bomber Force while still retaining its primary commitment for Army Support, began an all-out attack on enemy shipping. This role continued until, as has been shown, the enemy defences had been increased to a point where further attacks by the slow and unmanoeuvrable Blenheim were nothing short of suicidal.

The next stage in the history of No.2 Group comes with the decision in February, 1942, to undertake a full bombing offensive against German Industry and Morale. At that time Bomber Command were struggling to build up their heavy bomber force and there is little doubt that the light bombers, as far as the main strategic concept was concerned, were an anachronism.

The Army, on the other hand, were pressing hard for the allocation of more aircraft to Army Support and, in particular, for the transfer of No.2 Group to military control. The Air Ministry were therefore faced with the /following

following alternatives. Either they could hand over the light bombers to the control of the Army or they could build up the Group's depleted strength and use it as the second arm of the strategic bombing force while allowing it to maintain its primary commitment for training with the Army until such time as a re-entry was made into the Continent when it would automatically revert to its full Army Support role.

The first alternative cut directly across the accepted principle of a single integrated Air Force coming directly under the control of the Air Ministry. The Air Staff were convinced that the essential flexibility of such a force required for the maintenance of air power could only be achieved by keeping it as an independent entity under a central control from which position it could be turned to offensive or defensive operations at will. By handing over a part to one of the other Ministries, a vital section of the striking arm would be immobilised for long stretches at a time and the main offensive weapon against Germany at that time would be critically weakened. There was another and more immediate reason why such a course was unacceptable. At the beginning of 1942, Bomber Command was in a very depleted condition and this at a time when plans were maturing for an all-out bomber offensive against Germany. Every aircraft which could be brought into action was therefore of considerable value and the Air Ministry were extremely unwilling to divert any more of the striking potential of the Command than was strictly unavoidable.

In consequence, the Army proposals were turned down and every effort was made to expand and re-equip No.2 Group to enable it to play a significant part in the strategic offensive while still retaining its character as a potential Army Support Group in expectation of its ultimate reversion to that role in the event of a German invasion or an Allied re-entry into the Continent.

The extent to which the light bombers succeeded in their temporary function must be judged from the foregoing pages, bearing in mind the extraordinary success, from the physical damage point of view, of their attack on Eindhoven in December, 1942.

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CHAPTER 23

SUMMARY AND CONCLUSIONS TO VOLUME IV

(i) Summary

Strategical bombing policy in March 1942, was governed by two major considerations; namely, the pressing need to give every possible assistance to Russia who was fighting what seemed likely to prove a losing battle against the German armies in the east and the equal necessity of reducing German resistance in the west to the point where the contemplated re-entry of the Allies into the Continent of Europe in the Spring of 1943 could be accomplished with the minimum cost in bloodshed. It was proposed to achieve both these primary aims by the extensive bombardment of German towns and cities with the dual purpose of containing as much of her resources as possible away from the Russian front and of so weakening the morale of the German civilians and particularly the industrial population as to bring about a collapse either directly by bombing or ultimately by a military invasion of the country.

The policy of area attack of large towns for moral effect which was first adopted as the primary aim of the bomber offensive in February 1942, was by no means a new conception. It had been stirring in the minds of the Chiefs of Staff since the Battle of Britain and during 1941 was greatly fostered by two lines of research which were proceeding more or less concurrently; the one into the effects of German bombing on Britain's own war economy and the other into the results of British bombing in Germany.

An analysis of photographs taken with night bombing during the summer and autumn of 1941 had indicated that whereas it had been hoped that between 50% and 80% of the bombs dropped on Germany by night had been hitting their objectives, in practice only about 5% had done so. This state of affairs had long been suspected but nevertheless it's confirmation came as a considerable shock and it could no longer be denied that the bomber force as it then existed was incapable of the precision essential to the successful attack of purely military objectives. The only practical alternative appeared to be area bombing. This, of course, was nothing new. Many of the operations already carried out over Germany had, perforce, degenerated into area attack and the conviction had gradually developed, fostered as is now known by assiduous German propaganda, that widespread bombardment if followed to its logical conclusion would bring about a collapse of German civilian morale and, as a natural concomitant, their will to continue the war.

This was largely wishful thinking based on spurious intelligence but by the autumn of 1941 the idea of area attack for moral effect was being directed into more practical channels as a result of the second line of research into the effects of German bombing on Britain. Analysis had shown that the widespread devastation inflicted on a major industrial city such as Coventry, even though the factories themselves were not badly damaged, had had an immediate and profound effect on industrial output as a result of the general dislocation of domestic life, loss of sleep and other factors. By analogy, it appeared that similar but in view of the greater potential effort, more widespread and lasting

/results

G.169087/MBF/11/50/30.

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results could be achieved in Germany by the attack of large centres of industrial population. This conclusion, coupled with the limited capabilities of the bomber force at that time resulted in the policy of area bombing for moral effect as it finally emerged in February 1942.

In 1941, however, when these decisions were virtually taken, it was realised that to be successful such attacks required much heavier and more concentrated effort than was available at that time. It was accordingly decided to give morale second place to transportation although such objectives were carefully selected in heavily built-up areas in order that stray bombing should contribute to the general demoralisation of the civilian population. This policy formed a kind of half-way house between the attack of purely military targets in the early part of 1941 and the acceptance of morale as a primary objective in 1942.

During the winter of 1941/42 the strategic effort against Germany was much reduced by the decision to conserve the force for a spring offensive and by the need to divert a considerable proportion of the available effort to the attack of the German battleships in harbour at Brest. This delay had one advantage in that it allowed time for further re-equipment of the force to heavy bombers, for the first sets of Gee - the new radar air to navigation - to come into operational use and for the early development of the flare and incendiary techniques which were to prove so successful as marking methods in 1942.

By February 1942, however, the time had clearly come to release Bomber Command from the shackles which had limited its offensive effort during the winter. The position in Russia was critical. Gee was ready for immediate use and conditions on the Continent favoured large scale incendiary attacks. Taking these factors into account it was decided to initiate immediately a campaign of area bombing directed for the first time against the morale of the German civilian population as a whole and of the industrial workers in particular.

Selection of targets for attack was based on the known capabilities of the bomber force which required that they should be large, comparatively easy to find and, in view of the strong enemy defence system, not involving deep penetration. First priority was given to the four largest industrial cities in the Ruhr and Rhineland with particular attention to Essen and, as alternative targets when weather, ever the great enemy of offensive operations, precluded attacks in the primary area, the major ports on the German Baltic and North West coast. Not only were these ports large centres of population and therefore of strategic importance as morale targets but they also figured as vital objectives in the anti-submarine campaign which was then being waged with growing intensity.

At this point it must be emphasised that the intention underlying this policy was to reduce the output of the industrial workers by striking at their morale through the general disorganisation of their domestic lives rather than by attempting to bomb the factories where they worked which experience had shown could not be done effectively under existing circumstances. To this end the CAS had specifically stated that attacks should be directed against the most heavily

/built-up

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built-up area of a town rather than the docks or factories unless the two points coincided. This clarified beyond all doubt the policy behind the bombing offensive in 1942. It was a policy conceived by the Chiefs of Staff and approved by the Prime Minister but it is necessary to add that it was never intended to be more than a temporary measure, born of bitter experience, until such time as either Gee had proved itself a satisfactory aid to bombing or the force had been given other devices to enable it to return to the precision attack of specific industrial objectives.

In March 1942, Bomber Command had a front line of some 300 aircraft the majority of which were medium bombers. The magnitude of the task set this small and comparatively inexperienced force of devastating the great industrial centres of Germany town by town and city by city argued great optimism on the part of the Air Ministry and indeed there were some grounds for it at that time. The vast resources of the United States had, for better or worse, been flung into the scales against the Axis; planning for a second front had already begun and there were good prospects that, in the near future, a large number of American manned aircraft would be operating side by side with the R.A.F.; expansion was still being pursued in terms of a front line of 4000 heavy and medium bombers; aircrew training had been re-organised; heavy bombers were coming off the production line in increasing numbers; and, last but perhaps most significant, Gee was ready for immediate operational use.

Great hopes were undoubtedly pinned on this device. It was confidently predicted that not only would it enable the bomber force to achieve the concentration both en route to and over the target which experience had shown was essential both as a defensive measure against enemy fighters and A.A. and as an offensive measure to devastate the target areas but that it would provide an accurate target finding the blind bombing device which would obviate the need for visual identification and thus enable the bomber force to overcome many of the difficulties which in previous years had been a hindrance to successful operations.

In spite of the optimistic outlook at the beginning of the year there were to be many disappointments in 1942. Experience with Gee during the six months in which it enjoyed operational freedom more than fulfilled its earlier promise as a navigational aid but as a bombing device it failed to come up to expectations. In the last and most important stage of the operation crews were still dependent on visual methods. This led directly to the formation of the Pathfinder Force in August, the intention being to assemble a picked body of crews who by a mutual exchange of ideas, the evolution of new techniques and the use of the latest equipment as and when it was developed, would be able to find and mark the target accurately for the main force. The formation of the Pathfinder Force coincided with the jamming of Gee so that during the autumn and winter of 1942 it was not only without bombing aids or suitable pyrotechnics for marking but it was virtually deprived of any radar aids to navigation over Germany. Thus it was not until 1943 that the full value of the new scheme made itself felt by which time Oboe and H2S had come into service. Nevertheless, the necessary reliance on visual aids in 1942 led to considerable progress being made in the development of new marking methods and bombing techniques which were to stand the force in good stead in 1943.

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There were other disappointments in 1942. The Arnold/Towers/Portal agreement in June dealt a crippling blow to R.A.F. Expansion schemes. The very natural desire on the part of the Americans to fly their own machines meant that the supply of aircraft from that source virtually dried up and Britain was thrown back on her own limited production capacity which was itself in difficulties due to shortage in manpower and tools. As a result, planned expansion was severely curtailed. It is true that there were at least reasonable prospects that by the spring of 1943 part at any rate of this deficit would be made good by American bomber groups operating from the United Kingdom but that could not happen yet and in the meantime, Bomber Command had to maintain the offensive against Germany not only alone but with a very much smaller force than was envisaged when the morale plan was first conceived. This situation was not improved by the diversion of numbers of American bombers and crews to the campaign in North West Africa in the autumn of 1942.

This was not the only problem. As a result of the overall shortage of aircraft at that time there was, between March and September 1942, a persistent drain on the existing or potential strength of Bomber Command to other Commands and other theatres. Nor was this all. The war at sea was assuming menacing proportions, the gravest threat coming from the enemy U-boat fleet which was increasingly active against Allied shipping. Not only had whole squadrons to be loaned, detached or transferred to Coastal Command for anti-submarine and other duties but time and again pressure was exerted on the Air Ministry for the diversion of the strategic effort to other tasks and other targets directly connected with the war at sea. This persistent drain on the already limited effort available for the strategic offensive against Germany culminated in the War Cabinet decision in January 1943, to approve a policy of area bombing of the Biscay ports as a first priority task for the bomber force.

Nevertheless, inspite of the many difficulties and disappointments, 1942 was far from being a fruitless year. The fifty-squadron plan in September finally called a halt to the drain on resources enabling the Command to expand to 52 squadrons of which 35 were equipped with heavy bombers. Manchesters, Hampdens, Whitleys and the older Marks of Wellington were withdrawn from operations and replaced by Lancasters, Halifaxes, Stirlings and Wellington Mark III. Thus if expansion was strictly limited so that by the end of this period the Command had increased by only seven squadrons and a hundred odd aircraft, re-equipment had completely altered the force from one primarily medium to one primarily heavy in character.

Side by side with expansion and re-equipment, re-organisation of the Command was being carried out to meet planned expansion, changes in the training organisation and the arrival of American aircraft and personnel in the United Kingdom. New airfields were being constructed and grass runways replaced by concrete.

By the end of the period Bomber Command comprised six operational Groups and a third training Group had been added to the two already in existence, while Conversion Flights and Units had been amalgamated into Heavy Conversion Units on the basis of three per Group. It was planned that ultimately each operational Group would comprise 21 Stations, each accommodating

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the equivalent of two squadrons with an establishment of 16 plus 2 aircraft. The old parent and satellite system had been done away with and satellites raised to full Station status. To relieve the strain on Group Headquarters of the increased number of squadrons which would eventually come under their control, it was planned to introduce the Base organisation, each Base being responsible for the operational and administrative control of three Stations.

Thus the way was prepared for the expansion which was expected to take place in 1943. Nevertheless, 1942 was essentially a year of experiment and it is in that field that the greatest advance must be expected. Gee brought an immediate and marked improvement in navigational accuracy which enabled the Command to adopt a system of co-ordinated timing and routing which soon became a standard of bomber operations. Together these changes led to a greatly increased concentration en route and in the target area, the latter rising to a rate of well over 400 aircraft per hour while changes in the Flying Control organisation enabled these large concentrations of aircraft to be despatched and returned with comparative ease.

One of the more notable developments at this time was the increased use of incendiary bombs which, against suitably inflammable targets, proved themselves by far the most devastating weapon for area attack. An outstanding example of their use was the raid on Lubeck in March when practically the entire town was gutted in one night. This target was particularly vulnerable to fire, however, and the results achieved were the exception rather than the rule. In general, it was found more practicable to use a mixed bomb load of incendiaries and H.E. the proportion being adjusted according to the nature of the objective.

Throughout the year, the success of attacks was dependent on accurate visual identification of the target and the lack of radar aids gave added impetus to the development of suitable methods of target marking for the main force, considerable progress being made by the Pathfinder Force in this connection. Nevertheless, weather remained the greatest single obstacle to accurate bombing at this time and it was not until the advent of Oboe and H2S in December, 1942 and January 1943, respectively that the force seemed at last to have been provided with the means to overcome its difficulties in this respect.

Nor was development confined to the main force. Between March 1942 and January 1943, the light bombers of No. 2 Group expanded from five to ten squadrons. Blenheims which had given good service were withdrawn from operations and replaced by Bostons, Mosquitos, Venturas and Mitchells. Mosquitos, in particular, by reason of their high speed and manoeuvrability proved themselves invaluable for high level harassing and low level precision attacks on Germany while Bostons contributed greatly to the overall effort by escorted and non-escorted operations against ports, shipping and industrial targets in Occupied Territory.

It is not proposed to examine in this Volume the overall effects of bombing on German morale and industrial economy. These will be discussed in detail in relation to the other war years in a separate Narrative. During the early months of

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the period, the main effort was directed against the primary targets in the Ruhr or North West Germany with particular reference to Essen which, despite the many improvements in method and technique, remained invulnerable to attack by reason of its peculiar geographical position and the persistent industrial haze.

Experience during the first three months of this period early indicated that a force of 2/300 bombers even if concentrated on one target instead of being divided between a number of targets as they had in the past, was insufficient to inflict really lasting damage on major industrial centres. This led to the famous experiment of the thousand bomber raids which made headline news in May and June. Operations on that scale were only made possible by the use of training aircraft and clearly could not be maintained for any length of time. Nevertheless, by attempting the hitherto impossible, the C.-in-C. had clearly indicated what might eventually be achieved in the way of large scale damage once the forces had been expanded to a size commensurate with its tasks and had been given the means to find and mark its targets accurately under all conditions. Quite apart from this, the very fact that operations on such a scale could be conceived and carried out successfully at that time was in itself a proof of the advances which had been made in the field of tactics and technique.

In February 1942, the ban was lifted from night attacks on industrial targets in Occupied France and in June the embargo was also relaxed for Holland and Belgium. Comparatively few major attacks were made on targets in Occupied Territory during the year but special mention may be made of the raids on Billancourt and Poissy early in this period and the raid by aircraft of 2 Group on Eindhoven in December. These were all key points in the German subsidiary economic system and the considerable damage inflicted by the R.A.F. constituted a direct blow to the German war effort as a whole.

As the year progressed, bombing was extended over an ever widening field in an attempt to spread the enemy's defences which were concentrated in the main industrial areas and to bring the war home to the mass of the German people. In October, 1942, the effort was switched to Northern Italy in support of the campaign in North West Africa and during the remainder of the year every advantage was taken of the many occasions when weather was unfit over Germany to bring the full weight of the bombing offensive to bear on Italy in a bid to lower Italian morale to the point where Italy could be knocked out of the war once and for all. The success of these operations and the very evident effect they were having on the Italian people led to the North Italian targets being accorded high priority in the bombing offensive in January 1943. By that time, too, the anti-U-boat war had reached considerable proportions and in the same month it was decided to risk the possible political repercussions and initiate area attacks on the Biscay Ports on high priority in a bid to deny the bases to the enemy submarine fleet.

Finally, something must be said of the operational loss rate which increased slowly but steadily from March 1942 onwards, reaching a peak of 9.2% of sorties despatched in August. Scientific analysis of monthly losses sustained in attacks on German, French and Italian targets and on minelaying

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showed that this increase in casualties was almost entirely due to the improved defences inside Germany itself. Indeed little doubt was felt but that the increased efficiency of the enemy's early warning system and R.D.F. control of his night fighters was a primary cause of the higher casualties suffered during this period. It constituted a serious menace to the night bomber offensive and led directly to the development of the first radio countermeasures which were introduced into service in October 1942.

(ii) Conclusions

Thus between March 1942, and January 1943, the long arm of Bomber Command had reached out and struck not only at the majority of the larger and many of the smaller towns and cities in Germany but also at Italy, the weakest member of the Axis, and at those industrial targets in Occupied Europe which were known to be contributing to the German war effort. It had attacked ports and dockyards, submarine bases and shipping both at sea and in harbour, the minelaying effort alone accounting for 13.7% of the total number of operational sorties flown during the period. Many of the attacks were unsuccessful owing to weather and other tactical difficulties, lack of suitable equipment and shortage of aircraft. But something had been achieved in terms of material damage and very much more in tactical and technical development. What was even more important, it had been demonstrated to the enemy that nowhere or at any time were they secure from air attack.

Since the war ended there have been many attempts to prove that the decision to initiate a campaign of area bombing for moral effect was a gross strategic error and one which contributed little or nothing to ultimate victory. It does not lie within the limited scope of this Volume to assess the effects of that historic decision on the course of the offensive against Germany. That can only be judged in relation to the war as a whole and is a task which must be faced in the final Volume. Nevertheless, against any consideration of this controversial subject and of the many contrary suggestions which have been put forward since hostilities ceased, must be set the facts as they appeared to the strategists at that time. It is only too easy to be wise after the event.

Time was the all important factor at the beginning of 1942. Russia appeared to be tottering on the verge of a debacle and it was essential to give her whatever aid was immediately to hand in order to keep her in the field and prevent the full weight of the German war effort being concentrated on the western front. Moreover the Allies, goaded by public opinion on both sides of the Atlantic, were already thinking in terms of a Second Front in the spring of 1943. The softening up of German resistance by heavy air bombardment had been accepted by both Nations at the Washington Conference as an essential preliminary to the success of any such undertaking.

The only offensive weapon which could be brought to bear on Germany in the critical months of 1942 was the strategic bomber force. Already production and aircrew training not to speak of scientific development had been geared to a policy of night bombing. New equipment and devices were on their way which, it was hoped, would enable the force to find and hit its targets under almost all conditions. Any changes in offensive

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strategy at this time would have involved an undeniable and, as it seemed, an unacceptable delay while the vast machinery of planning, production, training and scientific research was directed into new channels.

It may be argued that area bombing was a policy of despair and that once it had been established that the bomber force was incapable of the accuracy essential to the night attack of precise military objectives, it should have reverted to a daylight role or at least conserved its effort until such time as the new radar aids to blind bombing had been made available. Once again it must be emphasised that time was the important factor and that either of these courses of action would have necessitated a serious delay in the course of which the only weapon available to come to the aid of Russia or to prepare the way for a re-entry into the Continent would have been virtually non-combatant. Nor would public and political opinion, on both sides of the Atlantic as well as on the Continent of Europe, have tolerated a period of forced inactivity of Bomber Command just then when instinct urged in favour of retaliatory action against the German Reich. Consequently it was a case of area bombing or nothing.

But there was a further and very practical argument against a reversion to daylight bombing. In the past the R.A.F. had suffered heavy casualties in this respect and there was no guarantee that a heavy bomber force could carry out in daylight and in the face of the extremely efficient enemy defence system the deep penetration into Germany required by current bombing policy without incurring a prohibitive casualty rate. The adoption of such a policy at that time could only have been in the nature of an experiment which, if it had failed, would have been extremely costly in every respect and might even have delayed final victory by a number of years. There was another side to this argument. If, despite British scepticism, the American daylight bombing policy succeeded, it would be complementary to the R.A.F. night offensive and there was strong reason to believe that together the two offensives would shatter on the one hand the principal industrial plants in Germany and on the other, the morale of the German industrial workers and their will to continue the war, thereby bringing about a collapse of the German war economy which if not leading directly to immediate capitulation would enable the Allied armies to effect an easy entry into the Continent of Europe and, ultimately, into Germany itself.

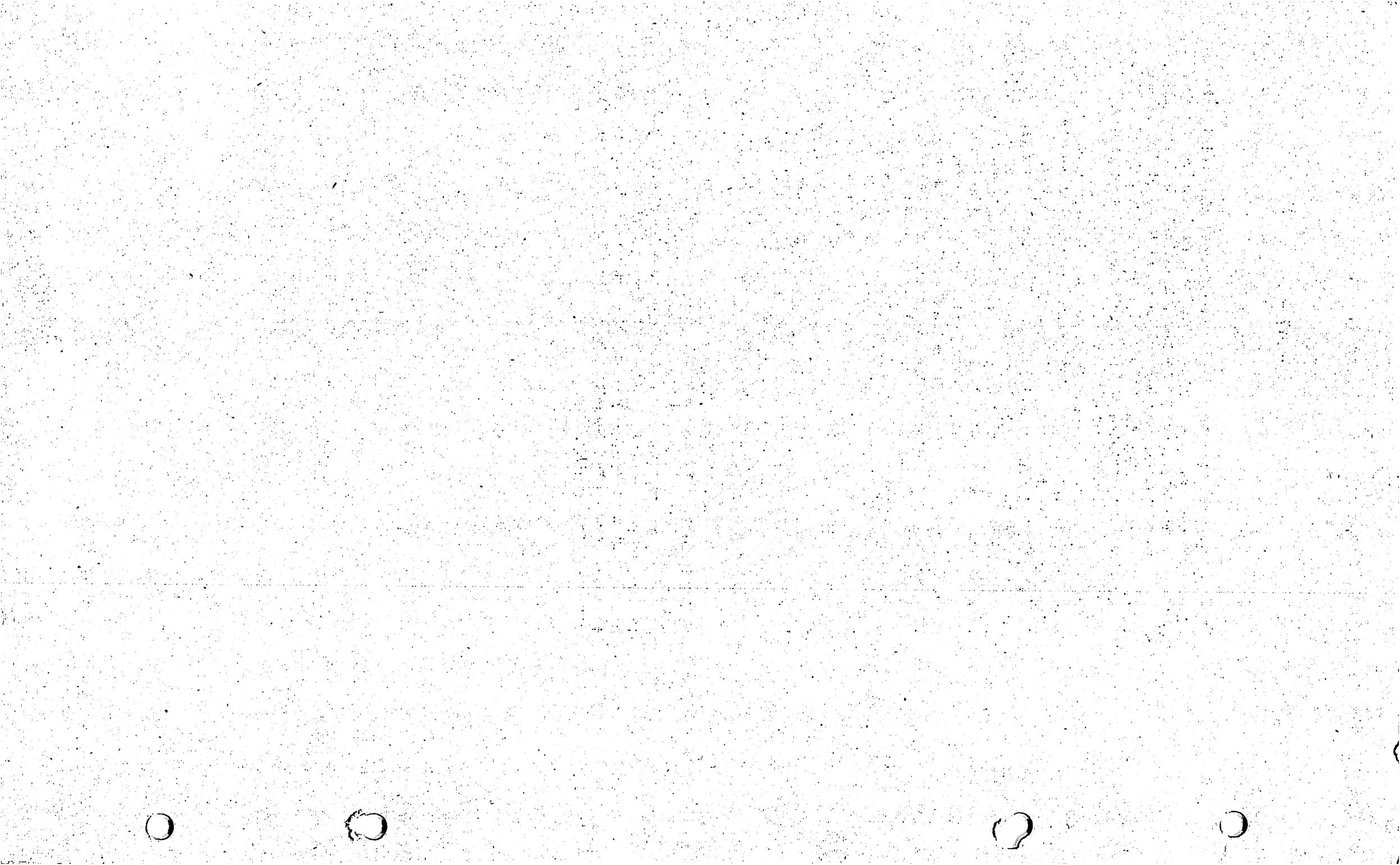
Taking all these factors into account and having regard to the limited capabilities of the bomber force at the beginning of 1942, the decision to strike at the German war effort through the morale of the industrial workers was, in the light of contemporary knowledge, the only practical solution. The tragedy was that, having taken what seemed on the face of it to be a practical and certainly a revolutionary step, the Air Ministry was unable, for reasons beyond its control, to give Bomber Command the means to carry it to its logical conclusions. Quite apart from the unavoidable shortage of aircraft and delays in the provision of equipment essential to the purpose, the strategic effort was constantly having to be diverted to other tasks and targets at the behest of the other services. Some of this dispersion of effort could have been avoided, much of it having regard to the available resources could not but there is no doubt that it seriously hampered the primary offensive against Germany in direct contrast to the policy of intensification agreed at Washington.

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Nevertheless, inspite of the setbacks and disappointments this was fundamentally a period of experiment in which much was achieved in the field of tactical and technical development and the strategic bomber force prepared for the part it would be called upon to play in the Combined Bomber Offensive in 1943. Thus the real significance of the period lies not so much in the material damage inflicted although this was by no means negligible, nor in the expansion and re-equipment which took place although this was sufficient to change the force from one primarily medium to one primarily heavy in character. Essentially, this was a period of new ideas, new methods, new scientific devices and the keynote was undoubtedly concentration; concentration as exemplified by the thousand bomber raids; concentration not only in time and space but against a single objective. Together with the adoption of a policy of Area bombing, this marked a fundamental change in the whole conception of strategic bombing and one which called for parallel advances in the development of new tactics and new bombing methods. Radar aids to navigation and target finding, countermeasures to the enemy's radar-controlled defence system, the formation of a Pathfinder Force and the development of new target marking methods are among the more obvious advances at this time. But perhaps the most marked was the conception of the bomber force not, as in the past, as a collection of individual aircraft but as a single, cohesive and decisive weapon capable of being used with deadly effect against any target or on any task required by the strategic situation.

Thus as far as the R.A.F. bomber force was concerned the period described in this Volume may be regarded as the watershed of the later years. Of necessity a period of trial and error, it was also a time of marked achievement in which the bomber force under the firm guidance of it's new Commander-in-Chief, Air Marshal, Sir Arthur Harris passed from the makeshift period described in the previous Volume to the full maturity of 1943.



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ANNEX I

BOMBER COMMAND AND THE WAR AT SEA

(i) Introduction

Much has already been said in this Volume regarding the increasing danger to Allied shipping in 1942 from enemy submarine warfare. It has been seen how, in a bid to counter this menace, the Admiralty pressed urgently for additional allocations of aircraft for long-range reconnaissance and other duties connected with the war at sea as well as for heavy bombing attacks on German docks, submarine construction yards and advanced bases on high priority. The War Cabinet's eventual decision in January 1943, to approve a policy of area bombing of the U-boat bases on the West Coast of France as targets whose prime military importance justified the political odium which the destruction of French civilian life and property would probably incur, is a measure of the anxiety felt by all concerned at that time.

The full story of the R.A.F. in Maritime Warfare is the subject of a separate Narrative. In this Annex it is proposed to summarise the effort expended by Bomber Command in that connection between March 1942, and January, 1943. This effort falls roughly into five categories:-

- (a) Attacks on German docks, construction yards and submarine bases.
- (b) Long-range anti-U-boat reconnaissance, convoy escort etc.
- (c) Attacks on German Naval Units.
- (d) Attacks on Occupied Ports and Shipping.
- (e) Minelaying.

Details of individual raids are given in the chronology of operations but the Table at the end of this Annex shows the proportion of effort assigned to the various tasks and targets throughout this period.

(ii) Attacks on German Baltic and North Sea Ports

Part of the Admiralty's requirement for assistance in the Naval war against enemy submarine and surface vessels was the intensive bombing of the important building yards at Bremen, Kiel and Hamburg which were believed to account for the construction of over 60% of the German U-boats fleet. These ports together with Emden, Wilhelmshaven, Lubeck and Rostock had already been included in the strategic bombing Directive issued in February, 1942, as alternative targets for area attack when weather precluded operations in the Ruhr and Rhineland and such operations have been described in detail in Part III of this Volume.

Although attacks on these targets were undoubtedly governed by both strategic and tactical considerations, an effort amounting to over 7,000 sorties and 11,552 tons of bombs against objectives primarily Naval in character cannot be disregarded

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in any consideration of the contribution made by Bomber Command to the war at sea. Moreover it must be noted that, on the majority of major raids on German ports, the docks, slipways or construction yards were given as special aiming points to selected crews. Between March, 1942 and January, 1943 the most heavily bombed ports were Bremen, Hamburg and Kiel in that order but mention must be made of the now famous incendiary raids on Lubeck and Rostock during which very considerable damage was inflicted on the town and dock areas.

Small scale precision attacks were also made on the submarine yards and slipways at Vegesack, Flensburg and Danzig while a persistent harassing effort was maintained over the N.W. German ports by single or small groups of aircraft operating under cover of cloud. Mosquitoes in particular from July, 1942 carried out a large number of operations directed primarily against German U-boat construction yards or slipways.

To describe the material results of these operations would be repetitive while the overall effects of bombing on enemy submarine production and operations is, in any event, the subject of a separate Narrative. (1) It must be remembered, however, that in any consideration of this subject, account must also be taken of the indirect or incidental effects on submarine production resulting from the damage or destruction of component factories during the course of the strategic bombing campaign against Germany and, in particular, such special operations as the daylight raid by heavy bombers on the M.A.N. diesel engine factory at Augsburg on 17 April, 1942.

(iii) Anti U-Boat Reconnaissance etc.

The bombing of submarine construction yards, however, was at best a long term measure and, in the meantime, enemy U-boat activity was steadily increasing. The Admiralty contended that the immediate danger could only be met by an intensification of Coastal Command's anti-U-boat patrols and convoy escort work. This in turn was dependent on an increase in the allocations of long-range G.R. aircraft for reconnaissance in the Bay of Biscay. Although the Naval aircraft requirements had been adequately catered for in the Air Ministry's provisioning programme, this too was long term and pending its realisation, Coastal Command had insufficient long range aircraft to enable it to retain the initiative in the vital area of the Bay. After prolonged discussion between the Naval and Air Staff it was finally agreed on 2 July, 1942, that the deficit should, as a temporary measure, be met by the loan of aircraft from Bomber Command.

It will be remembered that the original proposals required the detachment of two Lancaster squadrons to Coastal Command for G.R. and convoy escort work but that, in the meantime, the two Cs-in-C had reached an agreement whereby Coastal Command resources would be augmented by the loan of Whitleys and crews from Bomber OTU's who were nearing the completion of their training and would undertake anti-submarine patrols as part of their passing out tests. Bomber Command had also agreed to make available an unspecified number of Lancasters each month for similar duties.

(1) "The R.A.F. in Maritime Warfare".

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On 15 July, 1942, No. 61 Lancaster squadron was detached to St. Eval and between 17 July and 21 August, they flew some 80 sorties on anti-submarine and anti-shipping patrols in the Bay of Biscay plus a further 12 sorties on convoy escort duties. 4 Lancasters failed to return from these operations while, on the credit side, one submarine was known to have been definitely sunk - on 17 July when the maximum surprise was probably obtained - and two more were attacked without any apparent result. In addition, Lancasters on an anti-shipping patrol on 19 August sighted and attacked an enemy tanker, one direct hit being obtained on her bows.

Meanwhile a detachment from No. 10 O.T.U. consisting of 20 Whitleys and 25 crews drawn from Nos. 10, 19 and 24 O.T.U.'s had moved to St. Eval on 4 August, 1942. It had been arranged that those crews instead of completing their normal syllabus of 80 hours should do only 70 hours, counting the flying done at St. Eval against the remainder of their training.

The Whitleys carried out their first operation from St. Eval on 12 August. Thereafter, until they completed their duties with Coastal Command on 19 July, 1943 and were returned to Bomber Command, they flew over 1,800 sorties in operations over the Bay during the course of which they lost 45 aircraft (all causes) in return for the certain destruction of one U-boat, known damage to four others and possible damage to a further twenty. Although the unseen effects of these operations in curtailing enemy submarine activity cannot be discounted, this can scarcely be regarded as a fair return for the effort expended and the casualties incurred. On the other hand, the C-in-C Coastal Command, expressing his appreciation of their work during the twelve months of their detachment, claimed that due to their timely aid Coastal Command had been enabled to force the enemy onto the defensive in the Biscay area and, in later months, to bring to bear a weight of attack which, he hoped, would develop into final victory against the U-boat.

CC/S.7010/3/8
C-in-C/742
23.7.43

AHB/ITH/24/3/587
DC/S.28349
3A. 24.10.42

Ibid
Encl. 13A
29.12.42

Ibid
27A 27.2.43

During the autumn and winter of 1942 a further direct contribution was made by Bomber Command to the anti-U-boat campaign which was rapidly growing in intensity. On 25 October, 1942 No. 405 Halifax squadron was detached to Beaulieu for convoy escort and anti-submarine duties to augment Coastal Command's already tightly stretched resources during the initial period immediately prior to Torch. Initially this was to have been for 10 days only but in response to a request from Coastal Command, the Air Ministry agreed to extend the period of detachment until two squadrons in Coastal Command had been re-equipped to Halifaxes. Despite frequent protests from Bomber Command, No. 405 squadron was not returned until 1 March, 1943. In the interim it had carried out a total of 378 sorties on anti-submarine, anti-shipping and convoy escort duties in the course of which three U-boats were attacked and one definitely hit and seven attacks were made on shipping with no apparent results. One aircraft failed to return from these operations and a number of others were totally destroyed.

(iv) Attacks on German Naval Units

Although the strategic directive issued in February, 1942 had contained the warning that diversionary attacks might be

called for from time to time on objectives of immediate strategic importance such as naval units or submarine building yards and bases, operations against the former between March, 1942 and January, 1943 were confined to three attacks on the Tirpitz at Trondheim and one attack on the aircraft carrier Graf Zeppelin at Gdynia.

The presence of the Tirpitz in the Trondheim Fjord had been discovered in January, 1942 and, at the urgent request of the Prime Minister, 16 sorties had been despatched to attack it on 29/30 January. The aircraft were unable to locate their target and the operation was abortive.

Two months later, on 30/31 March, a further attempt was made by 34 Halifaxes of No. 4 Group. Once again the attack was foiled by weather and although two of the returning aircraft claimed to have bombed on its estimated position, the target was not sighted and from subsequent reconnaissance it was clear that no damage had been inflicted.

The last two attacks on 27/28 and 28/29 April respectively appeared at first sight to have been rather more successful. On the first night 16 of the 43 sorties despatched reported bombing the target on visual identification and a further 15 who found it obscured by an effective smoke screen claimed to have bombed on its estimated position. One aircraft attacked the Prinz Eugen and Admiral Scheer also present in the Fjord but no hits were obtained.

The following night, a smaller force comprising 34 heavy aircraft of Nos. 4 and 5 Groups were despatched with instructions to attack the battle-cruisers Tirpitz, Prinz Eugen, Admiral Scheer and Admiral Hipper all of which were known to be present in the Fjord at Trondheim. Although a smoke screen was thrown over the ships, several aircraft were able to see their target and altogether 27 claimed to have bombed the Tirpitz either on visual identification or estimated position. Several near misses were observed but daylight reconnaissance failed to reveal damage to any of the ships.

The last attack of this series was made on 27/28 August when nine Lancasters of No. 5 Group were despatched to attack the aircraft carrier Graf Zeppelin at Gdynia. Cloud and poor visibility made identification of the target difficult and although six aircraft claimed to have dropped their bombs in the primary area there was no evidence that any damage was inflicted on the Carrier.

From these operations, 12 aircraft failed to return.

(v) Occupied Ports and Shipping

Between March, 1942 and January, 1943, no less than 2,161 sorties were flown by day and night against the German occupied ports in the Channel and Bay of Biscay, during which some 2588.5 tons of bombs were dropped inflicting considerable damage on docks, harbour facilities and shipping in port. Excluding Lorient which, as a submarine base, was given high priority in January, 1943, the most heavily bombed of these Naval Objectives were Le Havre, St. Nazaire, Dunkirk, Boulogne and Cherbourg in that order.

/Other

AMB/II/39/1/3(a)
ORC/BC
Night Raid
Report No. 35

Ibid No. 55

Ibid No. 56

Ibid No. 139

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Other considerations apart, the Channel and Biscay ports provided convenient objectives for the initiation of inexperienced crews who, during the first four months of the period flew some 1035 night sorties against the docks and harbour facilities, this effort being supplemented by the light bombers of No. 2 Group which carried out daylight attacks with fighter escort on important shipping in the ports.

COS(42)326
30.6.42

COS(42)194th
Mtg. 1.7.42

COS(42)248th
Mtg. 26.8.42

On 30 June, 1942, however, the C-in-C Home Forces drew the attention of the Chiefs of Staff to the considerable damage being inflicted on the docks and harbour facilities of the channel ports by such operations which, if continued on their existing scale would be claimed seriously jeopardise the success of any attempted land operation on the Continent that year. The matter was discussed at a Chiefs of Staff Meeting the following day and it was agreed that, in future, the Channel ports should not be bombed except for good military reasons such as the known presence of important shipping or concentrations of E boats. During the next few weeks, however, prospects of a Continental invasion receded and on 26 August, this ruling was relaxed. Freshmen crews were then being employed on the recently intensified mine-laying campaign and the C-in-C was unwilling to withdraw them from these operations for the more dangerous task of attacking the Channel ports.

In consequence no further operations of that nature were carried out after August, 1942 but the light bombers continued to attack enemy shipping in harbour throughout the year. It is not possible to enumerate here the results of each operation but mention must be made of one or two particularly successful raids such as that on the submarine yards at Le Trait by a small force of nine aircraft on 25 March. On this occasion, photographs showed that at least 20 bombs had fallen in the yards, six scoring direct hits on buildings, one striking a small ship in the slips and another exploding close to a submarine also in the slips. Bostons also carried out a particularly successful attack on Cherbourg on 15 September during the course of which the whale oil ship Solglint was virtually destroyed. These and other daylight operations by small forces from No. 2 Group inflicted very considerable damage on enemy shipping and harbour installations during the course of the year.

No. 2 Group also retained its commitment for the attack of important shipping at sea if called upon by Coastal Command for assistance, their range of action extending from Cherbourg to Wilhelmshaven with the exception of the area Manston, Ostend, Dieppe, Beachy Head which was the responsibility of Fighter Command. Between March and May 1942, they flew some 22 sorties against enemy shipping at sea, only one sighting being made but thereafter, they were not called upon for further effort although this remained a commitment of the light bomber group.

AHB/DH/241/3/981
BG/S.26488
Encl. 3B

Finally, something must be said of Bomber Command's participation in the Combined Operation on St. Nazaire on 27/28 March, 1942, which was primarily Naval in character. It was known that the enemy were making great use of St. Nazaire as a U-boat base and port of shipping at that

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time and the object of the combined raid was to destroy the lock gates and mechanism of the large dock, to destroy the small lock gates and their installation and also to destroy or damage other key points as well as any U-boats or shipping which might be accessible. It was considered essential to the success of the plan that the enemy's attention should be distracted during the approach of the forces from the sea and during the operations on shore. To this end Bomber Command were asked to attack the seaport immediately before, during and after the operation in order to keep as many people as possible in shelters and to disorganise any efforts by the enemy to minimise the damage.

Ibid Encl. 8A

AHS/II/39/1/3(a)

ORS/BC
Night Raid
Report
No. 32

On 27/28 March despite the very bad weather forecasts Bomber Command were informed that operation Chariot was on and a force of 35 Whitleys and 27 Wellingtons took off for St. Nazaire. Crews were warned not to release their bombs unless they were certain of their position and as a result of this order and the very bad conditions found over the target only four aircraft actually bombed their objective. Six others attacked alternatives while all but four of the remainder were forced to abandon task owing to the 10/10ths cloud and severe icing encountered. While no aircraft were lost on this operation, four Whitleys crashed and were completely destroyed.

AHS/IIH/241/3/481

~~BE/S-26488~~
Encl. 11A

There appears to have been insufficient liaison on the planning side between the Naval and Air Commanders and in a letter written subsequently to the C.A.S., the C-in-C Bomber Command complained not only had no attempt been made by the Naval authorities to utilise Bomber Command's meteorological organisation when ordering the operation which, under the circumstances might well have resulted in very much heavier casualties to aircraft to no practical purpose but that no definite executive order had been received from the C-in-C Plymouth or any other source and the Command was compelled to ascertain by telephone on 27 March whether the operation for that night was actually to take place.

(vi) Minelaying

Despite the considerable effort expended by Bomber Command against Naval targets and on Naval tasks, there is no doubt that the intensive minelaying campaign inaugurated in March, 1942 was by far their greatest contribution to sea warfare at this time. In the eleven months under review 4,920 sorties or 13.7% of the total operational effort of the Command were flown on this task alone in the course of which no less than 10491 mines were laid in home waters.

Until March, 1942 the responsibility for minelaying had devolved on Hampdens, Manchesters and eventually Lancasters of No. 5 Group. In March, however, the C-in-C decided to extend this commitment to Stirlings and Wellingtons of No. 3 Group in the first instance and, ultimately, to all the aircraft in his Command as soon as they could be suitably modified and the necessary stocks and equipment made available. Not only did such tasks provide excellent training for inexperienced crews but there were numerous occasions when weather, although unfit for normal bombing operations was suitable for mine-laying. Hitherto, only No. 5 Group had been able to take advantage of those conditions. When all the heavy bomber Groups had been adapted, it would become possible to lay large numbers of mines without prejudice to the normal strategic effort. It was

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the C-in-C's intention that freshman crews should be so employed at the discretion of A.Os.C. and that on nights when normal operations were impossible, mining by trained as well as inexperienced crews would be ordered by Command Headquarters.

S.1636/Pt.II
Encl.106A and
Min: 107/109
Ibid Encl.,111A

This plan was officially notified to the Air Ministry on 20 March, 1942 and was approved by the C.A.S. On the same day, the C-in-C Coastal Command had written to the Air Ministry suggesting that in view of the greater mine-carrying capacity of the heavy bomber as opposed to the Torpedo bomber and the urgent need to maintain the latter at the highest pitch of efficiency for other tasks, they should be released from their routine minelaying commitment.

Ibid
115A

After due consideration, this suggestion was approved by the DCAS who advised Bomber Command officially on 25 March that their proposal to extend the minelaying activities to all aircraft in the Command had been approved subject to the provisos that it should not prejudice the normal bombing effort and that freshmen crews should only be so employed when their training could not be completed as effectively on bombing operations against primary or alternative targets. It was further stated that, in view of the increased effort made possible by the inclusion of heavy bombers, it had been decided to relieve Coastal Command of their minelaying commitment and that all minelaying in home waters would henceforward be the responsibility of Bomber Command although this would not prejudice any minelaying by Coastal Command as part of their night flying training or for special operations. Finally, it was stated that the Admiralty had been informed of the increased effort which was to be expected and had been asked to step up production accordingly. In point of fact, the Admiralty had already stated their intention to increase production to meet a laying rate of 300 mines a week provided that this effort was considered practicable.

S.1636/Pt.II
Encl.111A
13.3.42

AHB/ITH/241/3/621
BC/S.23824/
Vol.4 Encls.
12A, 14A and 27A

Bomber Command was now responsible for minelaying in all air areas from the Baltic to the West Coast of France. The commitment had been extended to No. 3 Group on 9 March and No. 1 Group on 24 March and Stirlings had carried out their first mining operation on 23/24 March followed by Wellingtons on 1/2 April.

The new policy had an immediate effect on the monthly laying rate which rose from 300 in February and March to 500 in April, reaching the thousand mark in May. By June, Bomber Command were able to inform the Air Ministry that once the minelaying programme was fully under way, expenditure would rise to 300 mines per week for which a supply rate of 600 would be essential.

S.1636/Pt.II
Encl. 145A

It now became necessary to correlate the enormous increase in the potential minelaying capacity of the Command with the production and operational aspects. A Meeting was called at Air Ministry on 2 July to examine the position. After discussion, the Admiralty representatives stated that in view of various production limitations and the urgent need to build up stocks against special commitments and the requirements of development, they felt that a 1000 mines per month was a reasonable laying rate having regard to output during the next three months. Thereafter, the situation would be

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reviewed. This was accepted by the Air Staff who agreed that Bomber Command should be instructed to restrict their minelaying effort to 250 per week. At the same time they urged the Admiralty to examine the desirability of increasing production to meet the potential capacity of the Command. This latter suggestion was accepted by the Admiralty who confirmed on 3 September that the necessary action was being taken.

S.1636/Pt.II
170A

Minelaying was restricted to under 1000 per month in July and August but in September and November it rose again to over 1,100 and reached a new peak of 1,285 in January, 1943. Halifaxes of No. 4 Group had flown their first minelaying sortie on 10/11 October, 1942. This meant that the whole of the heavy and medium bomber force was now available for this task. During October and November, particular attention was paid to the Bay of Biscay in support of operation Torch, the number of mines laid in that area increasing to 417 in October and rising to 607 in November. This feat drew a letter of congratulation from the Admiralty on 30 November in which they stated that apart from the material damage inflicted, the dislocation of the U-boat traffic in the Bay was a valuable contribution to the anti-submarine campaign.

S.23824/Vol.5
45A

It is not proposed to examine the results of Bomber Command's intensive minelaying campaign in detail as these are dealt with in a separate Narrative.⁽¹⁾ In general it may be said that, in comparison with the effort called for by the Admiralty in other tasks connected with the war at sea it was, sortie for sortie, considerably more effective than any other type of operation. Nor did it require any diversion of effort from the strategic bombing of Germany. As the C-in-C had pointed out, minelaying could not only be used as a final training for inexperienced crews but, on the many occasions when weather precluded normal bombing, it could be carried out by the entire force without prejudice to its primary commitments. Indeed, in January, 1943, it was decided to extend this effort to counter the occasions when weather at bases was unfit for flying of any sort by allowing Groups, at their own discretion, to despatch small forces in daylight to lay mines in suitable areas at dusk, returning to base before poor conditions set in over this country.

AHB/IIH/2A/3/515(5)
BG/S.23824/
Vol.5 69A
6.1.43

(vii) Summary and Conclusions

Between March, 1942 and January, 1943, the strategic bombing force flew no less than 8,520 sorties or 23.7% of the total operational effort on tasks directly connected with the war at sea. These figures do not include the 7,100 sorties flown against the German Baltic and North West ports which accounted for a further 20% of the total effort during this period; nor do they take into account the indirect effects on German submarine production resulting from the damage or destruction of component factories or the general reduction of the morale of the industrial workers during the course of the strategic bombing campaign. Indirect effects apart, 15,620 sorties of 4.3% of the total operational effort directed to tasks or against objectives which were primarily Naval in character at a time when the main aim of the strategic bombing offensive was the intensive attack of German industry and morale, cannot be lightly disregarded.

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(1) "The R.A.F. in Maritime Warfare".

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It would be incorrect, however, to regard this effort as wholly diversionary. Minelaying, as has been seen, could be and, in the main, was carried out either by inexperienced crews or by the main force on occasions when weather precluded normal bombing operations. Nor can the high proportion of the offensive effort devoted to the German Baltic and North West ports be considered in isolation from strategic bombing policy at this time. In the terms of the February Directive, this aimed at the reduction of German civilian morale and particularly that of the industrial workers by the intensive bombardment of heavily populated towns which were comparatively easy to find and did not require deep penetration. It is true that the German ports were important Naval targets and their attack on high priority had frequently been urged by the Admiralty in connection with the anti-submarine campaign. But as major German cities they had also been included in the former category as alternative targets for area attack when weather and other tactical considerations precluded operations in the primary Ruhr area. On those grounds it is apparent that as far as German ports are concerned there can be no clear-cut division between offensive and defensive bombing.

On the other hand, the high priority given to the attack of Lorient in January, 1943, when considerable damage was done to the town and docks area without any very noticeable effect on submarine operations cannot be regarded as anything but a major diversion of effort which might well have been put to better use elsewhere. Apart from detachments and transfers to Coastal Command in 1942 discussed in Part I of this Volume, Bomber Command also lost the use of the equivalent of an entire heavy bomber squadron which for over five months was solely engaged on anti-submarine duties. Finally the numbers of smaller raids on docks and submarine yards in Germany and the considerable effort put out by the light bombers against shipping in the Channel ports all contributed to the diversion of the strategic bombing force from its primary task; an effort which might more profitably have been expended against industrial targets in German and German Occupied Territory which were making a direct contribution to the enemy's war effort.

/German Ports

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Target or Purpose	Number of Ops.		Number of Sorties		Losses (1)		Total Tonnage and No. of Mines Laid
	Day	Night	Day	Night	Day	Night	
German Ports							
Bremen	15	7	40	2,490	3	185	4,131.7
Bremerhaven	3	-	3	-	-	-	1.8
Danzig	1	-	44	-	2	-	56.3
Emden	12	7	44	894	2	41	1,591.4
Emmerich	2	-	6	-	-	-	1.8
Flensburg	4	4	16	201	3	22	386.7
Hamburg	4	7	13	1,546	-	40	2,227.3
Kiel	7	3	7	444	-	21	745.3
Lubeck	3	1	24	234	2	3	340.2
Rostock	-	4	-	521	-	10	750.6
Vegesack	4	2	5	123	1	6	273.5
Wilhelmshaven	9	2	18	487	1	7	1,045.3
Total	64	37	220	6,940	14	335	11,551.9
Naval Units							
Gdynia	-	1	-	9	-	-	14.5
("Graf Zeppelin") Trondheim ("Tirpitz") etc.	-	3	-	111	-	13	130.4
Total		4		120		13	144.9
Occupied Ports							
Bordeaux	1	-	-	6	1	-	5.4
Boulogne	5	5	48	84	2	5	80.2
Cherbourg	11	1	108	31	2	1	74.9
Den Helder	7	-	26	-	1	-	10.0
Dieppe	2	5	12	66	-	2	71.7
Dunkirk	7	5	60	134	2	5	238.6
Flushing	7	-	62	-	5	-	51.6
Gironde	2	2	10	12	1	-	12.4
Le Havre	11	16	138	292	3	6	487.1
Le Trait	1	-	9	-	-	-	8.0
Lorient	-	6	-	675	-	17	1,193.8
Nantes	-	3	-	47	-	-	39.4
Ostend	1	2	12	26	-	2	42.6
Rouen	1	-	12	-	-	-	10.8
St. Malo	2	-	30	-	-	-	26.3
St. Nazaire	-	13	13	337	-	10	296.6
Total	58	58	540	1,710	17	48	2,649.4
Anti-Submarine, Anti-Shipping & Convoy Escort	-	-	1,328		37		
Minelaying	-	-	53	4,867	2	170	10,491 mines

(1) Aircraft missing and Cat. "E"

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ANNEX II

THE U.S.A.A.F. IN THE BRITISH ISLES IN 1942

(i) Build-up of the USAAF and VIII Bomber Command

"Army Air Forces
in World War II"
Vol. 1 P136/137

It is not the purpose of this Narrative to recount in detail the history of Anglo/American relations during World War II nor yet the difficulties facing the Americans in their efforts to build-up the necessary administrative organisation and operational control for the American Army Air Forces in Great Britain in 1942. (1) It is sufficient to say that a very close liaison had existed between the respective Staffs since the early days of the war which had become even more pronounced with the initiation of a series of "conversations" in January, 1941, between the members of the British Delegation in Washington and the American Staff Committee and reached a peak at the Atlantic conference between the President and Prime Minister in the summer of the same year. The conversations between the British and American representatives had been called to determine a basis of general strategy in the event of the United States "being compelled to go to war", to co-ordinate broad plans for the employment of the joint forces and to reach agreements for military co-operation, areas of responsibility, principles of command and the forces to be involved. Already it was mutually accepted that, since Germany was the predominant member of the Axis, the Atlantic and European area was the decisive theatre; that the Anglo/American effort would therefore be exerted in that direction; and that operations elsewhere would be conducted in such a fashion as to facilitate that end. Thus, when at the end of 1941, the events at Pearl Harbour finally forced a decisive issue, the Allies already had a background of broad strategy and preparatory organisation on which to build their future plans. The Washington Conference in effect no more than affirmed the agreement already reached that the defeat of Germany should be the first task of the Allies although a wary eye must of necessity be kept on events in the Pacific.

Ibid
Page 571

Page 575

The line which the offensive was to take, however, had still to be determined although it was evident from the start that the President, no doubt under pressure of strong public opinion (2) was determined to see his troops in action in 1942. There is little doubt that the delays and difficulties in the build-up of the U.S.A.A.F. in Britain were at least partly due to the fluctuations of grand strategy at that time (3) which ranged from a continuation of earlier proposals for an offensive in North west Africa (Gymnast) to a land offensive on the Continent in 1943 (Roundup) and/or an emergency landing in 1942 (Sledge-Hammer) and culminated in the decision in July, 1942, to launch a major offensive in North West Africa under the new code name Torch.

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- (1) For further information see AHB Narrative "Anglo/American Collaboration in the Air war over North West Europe" and the American official History of "The Army Air Forces in World War II".
- (2) Popular demand for a Second Front in Europe, already strong in Britain was becoming increasingly vocal in the United States and it was accepted that for reasons of national morale, offensive action on some front in 1942 was definitely needed. (See "Army Air Forces in World War II" Vol. I. Page 562).
- (3) See Chapter 14.

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Ibid
Page 580

On 8 January, 1942, Major General Chaney was designated Commanding General of the United States Army Forces in the British Isles (USAFBI). On 31 January, 1942, Brigadier General Eaker was designated Bomber Commander for USAFBI and on 22 February the first American Air Headquarters in Europe (US Army Bomber Command) was established with its Headquarters temporarily located at R.A.F. Bomber Command, High Wycombe. There General Eaker with a skeleton Staff set up his "shadow command" to study British methods and prepare for the arrival of the American Bomber Forces. On 15 April, he took over Wycombe Abbey (evacuated by one of the most famous girls' public schools in England at a fortnight's notice) and there set up his new Headquarters a few miles from and in close collaboration with the R.A.F. Bomber Command.

Ibid
Page 618

Ibid
Page 620

Meanwhile, on the other side of the Atlantic, the build-up of the Eighth Air Force was forging ahead under the direction of Major General Spaatz. From its inception, the Eighth had been intended for action in the European Theatre, but was originally designed as a mobile tactical airforce for use in connection with the projected landings in North West Africa, whereas the American Bomber Force in Britain was intended to be primarily strategic. By the end of March, 1942, plans for Gymmast had been temporarily shelved and at the suggestion of General Spaatz, the now taskless Eighth Air Force was used to form the nucleus of the USAAF in the British Isles. The new assignment involved a drastic change in the character of the force from tactical to strategic and yet more delays but nevertheless, overseas movement of advanced echelons began on 27 April. On 5 May, General Spaatz formally assumed command of the force with which he had been so long associated, although he himself did not reach England until June. In the interim, General Eaker had been charged with preparations for the reception of all airforce units and from 19 May until the opening of General Spaatz' Headquarters at Bushey Park in June, the Headquarters Detachment at High Wycombe remained the ranking A.A.F. Command in Britain. (1)

Ibid
Pages 614/
615

Ibid
Page 620

Ibid
Page 565

Meanwhile, on the level of higher strategy, the offensive in North West Africa had been shelved in favour of Roundup and Sledgehammer. As a result, the original conception of a purely strategic U.S. bomber force in Britain had to be modified and a more even balance struck between strategic and tactical requirements. From May onwards, planning for the flow of American Forces to Britain for the newly proposed commitments continued under the codename Bolero, and early negotiations between the two Powers culminated in the Arnold/Towers/Portal Agreement which was signed in London on 21 June, accepted by the American Joint Chiefs on 25 June and by the CCS on 2 July, 1942.

The Agreement stated that it was the policy of the President, concurred in by the Prime Minister, that powerful United States Air Forces must be created and maintained and that every appropriate aircraft built in the States should be manned by American crews subject to the following conditions:-

- (i) That the combined aim should be to create and bring into decisive action as quickly as possible fully trained British and American forces adequate for

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(1) At Appendix 23 is a chart showing the proposed chain of Command of the United States Army Air Forces as at 6 June, 1942. A more detailed Table of the Organisation of the Eighth Air Force in March, 1943, is at Appendix 24. For further details of organisation and functions see VD/80.

SECRET

the defeat of their enemies and that the combined resources of both countries should be used to the best advantage in creating and employing those air forces to that end.

- (ii) That the revision of previously agreed allocations of aircraft to Britain should be made so as to avoid weakening the combined strengths in any theatre.

In accordance with that policy the United States undertook to allocate aircraft to Great Britain and to maintain existing and projected squadrons of the R.A.F. and Dominions operating in theatres of British and American responsibility in which Units of the USAAF could not be substituted. In all other instances the United States undertook to assign to and maintain in British and Combined Theatres such American Air Forces as had been agreed. In effect, this allowed for a build-up in Britain by 1 April, 1943 as follows:- (1)

Heavy Bombers	Seventeen groups	(595)
Medium Bombers	ten groups	(570)
Light Bombers	six groups	(342)
Observation photo mapping	seven groups	(399)
Pursuit	twelve groups	(960)
Transport	eight groups	(416)

"Army Air Force in World War II" Vol. 1. Page 589

Meanwhile, planning and organisation for the Eighth Air Force was already going ahead on the basis of Bolero. On 8 June, 1942, a European Theatre of Operations, U.S.A. (ETOUSA) had been established by Presidential Directive and General Chaney (USAFBI) was designated Command of all the forces therein. This was little more than an honorary title, however, as on 20 June he was recalled to the States and succeeded by General Eisenhower who was soon to receive further responsibility as Allied Command for operation Torch. In the same month, General Spaatz arrived in London to take over his command of the Eighth Air Force and two months later, on 21 August, he was also designated Air Officer to ETOUSA. That step not only assured the active co-operation of an Air Officer in Theatre planning at its highest level but also marked the beginning of a close personal relationship between Generals Eisenhower and Spaatz which contributed greatly to the successful development and employment of American air power in the war against Germany.

Ibid Page 591

Although planning for Bolero was at last taking definite shape, the issue was soon due to be clouded once again by a reversal of grand strategy. By the end of July Torch had been definitely accepted as the main offensive in 1942 and although Roundup and Bolero continued on Paper, it was clear from the start that precedence accorded to Torch would seriously affect the build-up of United States Forces in Britain. Although conciliatory assurances were given to the contrary, it was all too evident to the Planners that, since

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(1) At Appendix 25 is a Table prepared for the Prime Minister on 3 July, 1942, giving the estimated stages of the build-up of these forces up to 1 April, 1943.

there was no other fund on which to draw, the provision of forces for North West Africa must inevitably be at the expense of Bolero. What actually occurred was that not only were aircraft, equipment and personnel diverted from the States to Torch but the first arrivals among the bomber squadrons in this country were singled out for the same task immediately they had obtained the required operational experience.

(ii) Co-operation with and Direction of VIII Bomber Command

As far as the American and R.A.F. Bomber Commands were concerned, a spirit of mutual co-operation and assistance had early been established. Considerable help was given to the Americans by the R.A.F. in the early months in all fields of operational and administrative activity and probably most of all in the field of Intelligence, R.A.F. Officers and personnel having been loaned to work with, advise and train American Intelligence Staffs until the latter were firmly established. In addition, when as a result of shortage of shipping and other difficulties, A.A.F. Units arrived without essential equipment and supplies, the R.A.F. furnished their requirements in ammunition, bombs, vehicles, spares, flying clothing and other necessities of all kinds. A very warm tribute which is worth quoting here was paid by General Eaker in his report to General Spaatz on 19 June on the "Work of the Advance Echelon" in which he wrote that the British:-

"in which theatre we have been understudying and operating for the past five months, have co-operated one hundred per cent in every regard. They have lent us personnel when we had none and have furnished us clerical and administrative staffs; they have furnished us liaison officers for Intelligence Operations and Supply; they have furnished us with transportation, they have housed and fed our people and they have answered promptly and willingly all our requisitions: in addition, they have made available to us for study their most secret devices and documents".

He added that he was extremely proud of the relations that had been established and was hopeful that they would be maintained by incoming Commanders and Staffs.

As far as the two Bomber Command Commanders were concerned, it is clear that from the start they had "got off on the right foot". The extent of the mutual regard and co-operation established between them is best reflected in a letter from General Eaker to Sir Arthur Harris on 30 July, 1942, proposing a method of co-ordination between the Commands and ending: "I shall continue to look upon you as the senior member of our firm - the elder brother in our bomber team". He suggested that:

- (i) He himself would continue to attend the C.-in-C's morning conferences while detailing a senior officer as liaison with the operations section. In addition every opposite number in the American Headquarters would maintain the closest liaison with the R.A.F. Staff Sections.
- (ii) Prior to the selection of targets by the Americans, the programmes would be gone over with Sir Arthur Harris and his staff to ensure that there was no conflict and to obtain the benefit of R.A.F. experience in target selection and operational methods.

/(iii)

Ibid
Page 651

AHS/
JH/241/3/679
100/S.28450
Encl: 2A
30.7.42.

SECRET

- (iii) Necessary diversions of aircraft as a result of weather and other difficulties either to American or R.A.F. airfields would be controlled by the R.A.F. Watch Officer and the American Liaison Officer at Bomber Command.

Those proposals met with the full agreement of the C-in-C who replied that he was supremely confident that so long as they retained their respective assignments, no difficulties of an operational or personal nature would arise.

"I myself and all the members of my Command who have been in official or unofficial relations with you and yours by now well appreciate that common doctrines prevail. We know full well that a mutual desire to vie in rendering the maximum possible service each to the other in our progress towards the common goal is the sole matter of likely competition between us. As from the date of the first operation of your first Unit in the Bomber Campaign, it is my insistence that you personally shall share as full partner with me in the conception and ordering of each day's operations".

Inevitably the differences and difficulties subsequently arose but they could and did not shake that strong basis of mutual regard and co-operation established between the two Commanders. The same attitude existed at a higher level and as a further step towards co-ordination, a series of weekly conferences⁽¹⁾ between the staffs of the Eighth Air Force and the Air Ministry was inaugurated at the end of August to thrash out problems of operational and administrative policy and procedure.

A.H.A. / ID4/385 and
AHB Narrative
"Anglo/American
Collaboration in
the Air War over
N.W. Europe"
paras. 397-401.

AHB Narrative
"Anglo/American
Collaboration
in the Air War
over N.W. Europe"
Paras. 321-328.

Meanwhile, by the end of July, the first American Bomber Group with its supporting fighter-Group and ground echelons had arrived in England and the question of the operational employment of the VIII Bomber Command became a matter of immediate importance. From the first it was evident that the Americans, convinced of the inadequacy of night bombing, were firmly wedded to their conception of their bomber force in a daylight offensive role against Germany and equally to their determination to employ their fighters in direct support of the bombers and not for the air defence of Great Britain. On both those counts they faced strong opposition on this side of the Atlantic. Indeed, as is accurately stated in their official history of the air war, it was to be many months before the Prime Minister and the Air Staff were finally convinced of the possible success of a daylight offensive against German targets. No doubt influenced by the results of operations with the Flying Fortress in 1941, and, more recently, by daylight attacks on the German battleships at Brest, the Air Staff maintained the view that daylight fighter-escorted raids could not reach targets sufficiently vital to the German war effort and that the main bomber offensive into Germany must be by night. Nevertheless they were anxious to see American bombers in action as soon as possible and, in spite of misgivings, by

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(1) Committee for the Co-ordination of Current Air Operations.

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the end of March, British and American views had been at least partially reconciled; mainly as a result of General Arnold's statement that he did not propose to attempt daylight bombing of Germany until after the German fighter force had been defeated.

Nevertheless, when General Eisenhower arrived in June to take over command of the ETOUSA, he brought with him a letter of instruction which clearly constituted the real directive under which the A.A.F. were to operate. This laid down that all air units based in the United Kingdom were to be integrated into the Eighth Air Force under General Spaatz. The basic role of the A.A.F. fighter units was to be the direct support of bomber operations and they were not to be integrated with British Fighter Units employed in the defence of Great Britain. The strategic control of air operations already vested in the British Government⁽¹⁾ should be construed to mean general strategic directives as to purpose and broad objectives but was not to include designation of targets or tactical control of operations.

Ibid

As regards the mission of the ETOUSA, the general aim was to gain air supremacy over Western Europe in preparation for and in support of a combined sea, land and air movement across the channel. This was clearly based on plans for Roundup and Sledgehammer. The initiation of Torch somewhat altered the complexion of things although no radical change in the command structure was required. The Eighth Air Force was thus enabled to transfer to the Twelfth (earmarked for North West Africa) the responsibility for air/ground co-operation and to revert to the earlier conception of an extended period of strategic bombardment in co-operation with the R.A.F. This involved the closest liaison between the American and British Bomber Commands which, as has been seen, had already been established.

Ibid

Page 607

With the change-over from Bolero to Torch, General Eaker was able to describe the mission of VIII Bomber Command as the destruction of carefully chosen strategic targets with the subsidiary purpose of determining American capacity to destroy pinpoint targets by daylight precision bombing and, to beat off enemy fighter and flak opposition.

Although the British Staffs were by no means happy or convinced of the suitability of American aircraft for attacking heavily defended targets in daylight, they were prepared to agree to a trial run and by 4 September, 1942, essential agreement as to immediate policy had been reached between the Air Staff and General Spaatz. In a "Joint American/British Directive on Day Bomber Operations involving Fighter Co-operation" which was issued on 8 September,⁽²⁾ it was stated that the aim of the day bombardment by Allied Air Forces based in the British Isles would be to achieve continuity in the bombing offensive against the Axis. The R.A.F. and American Bomber Commands would be the main instruments respectively for

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(1) Section I of S.D. 348 published in March, 1942 and based directly on agreements reached at the Washington Conference stated that:

"The strategic direction of the USAAF would be exercised by the British Government through the Commander of the USAFBI. The USAAF would maintain their national identity in the theatre of war and the chain of command would be as determined by the Commanding General, U.S.A.F.B.I."

(2) See Appendix 26.

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night and day air bombardment. The night bombing aim and method would be as already defined in Air Ministry Directives while the aim of daylight operations would be achieved by the destruction and damage of precise targets vital to the Axis war effort.

Ibid
31.8.42.

Within that general conception, the American daylight offensive was planned in three Phases. Owing to the existing shortage of American Fighters, Phase I operations would be limited to targets within the radius of British fighter protection, reinforced where possible by American fighters. In Phase 2, direct protection of the American Bombers would be afforded by their own fighters, British fighters being used principally for diversionary sweeps and withdrawal cover. Areas of attack would therefore be determined by the longer range of the American fighters which were to be exploited to increase the depth of penetration of the bombers and to widen the frontage of attack. In Phase 3, the 8th Bomber Command would develop its full daylight offensive against Germany, receiving such support and co-operation as would be required from R.A.F. fighters. Finally, during the development of the daylight offensive, R.A.F. day bombers would be used in the secondary role to add weight to R.A.F. diversionary operations and to maintain attacks during periods unsuitable for the operation of American heavy bombers.

The mission of the U.S.A.A.F. in North West Europe had thus been unequivocally stated. Whether they could achieve all that they hoped and was expected of them would depend very much on the availability of adequate resources and, as has been seen, those resources were already being seriously menaced by Operation Torch.

AIB Narrative
"Anglo/American
Collaboration in
the Air offensive
over N.W. Europe".
Para. 396.

Meanwhile, the principles of higher command had not yet been fully resolved in relation to the new strategic situation and in the light of the directive to General Eisenhower. In order to bring the relevant section of S.D. 348 up to date, the staff Officers of J.O.M. (US) had been endeavouring to draft a statement which would find mutual acceptance as a precise definition of the principles involved. On 5 August, the draft was submitted to ETOUSA and was agreed subject to slight modifications which were accepted by the Air Ministry on 21 September. A few days later the revised Section of S.D. 348 was issued and is sufficiently important to be quoted in full:

- (i) The Commanding General European Theatre of Operations prepares and carries on military operations against the Axis Powers and their Allies under strategical directives of the Combined United States/British Chiefs of Staff.
- (ii) All U.S. Army Troops (including the Eighth Air Force) in the British Isles are under the command of the Commanding General, ETOUSA.
- (iii) The term "strategical direction" is understood and employed to mean the function of prescribing for a force as a whole the general mission which it is to carry out and such modifications of that

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general mission as may from time to time become necessary or desirable without any control of details of tactical operations or administrative matters.

- (iv) The term "operational control" is understood and employed to mean the functions of prescribing initially and continuously the details of tactical missions and operations to be carried out by forces and by all elements of those forces together with modifications thereof without the responsibility or authority for controlling matters of administration, discipline or statutory authority or responsibility for such matters as promotion, transfer, relief and assignment of personnel.
- (v) This definition of operational control is operative whether United States troops are under the operational control of a British Commander or vice versa.
- (vi) The Channel of command for the Eighth Air Force Units allocated to operations in close support of the U.S. Army will be laid down by the Commanding General Eighth Air Force at that time.
- (vii) Units of the Eighth Air Force may be placed under the operational control of R.A.F. Commands and similarly Units of the R.A.F. may be assigned for duty to a Command of the Eighth Air Force.
- (viii) In such cases operational units and staffs of any subordinate headquarters controlling these will maintain their national identity and will be administered by the Service to which they belong.

(iii) British Concern over American Bombing Offensive

Although six American light bombers had flown with R.A.F. light bombers against four aerodromes in Holland on 4 July and again on 12 July against the Abbeville-Drucat aerodrome⁽¹⁾ it was not until 17 August that the VIII Bomber Command operated independently. On that date 12 Flying Fortresses attacked the Sotteville Marshalling Yards, escorted by four squadrons of R.A.F. Spitfires, while five more provided withdrawal cover. By the end of October they had undertaken 21 bombing raids over France and two over Holland but had still not ventured to penetrate beyond Lille⁽¹⁾. In almost every case they had required strong escorts.

By this time, events in North West Africa were making it evident that Roundup in 1943 might have to be postponed and as a result the emphasis was once again swinging back towards a combined strategic bomber offensive on a vast scale. The unavoidable delays incurred by the VIII Bomber Command in passing on to Phase 3 of their planned offensive was therefore a matter of grave concern to the Prime Minister and the Air

/Staff

(1) Although in November, 1942, the Americans were already selecting precise targets for initial operations over Germany as soon as weather permitted, it was not until 27 January, 1943 in an attack on Wilhelmshaven that they dropped their first bomb on German soil.

SECRET

Staff of whom the former at least was increasingly doubtful of the ability of the Americans to carry out their intended daylight offensive against Germany without incurring prohibitive losses. This was the subject of much anxious discussion which has been examined elsewhere⁽¹⁾ and it is a measure of the Prime Minister's concern that on 10 January, 1943, he informed the Secretary of State for Air that it was his intention to discourage the President from sending over any more daylight bombers in large quantities until the question of the daylight offensive had been settled one way or the other. This most unwelcome suggestion was firmly refuted by Sir Archibald Sinclair who pointed out that such a step would only hamper the development of the American effort, the success of which would depend largely on the size of the force at their disposal.

P.M. Personal
Minute M.26/3
10.1.43.

A.H.B./103/915
GAS Folder
945
12.1.43.

A.H.B./103/915
GAS Folder
945
27.12.42.

In spite of the Prime Minister's misgivings, the British Air Staff maintained a more sanguinary view, attributing much of the American failure to develop their offensive to the impact of outside circumstances. Not only were their bombers in action on five different fronts other than the United Kingdom but the States War Department had set itself a vast expansion programme which inevitably made heavy inroads on trained personnel and experienced leaders who would otherwise have been available to leaven the front line squadrons. In their anxiety to get their forces over to the British Isles, the majority of the first arrivals had been inadequately trained and had had to complete their training over here and in action. The first units to get the necessary experience and to work up their efficiency had immediately been conserved for operation Torch and later arrivals had had to start again from scratch. In spite of those handicaps, they had achieved some very accurate bombing and had on a number of occasions operated beyond fighter escort range and had destroyed a substantial number of enemy fighters with little loss to themselves⁽²⁾.

The problem was not finally resolved until the Prime Minister met President Roosevelt at the momentous Casablanca Conference when it was confirmed that the American task should be the daylight bombardment of precise targets in Germany in complement to the R.A.F. strategic night bombing offensive. The following Table shows the strength of the USAAF in the British Isles at that time (i.e. 2 February, 1943):- ⁽³⁾

A.I.3 (USA)
11.2.43.

/Heavy Bombers

(1) See Chapter 20.

(2) See Appendix 27 for a Table of VIII Bomber Command operations between August, 1942, and January, 1943.

(3) On 27th July, 1943, approximately a year after the arrival of the first heavy bombers in the U.K. the number of heavy bomber squadrons formed or forming totalled 64 with a total U.E. of 512 aircraft and 874 aircraft on charge (plus 12 heavy escort bombers).

A.I.3 (USA)
3.8.43.

SECRET

A/c. Cat:	Sqdns. formed or forming	U.E. per sqdn.	Total U.E.	A/c on charge	Serviceable	
					Immedia- tely	Within 7 days
Heavy bombers	26	9	234	233	123	46
Medium bombers	1	14	14	19	11	3
Light bombers	1	14	14	16	6	1
Fighters	9	25	225	464	165	98
P.R.U.	1	13	13	18	3	9
Army Co-op:						
Fighters		6)		10	-	-
Bombers		6)		14	-	-
Obs. & Liaison a/c.	4	9)	84	72	-	-

APPENDICES

BOMBER COMMAND ORDER OF BATTLE
As at 1800 hours, 6 March 1942.

Unit		Location	I.E. + I.R.	Aircraft on Unit Charge	Remarks
Operational	Non-Operational				
<u>No. 1 Group</u>		<u>Bawtry</u>			
<u>Squadron</u>	<u>Squadron</u>				
(a) 103		Elsnam Wolds	16 + 2	18 Wellingtons Ic	
150		Snaith	16 + 2	17 Wellingtons Ic	
300		Hemswell	16 + 2	18 Wellingtons IV	
(Polish)					
301		Hemswell	16 + 2	18 " IV	
(Polish)					
304		Lindholme	16 + 2	17 " Ic	
(Polish)					
305		Lindholme	16 + 2	18 " II	
(Polish)					
12		Binbrook	24 + 3	24 " II	
(a) 142		Grimsby	16 + 2	19 " IV	
	460 (RAAF)	Breighton	16 + 2	20 " IV	
<u>No. 2 Group</u>		<u>Huntingdon</u>			
(a) 21	(d)(a) 110	Wattisham	16 + 4	20 Blenheims IV	Detachments of Nos. 18 and 21 squadrons overseas. Nos. 82 and 110 squadrons to be withdrawn for transfer overseas.
		Watton	16 + 4	1 " IV	
(a) 18	(d)(a) 82	Bodney	16 + 4	21 " IV	
		Wattisham	16 + 4	6 " IV	
(d)(a) 107	(d)(a) 105	Horsham St. Faith	16 + 4	7 Mosquitos	
(a) 114		Gt. Massingham	16 + 4	23 Bostons III	
(c)(a) 226		West Raynham	16 + 4	21 Blenheims IV	
(c)(a) 88		Swanton Morley	16 + 4	20 Bostons III	
		Attlebridge	16 + 4	20 Bostons III	
<u>No. 3 Group</u>		<u>Exning</u>			
(a) 57		Feltwell	16 + 2	19 Wellingtons III	
101		Bourn	16 + 2	14 " III	
	419 (RCAF)	Mildenhall	16 + 2	12 " Ic	
				6 " III	
115		Marham	16 + 2	19 " III	
(a) 9		Honington	16 + 2	21 " III	
(a) 75		Feltwell	16 + 2	20 " III	
(NZ)					
214		Stradishall	16 + 2	18 " Ic	
311		East Wretham	16 + 2	15 " Ic	
(Czech)					
	156	Alconbury	16 + 2	16 " Ic	
				4 " III	
218		Marham	16 + 2	13 Stirlings	
7		Oakington	16 + 2	15 "	
15		Wyton	16 + 2	10 "	
149		Mildenhall	16 + 2	11 "	
138		Stradishall		12 Whitleys V	No. 138 Squadron Special Duties under D. of Plans
(Special Duties)				3 Halifaxes	

/No. 4 Group

Unit		Location	I.E. + I.R.	Aircraft on Unit Charge	Remarks
Operational	Non-Operational				
<u>No. 4 Group</u>		<u>York</u>			
<u>Squadron</u>	<u>Squadron</u>				
51	102(½)	Dishforth	24 + 3	27 Witleys V	}Non-Operational }on Halifaxes
102(½)		Dalton	16 + 2	18 Halifax	
58		Dalton	24 + 3	7 Witleys V	
77	78(½)	Linton	24 + 3	20 Witleys V	}Non-Operational }on Halifaxes
78(½)		Leeming	24 + 3	18 " V	
		Croft	16 + 2	8 " V	
		Croft	16 + 2	13 Halifaxes	
		Driffield	16 + 2	18 Wellingtons II	
158	76	Pocklington	16 + 2	14 " II	
405		Linton	16 + 2	20 Halifaxes	
(RCAF)		Middleton St.	16 + 2	18 Halifaxes	
35		George			
10		Leeming	16 + 2	19 Halifaxes	
<u>No. 5 Group</u>		<u>Grantham</u>			
420	106(½)	Waddington	16 + 2	18 Hampdens	}Operational }on Hampdens
(RCAF)		North Luffenham	24 + 3	26 Hampdens	
144		Scampton	24 + 3	26 Hampdens	
49		Scampton	16 + 2	17 Manchesters	
83		Skellingthorpe	24 + 3	24 Hampdens	
50		Coningsby	24 + 3	14 Hampdens	
106(½)		Coningsby	16 + 2	9 Manchesters	
		North Luffenham	24 + 3	26 Hampdens	
408		Wigsley	24 + 3	26 Hampdens	
(RCAF)		Bottesford	16 + 2	18 Manchesters	
455		Woodhall Spa	16 + 2	12 Lancasters	
(RAAF)		Woolfax Lodge	16 + 2	17 Manchesters	
207		Skellingthorpe	16 + 2	15 Lancasters	
97					
61					
44					
(Rhodesian)					
<u>No. 8 Group</u>		<u>Brampton Grange</u>			
109		Upper Heyford [∅]		9 Ansons	}Operational }on Wellingtons. }Under No.26 }Signals Group.
(Special Duties)		Wyton*		19 Wellingtons Ic	
		Boscombe Down		1 Lancaster	
		∅ No. 7 Group Station			
		* No. 3 Group Station			

- Notes: (a) Squadrons trained in use of gas spray
- (c) Earmarked for reinforcement of Northern Ireland on Alert No. 1 or at the request of the War Office.
- (d) Squadrons concerned in maintaining two Blenheim Squadrons on operations in Malta.

/BOMBER COMMAND

BOMBER COMMAND OPERATIONAL TRAINING UNITSAs at 6 March 1942

Unit	Station	Satellite	Establishment of Aircraft		Remarks
<u>No. 6 Group Abingdon</u>					
10 O.T.U.	Abingdon	Stanton Harcourt	16 Ansons	54 Whitleys	
11 "	Bassingbourne	Steeple Morden	18 "	54 Wellingtons	Crews trained in No. 15 O.T.U. for Middle East (Polish)
12 "	Chipping Warden	Gaydon	14 "	40 "	
15 "	Harwell	Hampstead Norris	18 "	54 "	
18 "	Bramcote	Bitteswell	14 "	40 "	
19 "	Kinloss	Forres	16 "	54 Whitleys	
20 "	Lossiemouth	Elgin	18 "	54 Wellingtons	
21 "	Moreton-in- the-Marsh	Edgehill	18 "	54 "	
22 "	Wellesbourne- Mountford	Stratford	18 "	54 "	
23 "	Pershore	Difford	18 "	54 "	
27 "	Lichfield	Tatenhill	14 "	40 "	
<u>No. 7 Group Winslow</u>					
13 O.T.U.	Bicester	Hinton-in- the Hedges	16 Ansons	48 Blenheims	
14 "	Cottesmore	Saltby	13 "	49 Hampdens	
16 "	Upper Heyford	Croughton	13 "	49 "	
17 "	Upwood	Warboys	16 "	48 Blenheims	
25 "	Finningley	Bircotes	12 "	)36 Wellingtons)24 Manchesters	
26 "	Wing	Cheddington	12 "	-	
		Total	108 Whitleys 264 Ansons 480 Wellingtons	96 Blenheims 98 Hampdens 24 Manchesters	

/BOMBER COMMAND

BOMBER COMMAND ORDER OF BATTLE

As at 1800 hours, 6 March 1942

SUMMARY OF SQUADRONS ^{SE}

Squadrons Established			Type of Aircraft	Squadrons Operational ^φ			Squadrons Non-Operational		
No.	Total I.E. + I.R.	Total Strength		No.	On Type I.E. + I.R.	A/c. on Unit Charge	No.	On Type I.E. + I.R.	A/c. on Unit Charge
3	48 + 12	63	Boston III	3	48 + 12	63	-	- -	-
5	80 + 20	69	Blenheim IV	3	48 + 12	28	2	32 + 8	41
1	16 + 4	7	Mosquito	None	- -	-	1	16 + 4	7
9	144 + 36	139	Total Light Bombers	6	96 + 24	91	3	48 + 12	48
6	144 + 18	104	Hampden	6	144 + 18	104	-	- -	-
1	16 + 2	18	"	1	16 + 2	18	-	- -	-
3	72 + 9	80	Whitley V	3	72 + 9	80	-	- -	-
7	112 + 14	113	Wellington 1c	5	80 + 10	85	2	32 + 4	28
3	48 + 6	50	Wellington II	3	48 + 6	50	-	- -	-
1	24 + 3	24	" II	1	24 + 3	24	-	- -	-
5	80 + 10	103	" III	5	80 + 10	93	-	- -	10
4	64 + 8	75	" IV	3	48 + 6	55	1	16 + 2	20
30	560 + 70	567	Total Medium Bombers	27	512 + 64	509	3	48 + 6	58
3	48 + 6	61	Manchester	3	48 + 6	52	-	- -	9
4	64 + 8	49	Stirling	4	64 + 8	49	-	- -	-
5	80 + 10	88	Halifax	2	32 + 4	39	3	48 + 6	49
2	32 + 4	27	Lancaster	2	32 + 4	27	-	- -	-
14	224 + 28	225	Total Heavy Bombers	11	176 + 22	167	3	48 + 6	58

* Excluding Nos. 138 and 109 Special Duty Squadrons.

^φ Includes two Blenheim Squadrons Overseas (See Note (d)).

G.169087/VY/2/50/30

/BOMBER COMMAND MISCELLANEOUS

BOMBER COMMAND MISCELLANEOUS TRAINING UNITS

As at 6 March 1942

Unit	Location
<u>No. 1 Group</u>	
1520 B.A.T. Flight	Holme
1481 T.T. and G. Flight	Binbrook
<u>No. 2 Group</u>	
1508 B.A.T. Flight	Horsham St. Faith
1515 B.A.T. Flight	Swanton Morley
1517 B.A.T. Flight	Ipswich
1482 T.T. and G. Flight	West Raynham
<u>No. 3 Group</u>	
1503 B.A.T. Flight	Mildenhall
1504 B.A.T. Flight	Wyton
1505 B.A.T. Flight	Honington
1513 B.A.T. Flight	"
1519 B.A.T. Flight	Feltwell
1521 B.A.T. Flight	Stradishall
1483 T.T. and G. Flight	Newmarket
1651 Conversion Unit	Waterbeach
7 " Flight	Oakington
15 " "	Wyton
149 " "	Mildenhall
218 " "	Marham
1418 Flight	Tempsford
1429 Czech Op. Trg. Flight	East Wretham
<u>No. 4 Group</u>	
1502 B.A.T. Flight	Driffield
1512 " "	Dishforth
1516 " "	Middleton St. George
1484 T.T. and G. Flight	Driffield
1652 Conversion Unit	Marston Moor
10 " Flight	Leeming
35 " "	Linton-on-Ouse
76 " "	Middleton-St. George
78 " "	Croft
102 " "	Dalton
<u>No. 5 Group</u>	
1506 B.A.T. Flight	Waddington
1514 " "	Coningsby
1518 " "	Scampton
1524 " "	Newton
1485 T.T. and G. Flight	Scampton
44 Conversion Flight	Waddington
97 " "	Coningsby
61 " "	Woolfox Lodge
83 " "	Scampton
106 " "	Coningsby
207 " "	Bottesford

Unit	Location
<p><u>No. 6 Group</u></p> <p>1501 B.A.T. Flight 1443 F.T. and D. Flight</p>	<p>Abingdon Harwell</p>
<p><u>No. 7 Group</u></p> <p>1506 B.A.T. Flight 1511 " " 1442 F.T. " 1428* Hudson Trg. Flight 1444* " F.T. "</p>	<p>Finningley Upwood Bicester Horsham St.Faith Horsham St.Faith</p>
<p><u>No. 8 Group</u></p> <p>1653 Conversion Unit</p>	<p>Polebrook</p>

* Lodger Units on a No. 2 Group Station

As at 1800 hrs. 18th September, 1942

UNIT		LOCATION	I.E. + I.R.	AIRCRAFT ON UNIT CHARGE	REMARKS
OPERATIONAL	NON-OP.				
<u>No. 1 GROUP</u>		<u>BAMTRY</u>			
<u>Squadrons</u>	<u>Squadrons</u>				
(d) 12		Binbrook	16 + 2 - -	8 Wellington III 15 " II	Re-equipping. Formerly established as 24+3 Well. II.
103		Elsham Wolds	16 + 2	14 Halifax	
(d) 142		Grimsby	16 + 2	1 Wellington III 15 " IV	Re-equipping to Mark III
(b) 150		Snaitth	16 + 2	16 " III	
300 (Pol)		Ingham	16 + 2	12 " IV	Operating on 10+2 Estab.
301 (Pol)		Hemswell	16 + 2	12 " IV	" " "
305 (Pol)		Hemswell	16 + 2	9 " IV 1 " II	" " "
	460 (RAAF)	Breighton	16 + 2	9 Halifax 2 Wellington IV	Re-equipping. Formerly established as 16+2 Well. IV.
<u>No. 2 GROUP</u>		<u>HUNTINGDON</u>			
	(a) 18	West Raynham	16 + 4	13 Blenheim V 25 " IV	Re-equipping. Formerly established as 16+4 Blenheim IV.
	(a) 21	Bodney	16 + 4	16 Ventura 1 Blenheim IV	" " " "
(a)(c) 88	98	Attlebridge	16 + 4	12 Boston III	Forming.
105		West Raynham	16 + 4	9 Mitchell	
		Horsham St. Faith.	16 + 4	17 Mosquito	
(a) 107	(a) 114	Gt. Massingham	16 + 4	16 Boston III	
		West Raynham	16 + 4	15 Blenheim V 14 " IV	Re-equipping. Formerly established as 16+4 Blenheim IV.
	139	Horsham St. Faith.	16 + 4	10 " V	
	180	West Raynham	16 + 4	- Mitchell	Forming.
(a)(c) 226	464 (RAAF)	Swanton Morley	16 + 4	20 Boston III	
	487 (RNZAF)	Feltwell	16 + 4	2 Ventura	
		Feltwell	16 + 4	2 Ventura	
<u>No. 3 GROUP</u>		<u>EXNING</u>			
(b) 7 PFF		Oakington	16 + 2	13 Stirling	
15		Bourn	16 + 2	12 "	
(b) 35 PFF		Gravelly	16 + 2	17 Halifax	
(a) 75 (H. Z.)		Mildenhall	16 + 2	10 Wellington III	
85 PFF		Wyton	16 + 2	19 Lancaster 2 Manchester	
(b) 101		Stradishall	16 + 2	- Stirling 16 Wellington III	On Wellingtons. Due to re-equip with Stirlings.
115		Marham	16 + 2	17 " III	
149		Lakenheath	16 + 2	15 Stirling	
(b) 156 PFF		Warboys	16 + 2	15 Wellington III	
(b) 214		Stradishall	16 + 2	10 Stirling	
218		Downham Market	16 + 2	14 "	
	109 (Special)	Wyton	8 + 1 2 + 1 10 + 3	5 Mosquito 3 Wellington IC - " IV 1 Lancaster	Special Duties under No. 26 Signals Group.

/No. 3 Group (cont.)

UNIT		LOCATION	I. E. + I. R.	AIRCRAFT ON UNIT CHARGE	REMARKS
OPERATIONAL	NON-OP.				
<u>No. 3 GROUP (cont)</u>					
138 (Special)		Tempsford	10 + 2 5 + 0	9 Halifax) 7 Whitley V)	
161 (Special)		Tempsford	7 + 0 3 + 0 2 + 0 1 + 0 2 + 0 2 + 0	6 Lysander) 7 Whitley V) - Halifax) - Hudson) - Havoc) - Albemarle/ Hudson.)	<u>Special Duties</u> under A.C.A.S. (I)
<u>No. 4 GROUP</u>		<u>YORK</u>			
	10	Melbourne	16 + 2	12 Halifax	
	76	Linton-on-Ouse	16 + 2	9 "	
78		" " "	16 + 2	15 "	
102		Pocklington	16 + 2	16 "	
158		East Moor	16 + 2	15 "	
(b) 405 (RCAF)		Topcliffe	16 + 2	20 "	
(b) 419 "		"	16 + 2	16 Wellington III	
	420 (RCAF)	Skipton	16 + 2	10 " III 3 Hampden	Re-equipping. Formerly established as 16+2 Hampdens
	425 (French Canadian)	Dishforth	16 + 2	14 Wellington III	
<u>No. 5 GROUP</u>		<u>GRANTHAM</u>			
(a) 9		Waddington	16 + 2	15 Lancaster 1 Manchester	
44 (Rhodesia)		Waddington	16 + 2	20 Lancaster 1 Manchester	
49		Scampton	16 + 2	16 Lancaster 5 Manchester	
50		Swinderby	16 + 2	18 Lancaster 2 Manchester	
	(b) 57	Scampton	16 + 2	6 Lancaster 8 Manchester 2 Wellington III	Re-equipping. Formerly established as 16+2 Wellington III Detachment with Coastal Command at St. Eval.
61		Syerston/ St. Eval.	16 + 2	14 Lancaster 1 Manchester	
97		Woodhall Spa.	16 + 2	19 Lancaster 1 Manchester	
106		Coningsby	16 + 2	15 Lancaster 5 Manchester	
207		Syerston	16 + 2	20 Lancaster	
	408 (RCAF)	Balderton	16 + 2	- Halifax - Hampden	Re-equipping with Halifax. Formerly established as 24+3 Hampden.

- (a) Squadrons trained in use of gas spray.)
 (b) Squadrons detailed for training in gas bombing.) Authority S.4392, Encl. 72A.
 (c) Earmarked for reinforcement of Northern Ireland on Alert No. 1 or at the request of the War Office.
 (d) Squadrons fully trained in parachute dropping.

/SUMMARY OF SQUADRONS

SUMMARY OF SQUADRONS

TYPE OF AIRCRAFT	OPERATIONAL SQUADRONS			NON-OPERATIONAL SQUADRONS		
	No.	Total I.E. + I.R.	A/C on Unit Charge	No.	Total I.E. + I.R.	A/C on Unit Charge
<u>Light Bombers</u>						
BLENHEIM IV	-	-	-	-	-	40
BLENHEIM V	-	-	-	3	48 + 12	38
BOSTON III	3	48 + 12	48	-	-	-
MOSQUITO	1	16 + 4	17	-	-	-
VENTURA	-	-	-	3	48 + 12	20
MITCHELL	-	-	-	2	32 + 8	9
<u>Medium Bombers</u>						
WELLINGTON II	-	-	16	-	-	-
WELLINGTON III	7	112 + 14	99	2	32 + 4	26
WELLINGTON IV	1	16 + 2	15	-	-	2
WELLINGTON IV	3	30 + 6	33	-	-	-
HAMPDEN	-	-	-	-	-	3
<u>Heavy Bombers</u>						
STIRLING	5	80 + 10	64	-	-	-
HALIFAX	6	96 + 12	97	4	64 + 8	30
MANCHESTER	-	-	18	-	-	8
LANCASTER	9	144 + 18	156	1	16 + 2	6
<u>Special Duties</u>						
<u>Squadrons</u>						
MOSQUITO)		-	-		8 + 1	5
WELLINGTON IC)		-	-		2 + 1	3
WHITLEY V)	2	8 + 0	14	1	10 + 3	-
HALIFAX)		12 + 2	9		-	-
LANCASTER)		-	-		-	1
LYSANDER)		7 + 0	6		-	-
T O T A L S	37	569 + 80	592	16	260 + 51	191

AHB / TH/84
A.M.W.R.

23.9.1942.

/BOMBER COMMAND TRAINING UNITS

BOMBER COMMAND TRAINING UNITS

As at 1800 hrs. 18th September, 1942

UNIT	LOCATION	AIRCRAFT			REMARKS
		I.E. + I.R.	TYPE	ON UNIT CHARGE	
<u>No. 1 GROUP</u>					
1520 B.A.T. Flight	Holme	6 + 2	Oxfords	9	
1481 T.T. & G. Flight	Binbrook	8 + 0	Whitleys	3	
		7 + 3	Lysanders	8	
		2 + 0	Defiants	2	
1653 Conversion Unit	Snaitth (Burn)	16 + 2	Wellingtons IC	3	
			Liberator II	5	
			Blenheim	1	
Air Bomber Training Flight.	Binbrook	6 + 2	Oxford	8	
No. 103 Conversion Flight.	Elsham Wolds	8 + 0	Halifax	6	
No. 160 " " "	Holme	8 + 0	Halifax	8	
<u>No. 2 GROUP</u>					
No. 1508 B.A.T. Flt.	Horsham St. Faith.	4 + 1	Oxfords	6	
No. 1515 " "	Swanton Morley	6 + 2	Oxfords	8	
No. 1517 " "	Wattisham	6 + 2	Oxfords	9	
No. 1482 T.T. & G. Flight.	West Raynham	3 + 1	Defiants	2	
		4 + 0	Blenheims	8	
		6 + 2	Lysanders	6	
No. 1655 Conversion Flight.	Horsham St. Faith.	4 + 2	Blenheims	6	
		6 + 3	Mosquito	5	
<u>No. 3 GROUP</u>					
No. 1504 B.A.T. Flt.	Holme	4 + 1	Oxfords	5	
No. 1504 " "	Honington	4 + 1	Oxfords	5	
			Wellington	1	
No. 1505 " "	Mildenhall	4 + 1	Oxfords	5	
No. 1513 " "	Honington	6 + 2	Oxfords	8	
No. 1519 " "	Feltwell	6 + 2	Oxfords	8	
No. 1521 " "	Stradishall	6 + 2	Oxfords	9	
No. 1483 T.T. & G. Flight.	Marham	7 + 3	Lysanders	8	
		2 + 0	Defiants	2	
		8 + 0	Whitleys		
			Wellingtons	10	
Air Bomber Training Flight.	Marham	6 + 2	Oxfords	4	
No. 1651 Conversion Unit.	Waterbeach	16 + 0	Stirlings	15	
			Oxford	1	
No. 7 Conversion Flight.	Oakington	8 + 0	Stirlings	4	
No. 15 " "	Wyton (Waterbeach)	8 + 0	Stirlings	4	
No. 101 " "	Oakington	8 + 0	Stirlings	5	
No. 149 " "	Mildenhall (Lakenheath)	8 + 0	Stirlings	6	
No. 214 " "	Stradishall (Waterbeach)	8 + 0	Stirlings	4	
No. 218 " "	Marham	8 + 0	Stirlings	7	
No. 1474 Flight	Tempsford (Grandsen Lodge)	8 + 1	Wellingtons	9	
No. 1 B.D.U.	Tempsford (Grandsen Lodge)	6 + 0	Wellingtons	5	
		2 + 0	Halifax	1	
		1 + 0	Lancaster		
		1 + 0	Stirling		
		1 + 0	Proctor	1	
			Albemarles	3	

No. 4 GROUP

UNIT	LOCATION	AIRCRAFT			REMARKS
		I.E. + I.R.	TYPE	ON UNIT CHARGE	
<u>No. 4 GROUP</u>	<u>YORK</u>				
No. 1502 B.A.T.Flt.	Linton-on-Ouse (Driffield)	4 + 1	Oxfords Whitley Wellington	5 1 1	
No. 1512 " "	Topcliffe (Dishforth)	6 + 2	Oxfords	8	
No. 1516 " "	Middleton- St. George	6 + 2	Oxfords	8	
No. 1484 T.T. & G.Flt.	Driffield	5 + 0 8 + 0 7 + 3	Whitleys Defiants Lysanders	5 9 7	
Air Bomber Training Flight.	Driffield	6 + 2	Battles Oxfords	4 7	
No. 1652 Conversion Unit.	Marston Moor	16 + 0	Halifax	19	
No. 10 Conversion Flight.	Pocklington (Melbourne)	8 + 0	Halifax	8	
No. 35 " "	Marston Moor	8 + 0	Halifax	8	
No. 76 " "	Snaith (Riccall)	8 + 0	Halifax	7	
No. 78 " "	Snaith (Riccall)	8 + 0	Halifax	6	
No. 102 " "	Pocklington	8 + 0	Halifax	8	
No. 158 " "	Linton-on-Ouse (East Moor)	8 + 0	Halifax	8	
No. 405 " "	Topcliffe	8 + 0	Halifax	9	
<u>No. 5 GROUP</u>	<u>GRANTHAM</u>				
No. 1506 B.A.T.Flt.	Waddington	6 + 2	Oxfords	8	
No. 1514 " "	Coningsby	6 + 2	Oxfords	8	
No. 1518 " "	Scampton (Dunholme Lodge)	6 + 2	Oxfords	6	
No. 1485 T.T. & G.Flt.	Scampton (Dunholme Lodge)	6 + 2 2 + 0 8 + 0	Lysanders Defiants Manchesters	7 4 8	
Air Bomber Training Flight.	Scampton	6 + 2	Whitleys Oxfords	2 10	
No. 1654 Conversion Unit.	Swinderby (Wigsley)	8 + 0 8 + 0	Lancasters Manchesters	8 9	
No. 9 Conversion Flight	Waddington	4 + 0	Lancasters	2	
No. 44 " "	Waddington	4 + 0	Manchesters	4	
No. 44 " "	Waddington	4 + 0	Lancasters	3	
No. 49 " "	Scampton	4 + 0	Manchesters	3	
No. 49 " "	Scampton	4 + 0	Lancasters	3	
No. 50 " "	Swinderby (Wigsley)	4 + 0	Manchesters	4	
No. 50 " "	Swinderby (Wigsley)	4 + 0	Lancasters	3	
No. 61 " "	Syerston (Swinderby)	4 + 0	Manchesters	3	
No. 83 " "	Swinderby (Wigsley)	4 + 0	Lancasters	2	
No. 83 " "	Swinderby (Wigsley)	4 + 0	Manchesters	4	
No. 97 " "	Coningsby (Woodhall Spa)	4 + 0 4 + 0	Lancasters Manchesters	3 3	
No. 106 " "	Coningsby	4 + 0	Lancasters	2	
No. 106 " "	Coningsby	4 + 0	Manchesters	3	
No. 207 " "	Bottesford (Swinderby)	4 + 0	Lancasters	3	
No. 207 " "	Bottesford (Swinderby)	4 + 0	Manchesters	3	
No. 408 " "	Syerston	8 + 0	Halifax		

/No. 91 GROUP

UNIT	LOCATION	AIRCRAFT			REMARKS
		I.E. + I.R.	TYPE	ON UNIT CHARGE	
<u>No. 91 GROUP</u>		<u>ABINGDON</u>			
No. 10 O.T.U.	Abingdon	8 + 2	Ansons	10	
	(Swanton	60 + 20	Whitleys	51	
	Harcourt)	1 + 0	Defiant	1	
		2 + 0	Lysanders	2	
No. 11 "	Bassingbourne	8 + 2	Ansons	5	
	(Steeple	40 + 14	Wellingtons	32	
	Morden)	1 + 0	Defiant	1	
		2 + 0	Lysanders	2	
No. 12 "	Chipping Warden	30 + 10	Wellingtons	42	
		1 + 0	Defiant	1	
		2 + 0	Lysanders	2	
		8 + 2	Ansons	2	
No. 15 "	Harwell	14 + 4	Ansons	17	
	(Hampstead	40 + 14	Wellingtons	43	
	Norris)	1 + 0	Defiant	1	
		2 + 0	Lysanders	2	
No. 19 "	Kinloss	8 + 2	Ansons	7	
	(Forres)	40 + 14	Whitleys	52	
		1 + 0	Defiant	1	
		2 + 0	Lysanders	2	
No. 20 "	Lossiemouth	8 + 2	Ansons	7	
	(Elgin)	40 + 14	Wellingtons	47	
		1 + 0	Defiant		
		2 + 0	Lysanders	2	
No. 21 "	Moreton-in-Marsh	14 + 4	Ansons	15	
	(Edgehill)	40 + 14	Wellingtons	47	
		1 + 0	Defiant		
		2 + 0	Lysanders	1	
No. 22 "	Wellesbourne-	8 + 2	Ansons		
	Mountford	50 + 16	Wellingtons	41	
	(Stratford/	1 + 0	Defiant		
	Gaydon).	2 + 0	Lysanders	2	
No. 23 "	Pershore	30 + 10	Wellington	33	
		1 + 0	Defiant		
		2 + 0	Lysanders	2	
No. 1501 B.A.T.Flt.	Abingdon	4 + 1	Oxfords	5	
No. 1443 F.T. & D.Flt.	Harwell	2 + 0	Wellingtons	2	
			Ansons	2	
No. 1446 F.T.Flight.	Moreton-in-Marsh	2 + 0	Wellingtons	19	
Special Flight	Abingdon	26 + 0	Whitleys	35	
<u>No. 92 GROUP</u>		<u>WINSLOW</u>			
No. 13 O.T.U.	Bicester	8 + 2	Ansons	14	
	(Finmere)	36 + 12	Blenheims	53	
		1 + 0	Defiant	1	
		2 + 0	Lysanders		
No. 14 "	Cottesmore	40 + 14	Wellingtons	23	
	(Saltby)	1 + 0	Defiant	1	
		2 + 0	Lysanders	2	
			Oxfords	1	
			Hampdens	34	
			Ansons	9	
No. 16 "	Upper Heyford	8 + 2	Ansons	3	
	(Barford	40 + 14	Wellingtons	39	
	St. John/	1 + 0	Defiant	1	
	Hinton-in-	2 + 0	Lysanders	2	
	the Hedges.				

/No. 92 GROUP (cont)

UNIT	LOCATION	AIRCRAFT			REMARKS
		I.E. + I.R.	TYPE	ON UNIT CHARGE	
No. 92 GROUP (cont)	WINSLOW				
No. 17 O.T.U.	Upwood	4 + 1 18 + 6 1 + 0 2 + 0	Ansons Blenheims Defiant Lysanders	4 41 1 3	
No. 24 "	Honeybourne (Long Marston)	5 + 1 27 + 9 1 + 0 2 + 0	Ansons Whitleys Defiant Lysanders	6 36 1 2	
No. 26 "	Wing Little Harwood	5 + 1 27 + 9 1 + 0	Ansons Wellingtons Defiant	8 27 2	
No. 29 "	North Luffenham (Woolfax Lodge)	2 + 0 30 + 10 1 + 0 2 + 0	Lysanders Wellingtons Defiant Lysanders	2 42 1 2	
No. 1507 B.A.T.Flt.	Finningley	4 + 2	Ansons	1	
No. 1511 " "	Upwood	6 + 2	Oxfords	6	
No. 1429 (Czech Optl. Training Flight)	Litchfield (Church Broughton)	10 + 2 2 + 1	Oxfords Wellingtons	8 10	
No. 1473 Flight	Upper Heyford	4 + 0 6 + 2	Wellingtons Ansons	4 6	
B.A. Calibration Flight	Bicester	4 + 0 2 + 0	Ansons Masters	4 2	
3503 Servicing Unit	Upwood		Oxfords	4	
No. 93 GROUP	EGGINTON HALL				
No. 18 O.T.U. (Polish)	Bramcote (Bitteswell)	30 + 10 1 + 0 2 + 0	Wellingtons Defiant Lysander	34 1 1	
No. 25 O.T.U.	Finningley (Bircotes)	40 + 14 1 + 0 2 + 0 8 + 2	Wellingtons Defiant Lysanders Ansons	52 2 4 8	
No. 27 "	Litchfield (Tatenhill/ Church Broughton)	30 + 10 1 + 0 2 + 0	Wellingtons Defiant Lysanders	31 2 2	
No. 28 "	Wymeswold (Castle Donington)	20 + 7 1 + 0 2 + 0	Wellingtons Defiant Lysanders	31 2 2	
No. 30 "	Hixon (Seighford)	20 + 7 1 + 0 2 + 0	Wellingtons Defiant (Lysanders Battles)	29 1 1	
No. 61 "	Whitchurch Heath (Lleap)	20 + 7 1 + 0	Wellingtons Defiants		

/SUMMARY OF TRAINING UNITS

AMB/TH/84
Asst. Dir.

23.9.1942.

SUMMARY OF TRAINING UNITS.

	ALBEMARLE		ANSON		BATTLE		BLENHEIM		DEFIANT		HALIFAX		HAMPDEN		LANCASTER		LIBERATOR	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
O.T.U's			153	120	-	3	72	94	22	11			-	34				
T.T. & G. Flights					-	4	4	8	18	19								
Conversion Flights											80	68			36	24		
Conversion Units											16	19			8	8	18	5
Bombing Development Units	-	3									2	1			1	-		
F.T. & D. Flights			-	2														
No. 1473 Flight			8	6														
B.A. Calibration Flight			4	4														
Total	-	3	165	132	-	7	82	109	40	30	98	88	-	34	45	32	18	5
	LYSANDER		LANCASTER		MASTER		MOSQUITO		OXFORD		STIRLING		WELLINGTON		WHITLEY		PROCTOR	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
O.T.U's	42	38							-	1			761	593	160	139		
B.A.T. Flights									132	135			-	1	-	1		
T.T. & G. Flights	46	36	8	8									-	13	21	10		
Air Bombing Training Flights									32	29								
Conversion Flights			36	32							48	30	9	9				
Conversion Units			8	9							16	15						
Bombing Development Units							9	5	-	1	1	-	6	5			1	1
F.T. & D. Flights													2	2				
F.T. Flights													2	19				
Special Flights															26	35		
Czech Operational Training Flight									3	3			12	10				
No. 1473 Flight													4	4				
B.A. Calibration Flight					2	2			-	4								
Total	88	74	52	49	2	2	9	5	167	173	65	45	796	656	207	185	1	1

(a) Total Establishment I.E. + I.R.
 (b) Aircraft on Unit charge.

A.H.B./I.H./84.

A. H. W. R.

23.9.42.

G.169087/HCI/3/50/30

BOMBER COMMAND ORDER OF BATTLE

As at 1800 hours 4 February 1943

Unit		Location	Aircraft			Remarks
Opln.	Non-Opl.		I.E. + I.R.	Type	On Unit Charge	
<u>No. 1 Group</u>		<u>Bawtry</u>				
12		Wickenby	16 + 2	Lancaster	21	
				Wellington II	1	
101		Holme	16 + 2	Lancaster	18	
				Wellington III	1	
103		Elsham Wolds	16 + 2	Lancaster	19	
				Halifax	1	
460 (RAAF)		Brighton	16 + 2	Lancaster	17	
				Wellington IV	1	
166		Kirmington	16 + 2	Wellington III	21	
199		Ingham	16 + 2	Wellington III	20	
399 (Pol.)		Hemswell	16 + 2	Wellington III	8	(The three (Polish Sqdns. (are operating (to 10 + 2 (establishment
301 (Pol.)		Hemswell	16 + 2	Wellington IV	12	
305 (Pol.)		Hemswell	16 + 2	Wellington IV	10	
	100	Grimsby	16 + 2	Lancaster	20	
<u>No. 2 Group</u>		<u>Huntingdon</u>				
88 (a) (c)		Oulton	16 + 2	Boston III (A.20)	15	
107 (a)		Gt. Massingham	16 + 2	Boston III (A.20)	19	
226 (a)		Swanton Morley	16 + 2	Boston III (A.20)	14	
105		Marham	16 + 2	Mosquito	18	
139		Marham	16 + 2	Mosquito	10	
				Blenheim V	13	
21		Methwold	16 + 2	Ventura (B.34)	16	
464 (RAAF)		Feltwell	16 + 2	Ventura (B.34)	20	
487 (RNZAF)		Feltwell	16 + 2	Ventura (B.34)	21	
98		Foulsham	16 + 2	Mitchell (B.25)	20	
180		Foulsham	16 + 2	Mitchell (B.25)	19	
<u>No. 3 Group</u>		<u>Exning</u>				
15 (b)		Bourn	16 + 2	Stirling	20	
75 (N.Z.)		Newmarket	16 + 2	Stirling	15	
90		Ridgewell	16 + 2	Stirling	15	
149 (b)		Lakenheath	16 + 2	Stirling	17	
214 (b)		Chedburgh	16 + 2	Stirling	15	
218		Downham Market	16 + 2	Stirling	16	
115		East Wretham	16 + 2	Stirling	-	To re-equip. Opl. on Wellington. These Sqdns. are under the control of A.C.A.S(I).
				Wellington	17	
138 (Special)		Tempsford	13 + 2	Halifax	15	
161 (Special)		Tempsford	7 + 0	Lysander	8	
			5 + 0	Halifax	5	
			1 + 0	Hudson	1	
			2 + 0	Havoc	2	Det. on loan to C.C. at St. Eval.
			2 + 0	Albemarle/Hudson	2	
192 (Special)		Gransden Lodge	1 + 0	Halifax	2	
			8 + 3	Wellington X	12	
			3 + 0	Mosquito	3	
				Wellington IC	2	

Unit		Location	Aircraft			Remarks
Opln.	Non-Opl.		I.E. + I.R.	Type	On Unit Charge	
<u>No.4 Group</u>		<u>York</u>				
10		Melbourne	16 + 2	Halifax	31	
51		Snaith	24 + 3	Halifax	25	
				Whitley	2	
76		Linton-on-Ouse	16 + 2	Halifax	18	
77		Elvington	16 + 2	Halifax	19	
				Whitley	1	
78		Linton-on-Ouse	16 + 2	Halifax	18	
102		Pocklington	16 + 2	Halifax	17	
158		Rufforth	24 + 3	Halifax	27	
				Wellington II	1	
196		Leconfield	16 + 2	Wellington X	20	
429(RCAF)		East Moor	16 + 2	Wellington III	16	
				Wellington X	2	
466(RAAF)		Leconfield	16 + 2	Wellington X	16	
	431 (RCAF)	Burn	16 + 2	Wellington X	19	
<u>No.5 Group</u>		<u>Grantham</u>				
9		Waddington	16 + 2	Lancaster	19	
44(Rhod)		Waddington	16 + 2	Lancaster	16	
49		Fiskerton	16 + 2	Lancaster	16	
50		Skellingthorpe	16 + 2	Lancaster	19	
57		Scampton	16 + 2	Lancaster	17	
61		Syerston	16 + 2	Lancaster	19	
97		Woodhall Spa	16 + 2	Lancaster	16	
106		Syerston	16 + 2	Lancaster	17	
207		Langar	16 + 2	Lancaster	22	
467(RAAF)		Bottesford	16 + 2	Lancaster	24	
<u>No.6 Group</u>		<u>Allerton</u>				
<u>R.C.A.F.</u>						
405		Beaulieu	16 + 2	Halifax	18	Temporarily detached to Coastal Cmd.
408		Leeming	16 + 2	Halifax	15	
419		Middleton St. George	16 + 2	Halifax	16	
420		Middleton St. George	16 + 2	Wellington III	18	
424		Topcliffe	16 + 2	Wellington III	19	
425		Dishforth	16 + 2	Wellington III	18	
426		Dishforth	16 + 2	Wellington III	18	
427		Croft	16 + 2	Wellington III	19	
428		Dalton	16 + 2	Wellington III	10	
				Wellington X	5	
<u>No.8 Group</u>		<u>Wyton</u>				
7(PFF)		Oaklington	24 + 3	Stirling	21	Lodger unit on 3. Grp. Station.
35 "		Gravelly	24 + 3	Halifax	23	
83 "		Wyton	16 + 2	Lancaster	19	
109 "		Wyton	16 + 2	Mosquito	19	
				Wellington IC	2	
156(1/2)"	156(1/2)	Warboys	16 + 2	Lancaster	17	Re-equipping
				Wellington III	8	

- (a) Squadrons trained in use of gas spray. } Authority S.4392/A.C.A.S.Ops/26.11.42).
 (b) Squadrons trained for gas bombing. }
 (c) Earmarked for reinforcement of Northern Ireland on Alert No.1 or at the request of the War Office.

BOMBER COMMAND ORDER OF BATTLE

As at 1800 hours 4 February 1943.

SUMMARY OF SQUADRONS

No.	<u>SQUADRONS ESTABLISHED</u>		TYPE OF AIRCRAFT	No.	<u>SQUADRONS OPERATIONAL</u>		No.	<u>SQUADRONS NON-OPL.</u>	
	Total I.E. + I.R.	Total Strength			ON TYPE I.E. + I.R.	A/C on Unit Charge		ON TYPE I.E. + I.R.	A/C on Unit Charge
-	-	13	Blenheim	-	-	-	-	-	13
3	48 + 6	48	Boston	3	48 + 6	48	-	-	-
3	48 + 6	47	Mosquito	3	48 + 6	47	-	-	-
6	96 + 12	108	TOTAL LIGHT BOMBERS	6	96 + 12	95	-	-	13
-	-	2	Wellington IC	-	-	-	-	-	2
-	-	2	Wellington II	-	-	-	-	-	2
8	128 + 16	193	Wellington III	9(d)	144 + 18	193	-	-	-
5	80 + 10	62	Wellington X (or III)	4	64 + 8	43	1	16 + 2	19
2	32 + 4	23	Wellington IV	2	32 + 4	22	-	-	1
3	48 + 6	57	Ventura	3	48 + 6	57	-	-	-
2	32 + 4	39	Mitchell	2	32 + 4	39	-	-	-
20	320 + 40	378	TOTAL MEDIUM BOMBERS	20	320 + 40	354	1	16 + 2	24
11	200 + 25	228	Halifax	11	200 + 25	228	-	-	-
17	272 + 34	315	Lancaster	15½	248 + 31	295	1½	24 + 3	20
8(a)	136 + 17	119	Stirling	7	120 + 15	119	-	-	-
36	608 + 76	662	TOTAL HEAVY BOMBERS	33½	568 + 71	642	1½	24 + 3	20
62	1024 + 128	1148	TOTAL ALL CLASSES	59½	984 + 123	1091	2½	40 + 5	57
3	42 + 6	52	SPECIAL DUTY SQUADRONS (Various)	3	42 + 6	52			

NOTES: (d) 115 Squadron established Stirling, operational on Wellington III.

BOMBER COMMAND TRAINING UNITS

As at 4 February 1943

Unit	Location	I.E. + I.R.	Type	On Unit Charge	Remarks
<u>No. 1 Group</u>					
	<u>Bawtry</u>				
1520 B.A.T. Flight	Holme	6 + 2	Oxford	8	
1481 (Bomber) G.F.	Lindholme	6 + 0	Whitley	6	
			Lysander	8	
		6 + 0	Defiant	4	
		1 + 0	Tiger Moth	1	
		7 + 3	Martinet	2	
1503 B.A.T. Flight	Lindholme	4 + 1	Oxford	5	
1656 Conversion Flight	"	12 + 0	Lancaster	15	
			Manchester	6	
		20 + 0	Halifax	23	
Air Bomber Training Flight	"	6 + 2	Oxford	8	
1662 Conversion Flight	Blyton	12 + 0	Lancaster	-	
		20 + 0	Halifax/ Manchester	-	
<u>No. 2 Group</u>					
	<u>Huntingdon</u>				
1508 B.A.T. Flight	Horsham St. Faith	4 + 1	Oxford	7	
1515 " "	Swanton	6 + 2	Oxford	8	
1519 " "	Morley				
	Feltwell	6 + 2	Oxford	9	
		2 + 1	Mitchell	-	
1482 (Bomber) G.F.	West		Defiant	4	
	Raynham		Blenheim	3	
			Lysander	6	
		1 + 0	Tiger Moth	1	
		6 + 2	Martinet	3	
		3 + 1	Ventura	4	
1655 Training Unit	Marham	4 + 2	Blenheim	6	
		6 + 3	Mosquito	9	
<u>No. 3 Group</u>					
	<u>Exning</u>				
1504 B.A.T. Flight	Exning	4 + 1	Oxford	5	Detachments attached to No. 3 Group Sqdns.
1521 " "	Stradishall	6 + 2	Oxford	8	) Lodger) Units on) a No. 2) Group) Station
1483 (Bomber) G.F.	Marham		Lysander	5	
		2 + 0	Defiant	3	
		1 + 0	Tiger Moth	1	
		8 + 0	Wellington	11	
		7 + 3	Martinet	5	
Air Bomber Training Flight	Marham	6 + 2	Oxford	7	
1657 Conversion Flight	Stradishall	32 + 0	Stirling	26	
1651 Conversion Flight	Waterbeach	32 + 0	Stirling	32	
1 B.D.U.	Gransden Lodge	6 + 0	Wellington	6	
		4 + 1	Halifax	4	
		1 + 0	Lancaster	1	
		1 + 0	Stirling	1	
		1 + 0	Proctor	1	

Unit	Location	I.E.+ I.R.	Type	On Unit Charge	Remarks
<u>No. 4 Group</u>	<u>York</u>				
1502 B.A.T. Flight	Driffield	4 + 1	Oxford	5	
1484 (Bomber) G.F.	Driffield	5 + 0	Whitley	5	
		8 + 0	Defiant	12	
			Lysander	4	
		1 + 0	Tiger Moth	1	
		7 + 3	Martinet	9	
Air Bomber Training Flight	Driffield	6 + 2	Oxford	9	
1652 Conversion Unit	Marston Moor	32 + 0	Halifax	34	
1658 " "	Ricall	32 + 0	Halifax	29	
1663 " "	Rufforth	32 + 0	Halifax	-	Forming
<u>No. 5 Group</u>	<u>Grantham</u>				
1506 B.A.T. Flight	Waddington	6 + 2	Oxford	8	
1514 " "	Coningsby	6 + 2	Oxford	9	
1518 " "	Dunholme Lodge	6 + 2	Oxford	8	
1485 (Bomber) G.F.	Fulbeck		Lysander	4	
		4 + 0	Defiant	4	
		8 + 0	Manchester	8	
		1 + 0	Tiger Moth	1	
		6 + 2	Martinet	5	
Air Bomber Training Flight	Fulbeck	6 + 2	Oxford	8	
1654 Conversion Unit	Wigsley	12 + 0	Lancaster	18	
		20 + 0	Manchester/ Halifax	18	
1660 " "	Swinderby	12 + 0	Lancaster	14	
		20 + 0	Manchester/ Halifax	18	
			Halifax	9	
1661 " "	Winthorpe	12 + 0	Lancaster	14	
		20 + 0	Manchester/ Halifax	14	
			Halifax	-	
<u>No. 6 Group</u>	<u>Allerton</u>				
1512 B.A.T. Flight	Dishforth	6 + 2	Oxford	9	
1535 " "	Middleton	6 + 2	Oxford	8	
1659 Conversion Unit	St. George Leeming	32 + 0	Halifax	21	
<u>No. 91 Group</u>	<u>Abingdon</u>				
10 O.T.U.	Abingdon	8 + 2	Anson	11	
		40 + 14	Whitley	55	
		1 + 0	Defiant	1	
		4 + 1	Lysander	3	
Special Flight	Abingdon	20 + 6	Whitley	33	
		1 + 0	Leopard Moth	1	
15 O.T.U.	Harwell	40 + 14	Wellington	48	
		1 + 0	Defiant	-	
		4 + 1	Lysander	3	
19 O.T.U.	Kinloss	40 + 14	Whitley	50	
		8 + 2	Anson	15	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	

Unit	Location	I.E.+ I.R.	Type	On Unit Charge	Remarks
<u>No. 91 Group (contd.)</u>					
20 O.T.U.	Lossiemouth	40 + 14	Wellington	52	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
			Anson	4	
21 O.T.U.	Moreton-in-the-Marsh	12 + 4	Anson	17	
		40 + 14	Wellington	54	
		1 + 0	Defiant	1	
		4 + 1	Lysander	3	
22 O.T.U.	Wellesbourne-Mountford	50 + 16	Wellington	60	
		1 + 0	Defiant	1	
		4 + 1	Lysander	3	
23 O.T.U.	Persnore	40 + 14	Wellington	57	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
24 O.T.U.	Honeybourne	40 + 14	Whitley	55	
		8 + 2	Anson	11	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
1501 B.A.T. Flight	Abingdon	4 + 1	Oxford	6	
1516 " "	Hampstead	6 + 2	Oxford	8	
	Norris				
1443 " "	Harwell	2 + 0	Wellington	1	
1446 F.T. Flight	Moreton-in-the-Marsh		Anson	2	
			Wellington	12	
<u>No. 92 Group</u>					
<u>Winslow Hall</u>					
11 O.T.U.	Westcott	40 + 14	Wellington	52	
		1 + 0	Defiant	2	
		4 + 1	Lysander	2	
			Anson	1	
12 O.T.U.	Chipping Warden	40 + 14	Wellington	51	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
13 O.T.U.	Bicester	36 + 12	Blenheim	46	
		1 + 0	Defiant	1	
		4 + 1	Lysander	-	
		8 + 2	Anson	9	
			Albemarle	1	
14 O.T.U.	Cottesmore	40 + 14	Wellington	52	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
			Anson	4	
16 O.T.U.	Upper Heyford	40 + 14	Wellington	57	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
			Anson	6	
17 O.T.U.	Upwood	18 + 6	Blenheim	33	
		4 + 1	Anson	5	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
26 O.T.U.	Wing	40 + 14	Wellington	58	
		1 + 0	Defiant	1	
		4 + 1	Lysander	3	
			Anson	6	
29 O.T.U.	North Luffenham	40 + 14	Wellington	49	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
			Anson	3	

Unit	Location	I.E. + I.R.	Type	On Unit Charge	Remarks
<u>No. 92 Group (contd.)</u>					
307 F.T.U.	Bicester	7 + 0	Blenheim	7	To be disbanded
1505 B.A.T. Flight	Upper Heyford	-	Oxford	5	
1511 " "	Upwood	6 + 2	Oxford	8	
1517 " "	Chipping Warden	6 + 2	Oxford	8	
1473 Flight	Finnere	1 + 0	Leopard	1	
		3 + 1	Moth	4	
		6 + 2	Wellington	6	
			Anson	1	
1551 Flight	Bicester	4 + 0	Whitley	4	
		2 + 0	Anson	2	
			Master	3	
			Oxford	4	
E.C.D.U.	Westcott	3 + 0	Wellington	4	
<u>No. 93 Group</u>					
	<u>Egginton Hall</u>				
18 O.T.U.	Bramcote	20 + 7	Wellington	39	Det. at Finningley
		1 + 0	Defiant	-	Disbanded
		4 + 1	Lysander	3	
25 O.T.U.	Finningley		Wellington	1	
			Lysander	1	
27 O.T.U.	Lichfield	40 + 14	Wellington	49	
		4 + 1	Lysander	3	
		1 + 0	Defiant	1	
			Anson	2	
			Albemarle	2	
28 O.T.U.	Wymeswold	40 + 14	Wellington	55	
		1 + 0	Defiant	1	
		4 + 1	Lysander	2	
30 O.T.U.	Hixon	40 + 14	Wellington	69	
		1 + 0	Defiant	1	
		4 + 1	Lysander	3	
81 O.T.U.	Whitchurch Heath	30 + 10	Whitley	41	
		1 + 0	Defiant	-	
		6 + 2	Anson	8	
		4 + 1	Lysander	3	
1507 B.A.T. Flight	Finningley	4 + 1	Oxford	5	
1513 " "	Bramcote	6 + 2	Oxford	8	

/Halifax

Type	O.T.U.		Conversion Units		Miscellaneous Units		Total	
	U.E. (I.E. + I.R.)	On Charge	U.E. (I.E. + I.R.)	On Charge	U.E. (I.E. + I.R.)	On Charge	U.E.	On Charge
Halifax	-	-	168	116	5	4	173	120
Stirling	-	-	64	58	1	1	65	59
Lancaster	-	-	48	61	1	1	49	62
Total	-	-	280	235	7	6	287	241
Albemarle	-	3	-	-	-	-	-	3
Anson	69	102	-	-	12	12	81	114
Blenheim	72	79	6	6	7	10	85	95
Defiant	21	20	-	-	20	27	41	47
Leopard Moth	1	1	-	-	1	1	2	2
Lysander	105	50	-	-	-	27	105	77
Manchester	-	-	60	57	8	8	68	65
Martinet	-	-	-	-	46	24	46	24
Master	-	-	-	-	2	2	2	2
Mitchell	-	-	-	-	3	-	3	-
Mosquito	-	-	9	9	-	-	9	9
Oxford	-	-	-	-	166	180	166	180
Proctor	-	-	-	-	1	1	1	1
Tiger Moth	-	-	-	-	5	5	5	5
Ventura	-	-	-	-	4	4	4	4
Wellington	795	803	-	-	25	38	820	841
Whitley	228	234	-	-	11	12	239	246
Total	1291	1292	75	72	311	351	1677	1715
Grand Total	1291	1292	355	307	318	357	1964	1956

LOANS, DETACHMENTS AND TRANSFERS FROM BOMBER COMMAND

March 1942 - January 1943

Sqdn. No.	Aircraft	Loans, Detachments and Transfers	Date	Re-formed	Remarks
10	Halifax	Detached to Middle East	5. 7.42	16. 9.42	Sqdn. established 24 + 3 on 20.7.42. Reverted 16 + 2 on 16.9.42.
12	Wellington	Detached to Army Co-operation command for Parachute Training.	7. 6.42	8. 7.42	
18	Blenheim	Detached to Middle East	Until	27. 3.42	
		Transferred to N.W.Africa	6.11.42	-	
21	Blenheim	Detached to Middle East	Until	27. 3.42	
51	Whitley	On loan to Coastal Command	6. 5.42	27.10.42	
58	Whitley	Transferred to Coastal Command	7. 4.42	-	
61	Lancaster	Temporarily detached to Coastal Command	15. 7.42	21. 8.42	
76	Halifax	Detached to Middle East	5. 7.42	16. 9.42	Established 24 + 3 on 20.7.42. Reduced to 16+2 on 16.9.42
77	Whitley	On loan to Coastal Command	6. 5.42	4.10.42	
82	Blenheim	Transferred to India Command	6. 3.42	-	
110	Blenheim	Transferred to India Command	6. 3.42	-	
114	Blenheim	Transferred to N.W.Africa	13.11.42	-	
142	Wellington	Detached to Army Co-op. Command on Parachute Training.	7. 6.42	8. 7.42	Established 24 + 3 on 15.12.42.
		12 a/c detached to N.W. Africa.	11.12.42	-	
144	Hampden	Transferred to Coastal Command	22. 4.42	-	
150	Wellington	12 a/c detached to N.W. Africa	11.12.42	-	Established 24 + 3 on 15.12.42.
304	Wellington	Temporarily transferred to Coastal Command	7. 5.42	-	
		Transferred to Coastal Command	9.12.42	-	
311	Wellington	Temporarily transferred to Coastal Command	30. 4.42	-	
405	Halifax	On loan to Coastal Command	25.10.42	-	
455	Hampden	Transferred to Coastal Command	27. 4.42	-	

Note on Sources: ~~A.M.W.R. Manual of Bomber Command Operations 1942/43.~~ AHB/11/84
 Air Ministry Expansion and Re-equipment Policy Papers, 1942/43.
 Bomber Command Administrative Record Book and Appendices.

G.169087/VY/2/50/30

SECRET
AVERAGE AVAILABILITY OF AIRCRAFT WITH CREWS

(Monthly)

Month (1942)	HEAVY					MEDIUM				LIGHT					Grand Total	
	Lancaster	Halifax	Stirling	Manchester	Total	Wellington	Whitley	Hampden	Total	Blenheim	Boston	Mosquito	Ventura	Mitchell		Total
March	7	17	29	15	68	191	40	70	301	16	36	-	-	-	52	421
April	11	31	32	12	86	179	21	47	247	16	40	-	-	-	56	389
May	26	55	41	14	136	183	2	25	210	26	44	-	-	-	70	416
June	43	52	43	3	141	159	-	22	181	26	48	6	-	-	80	402
July	61	45	47	-	153	170	-	28	198	21	47	8	-	-	76	427
August	82	46	46	-	174	135	-	17	152	13	42	7	-	-	62	388
September	86	50	42	-	178	104	-	5	109	-	36	8	-	-	44	331
October	99	76	50	-	225	132	-	-	132	-	37	10	4	-	51	408
November	109	79	46	-	234	100	-	-	100	-	36	9	18	-	63	397
December	145	78	39	-	262	78	-	-	78	-	35	11	33	-	79	419
January	156	106	51	-	313	107	-	-	107	-	37	16	36	5	94	514
Average	75	57.7	42.2	11	179.1	141.6	21	30.6	165	19.7	38.9	9.4	22.8	5	66.2	410.2

PROPOSED LAYOUT OF OPERATIONAL GROUPS
as at 26 January 1943

GROUP	BASE STATION	'CLUTCH' STATION
No. 1 Group, Headquarters, Bawtry.	Binbrook Ludford Magna Elsham Wolds Lindholme Hemswell	Grimsby Kelstern Wickenby Faldingworth North Killingholme Kirmington Sandtoft Blyton Ingham Upton
No. 2 Group, Headquarters, Bylaugh Hall.	Marham Feltwell West Raynham Swanton Morley Foulsham	Downham Market Lakenheath Methwold Great Massingham Sculthorpe Oulton Swannington North Creake Little Snoring
No. 3 Group, Headquarters, Exning.	Stradishall Waterbeach Mildenhall Tempsford	West Wickham Chedburgh Mepal Witchford Newmarket Tuddenham Gransden Lodge
No. 4 Group, Headquarters, York.	Marston Moor Riccall Holme Pocklington Driffield	Rufforth Acaster Malbis Burn Snaith Brighton Melbourne Elvington Full Sutton Leconfield Lissett

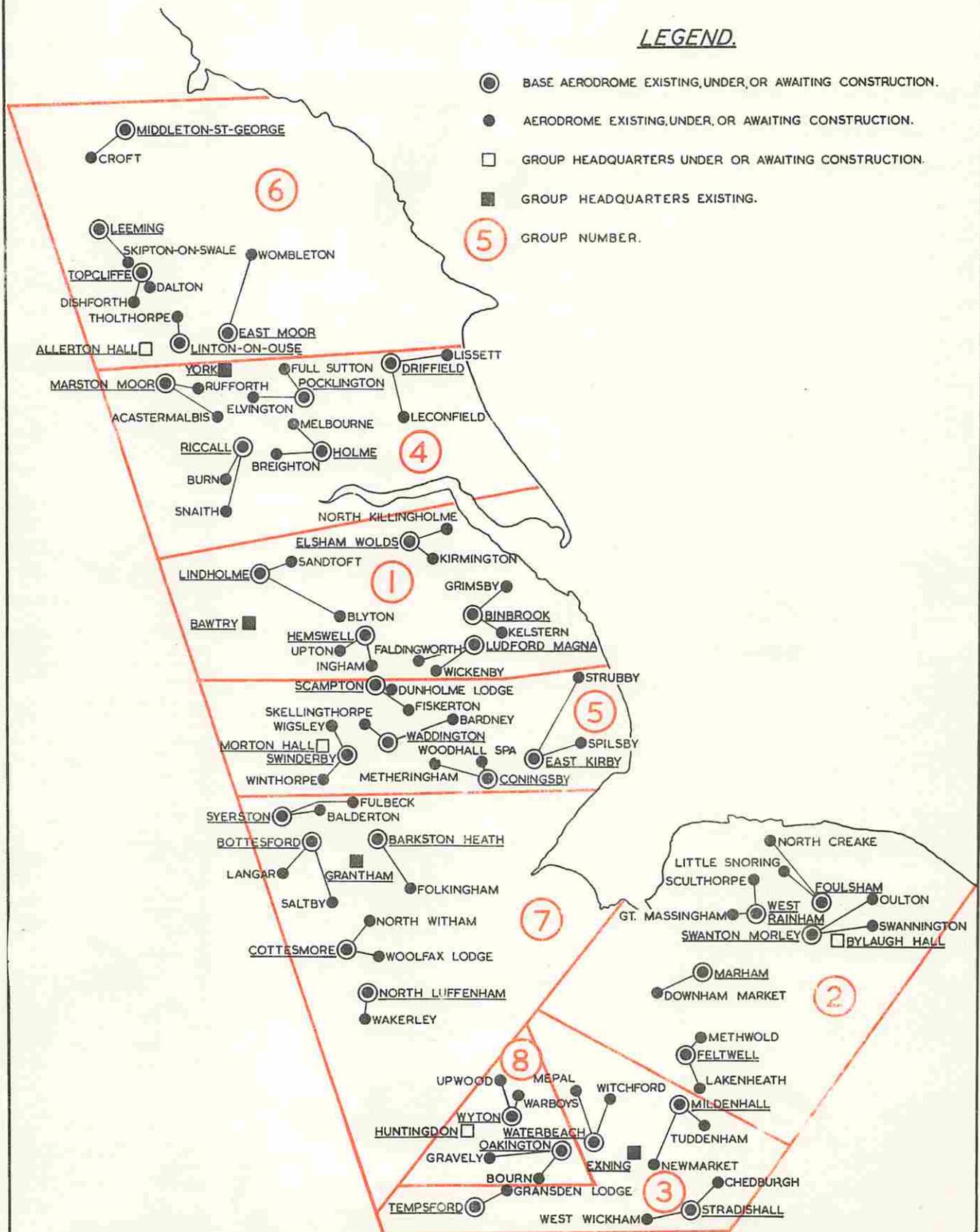
/No. 5 Group

GROUP	BASE STATION	'CLUTCH' STATION
No. 5 Group, Headquarters, Moreton Hall. (Temporarily at Grantham)	Swinderby Waddington Scampton Coningsby East Kirby	Wigsley Winthorpe Skellingthorpe Bardney Dunholme Lodge Fiskerton Woodhall Spa Metheringham Spilsby Stouby
No. 6 (RCAF) Group, Headquarters, Allerton Hall.	Middleton St. George Leeming Linton-on-Ouse Topcliffe East Moor	Croft Skipton-on-Swale Tholthorpe Dishforth Dalton Wombledon
No. 7 Group, Headquarters, Grantham.	Syerston Bottesford Cottesmore North Luffenham Barkston Heath	Balderton Fulbeck Langar Saltby Woolfax Lodge North Witham Wakerley Folkingham
No. 8 (PFF) Group, Headquarters, Huntingdon. (Temporarily at Wyton)	Wyton Oakington	Warboys Upwood Bourn Graveley

Note on Sources: Appendix 'A' to L.M. 846/DDOP 10 October 1942
As amended by L.M. 1113/DDOP 14 December 1942
L.M. 1196/DDOP 26 January 1943

PROPOSED LAYOUT OF OPERATIONAL GROUPS

AS AT 26TH JANUARY 1943.



ESTIMATED INCREASE IN EFFECTIVENESS OF ATTACKS DUE TO EMPLOYMENT OF O.T.Us.

Date		30/31 May	1/2 June	25/26 June	31/1 August	10/11 September	13/14 September	16/17 September
Target		Cologne	Essen	Bremen	Dussel- dorf	Dussel- dorf	Bramen	Essen
Weather		No cloud No haze Bright moon	5/10 cloud Haze Bright moon	9-10/10 Cloud Bright moon	No cloud Slight haze Bright moon	No cloud Haze No moon	No cloud Much haze No moon	4-7/10 cloud Some haze No moon
Sorties Despatched	Op. Groups	675	607	595	419	301	308	242
	O.T.Us	367	347	304	211	174	138	126
Percentage increase in effort		54%	57%	51%	50%	58%	49%	52%
Sorties claiming attack	Op. Groups	569	497	432	336	250	253	173
	O.T.Us	326	268	223	148	115	100	71
Aircraft Missing	Op. Groups	27	20	16	14	17	10	22
	O.T.Us	13	11	28	15	13	10	17
No. of photo- graphs show- ing ground detail	Op. Groups	32	58	2	157	148	87	56
	O.T.Us	13	15	-	5	28	11	8
Percentage of photographs within 3 miles	Op. Groups	59%	7%	none) plotted)	27%	35%	32%	27%
	O.T.Us	50%	0%		20%	7%	27%	0%
Estimated weight of bombs within 3 miles	Op. Groups	714 tons	74 tons	No estimate possible	215 tons	208 tons	200 tons	111 tons
	O.T.Us	122 tons	0 tons		25 tons	8 tons	25 tons	0 tons
Estimated percentage increase in material damage due to use of O.T.Us.		17%	0%		11.5%	4%	12.5%	0%
Estimated No. of aircraft bombing within 3 miles	Op. Group	336	35		91	88	82	47
	O.T.Us	163	0		30	8	27	0
Estimated percentage increase in effect on industrial activity due to use of O.T.Us.		37%	0%		25%	8%	26%	0%

NOTE: Details of operations by Conversion Units cannot be shown as these aircraft have been included in returns of the operational squadrons to which they were attached and the information is not available.

Source: ORS/BC/S.70
Appendix A

G.169087/ES/3/50/30.

PLANNED AND ACTUAL EFFORT AND WASTAGE

July - September 1942

	Detail	Planned	Actual
(a) Bombing effort	No: of Nights per month	5 (4 using O.T.U.s. etc.)	July: 11 (2 with O.T.U.s) August: 12 (O.T.U.s not used) September: 14 (3 with O.T.U.s) Monthly Average: 12 nights (2 with O.T.U.s)
	Sorties per month	Operational Squadrons 2,915 O.T.U.s. 1,144	July: 3,009 sorties August: 1,983 " September: 2,286 " Monthly Average: 2,426 sorties July: 304 sorties August: - September: 438 " Monthly Average: 247 sorties
(b) Mining Effort	Sorties per month Mines per month	Operational Squadrons only 350/400 " " " 1,000	July: 434 sorties 899 mines August: 382 " 935 " September: 469 " 1,091 " Monthly Average: 428 sorties 975 mines
(c) Wastage (Missing and Cat.'E') Bombing Operations	Bombing Operations Wastage Rate per month Operational Squadrons	2,915 sorties at 4.1 per 100 = 120 aircraft	July: 3009 sorties at 5.8 per 100 = 176 a/c August: 1983 " " 8.1 " " = 160 a/c September: 2286 " " 6.3 " " = 144 a/c Monthly Average: 2,426 sorties at 6.7 per 100 = 160 a/c
	O.T.U.s.	1,144 sorties at 6.3 per 100 = 120 a/c	July: 304 sorties at 7.9 per 100 = 24 a/c August: Nil. September: 438 " " 11.9 " " = 52 a/c Monthly Average: 247 sorties at 10.2 per 100 = 25 a/c.
	Total	192 aircraft per month for 4,059 sorties	July: 200 a/c August: 160 " September: 196 " Monthly Average: 185 a/c for 2,673 sorties
(d) Wastage (Missing and Cat.'E') Mining	Mining Operations	Operational Squadrons only: 11 aircraft per month	July: 14 aircraft August: 17 " September: 21 " Monthly Average: 17 aircraft
(e) Total Wastage	Total Wastage per month	Operational Squadrons and O.T.U.s. 203 aircraft for 4409/4459 sorties	July: 214 aircraft August: 177 " September: 217 " Monthly Average: 203 aircraft for 3,648 sorties

Note: In this comparison the Conversion Units and Flights have not been separated from the Squadrons to which they were attached.

Source: ORS/BC/S.70
Appendices B & C.

THE STRATEGIC BOMBING DIRECTIVE.
FEBRUARY 1942.

AIR MINISTRY,

LONDON, S.W.1.

14 February 1942.

Sir,

I am directed to refer to Air Ministry letter CS.8337/II/D.B.Ops. dated 4 February 1942, and to say that, in order to enable you to make your offensive fully effective on the introduction of TR.1335 equipment on operations, it has been decided that the principle of conservation of your forces, laid down in Air Ministry letter CS.10488/D.C.A.S. dated 13 November 1941, should be modified. You are accordingly authorised to employ your effort without restriction, until further notice, in accordance with the following directions. Clearly this does not warrant pressing your attacks if weather conditions are unfavourable or if your aircraft are likely to be exposed to extreme hazards.

2. In the opinion of the Air Staff, the introduction of TR.1335 will confer upon your forces the ability to concentrate their effort to an extent which has not hitherto been possible under the operational conditions with which you are faced. It is accordingly considered that the introduction of this equipment on operations should be regarded as a revolutionary advance in bombing technique which, during the period of its effective life as a target-finding device, will enable results to be obtained of a much more effective nature.

3. The period in which this device can be used as an aid to target location and blind bombing will be governed by the ability of the enemy to develop counter-measures when the secret of its nature and operation has been disclosed. Much will depend on the security measures observed in its employment and the care taken by air crews to ensure the destruction of the apparatus and to avoid mentioning or discussing it in the event of their aircraft being forced down over enemy territory. It is unlikely, however, that under the best possible conditions this period will exceed six months from the date of its introduction. It is accordingly of first importance to exploit the advantages it confers to the full. The maximum effort possible having due regard to weather and other hazards should be exerted throughout the period it is thus available, and particularly in the first few weeks of your operations.

4. In addition to the foregoing primary factor, a resumption of your offensive at full effort is considered desirable for the following reasons:-

- (i) This is the time of year to get the best effect from concentrated incendiary attacks.
- (ii) It would enhearten and support the Russians if we were to resume our offensive on a heavy scale, while they were maintaining so effectively their own counter-offensive against the German armies.
- (iii) The co-incidence of our offensive with the Russian successes would further depress the enemy morale, which is known already to have been affected by the German armies' reverses on the Eastern Front.

5. In accordance with these principles and conditions, a review has been made of the directions given to you in Air Ministry letter S.46368/D.C.A.S. dated 9 July 1941 and it has been decided that the primary object of your operations should now be focussed on the morale of the enemy civil population and in particular, of the industrial workers. With this aim in view, a list

of selected area targets (taking account of the anticipated range of the TR.1335 equipment) is attached in Annex "A" to this letter. An additional list of targets beyond this range, which can be attacked when conditions are particularly favourable and when a correct assumption of the accuracy and powers of concentration obtainable with the equipment has been made, are also included in Annex "A".

6. You will note that Berlin has been included amongst the latter targets. In this case, your operations should be of a harassing nature, the object being to maintain the fear of attack over the city and to impose A.R.P. measures. The scale of effort and tactics employed should be designed to incur the minimum casualties and for that reason they should be undertaken at high altitude even if this entails carrying reduced bomb-loads. Apart from these particular operations against Berlin, the cardinal principle which should govern your employment of TR.1335 from the outset, should be the complete concentration on one target until the effort estimated to be required for its destruction has been achieved. Estimates of the scales of attack required are given in Annex "C".

7. Essen is the most important of the selected primary targets, and by attacking it first, the maximum benefit should be derived from the element of surprise. I am to suggest, therefore, that this should be selected as your initial target for TR.1335 operations, to be followed by attacks against the remaining priority areas listed in Annex "A".

8. When experience in the employment of TR.1335 has proved that, under favourable conditions, effective attacks on precise targets are possible, I am to request that you will consider the practicability of attacking first, the precise targets within TR.1335 range and, later, those beyond this range listed in Annex "B".

9. During the estimated effective life of TR.1335 as a target-finding and blind bombing device, it will not be possible to equip more than a relatively small proportion of your force. It is, therefore, of the first importance that tactical methods to assist the remainder of the force to achieve concentration, both when the target is capable of being illuminated and under blind bombing conditions, should be studied, developed and applied to the maximum possible extent. In this connection I am to remind you of the principles and scales of attack with incendiary weapons laid down in Air Ministry letter S.46368/II/D.C.A.S. dated 25 Oct 1941.

10. Apart from your primary offensive on the above lines, I am to say that the following additional commitments will still have to be met from time to time:-

- (i) Attacks on factories in France are to be undertaken as notified to you in Air Ministry letter S.46368/D.C.A.S. dated 5 February 1942. If a favourable opportunity for the initial attack on the Renault plant has not occurred before you begin operations with the TR.1335 equipment, attacks on the French factories are to be carried out only when weather conditions are particularly favourable and at the same time are unsuitable for the concentrated bombing of targets in Germany within this Directif.
- (ii) The operations of No.2 Group are to continue to be governed by the directions in Air Ministry letter S.46368/II/D.C.A.S. dated 25 November 1941 bearing in mind the commitment for army air support as stated in para. 7 of that letter.
- (iii) Periodical support for the operations planned by the Adviser of Combined Operations will be required in accordance with the directions issued to you in Air Ministry letter 3164/Plans dated 21 December 1941.

SECRET

APPENDIX 10.

3.

11. Finally, I am to say that, although every effort will be made to confine your operations to your primary offensive, you should recognise that it will on occasions be necessary to call upon you for diversionary attacks on objectives, the destruction of which is of immediate importance in the light of the current strategical situation. In particular, important naval units and the submarine building yards and bases may have to be attacked periodically, especially when this can be done without missing good opportunities of bombing your primary targets.

I am, Sir,
Your obedient Servant,

(Sgd) (N.H. Bottomley)

Air Vice-Marshal,
Deputy Chief of the Air Staff.

S.46368/Part III. Enclosure 11A.

/ANNEX "A"

SECRET

G.169087/DS/2/50/30.

ANNEX "A"
to Air Ministry letter
S.46368/DCAS dated 14 February 1942

PRIMARY INDUSTRIAL AREAS.
(Within T.R.1335 range - 350 miles from Mildenhall)

Central (Ruhr) area.

Essen
(Transportation and heavy industries)

Duisberg
(Transportation and heavy industries)

Dusseldorf
(Transportation and general industries)

Cologne
(Transportation and general industries)

ALTERNATIVE INDUSTRIAL AREAS.
(Within T.R.1335 range - 350 miles from Mildenhall.)

Northern (coastal) area

Bremen
(Naval dockyards)

Wilhelmshaven
(Naval dockyards)

Emden
(Naval dockyards)

ALTERNATIVE INDUSTRIAL AREAS
(Involving deeper penetration beyond T.R.1335 range).

Northern

Hamburg
(Naval and general shipbuilding)

Kiel
(Naval dockyards)

Lubeck (Baltic port)
(Industrial and armament centre)

Rostock
(Heinkel factories)

Central

Berlin
(General industries)

Kassel
(Locomotive industry)

Hanover
(Rubber manufacture)

Southern

Frankfurt
(Chemical and general engineering)

Mannheim
(Transportation, chemical and general engineering)

Schweinfurt
(Ball bearings)

Stuttgart
(General, electrical and precision engineering)

SECRET

5.

APPENDIX 10.

PRECISE TARGETS

ANNEX "B"

To Air Ministry letter
S.46368/D.C.A.S. dated
14 February 1942.

WITHIN T.R.1335 RANGE

<u>OPERATIONAL NUMBER</u>	<u>DETAIL</u>	<u>REMARKS</u>
G S 162	CHEMISCHE WERK HULS SYNTHETIC RUBBER	Producing approximately 20% of Germany's total rubber supply.
G O 1236	QUADRATH (FORTUNA) POWER STATION	Production capacity 250,000 kw.
G O 1237	GOLDENBERG WERK, KOLN (Knapsack) POWER STATION	Largest steam power plant in Europe. Production capacity 500,000 kw.
G O 1428	BRAUWEILER (KOLN) SWITCHING AND TRANSFORMER STATION.	Outdoor Transformer and switching station controlling 1,500,000 kw. of plant output. Controls the flow of power from South into Ruhr-Rhineland.
G O 1128	GERSTEINWERK (STOCKUM) POWER AND SWITCHING STATION.	150,000 kw. Steam Station. Also control flow power from East in Ruhr-Rhineland.
G Q 1509	GELSENBERG-BENZIN A.G. GELSENKIRCHEN (NORDSTERN) Synthetic oil.	Annual output 390,000 tons fuel.
G Q 1537	HYDRIERWERKE SCHOLVEN GELSENKIRCHEN A.G. (BUER)	Annual output approximately 300,000 tons fuel.
G.Q 1510	UNION RHEINISCHE BRAUNKOHLN WESSERLING	Annual output 240,000 tons fuel.

OUTSIDE T.R. 1335 RANGE

G S 153	BUNAWERKE SCHOPAU (MERSEBURG) Synthetic Rubber	Produces approximately 30% Germany's total rubber supply
G Z 2805	V.D.M. FRANKFURT HEDDERNHEIM	Leading German airscrew manufacturers and aircraft components.
G B 3280	ROBERT BOSCH - STUTTGART - FUERBACH	Most important factory in Germany making dynamos, injection pumps and magnetos.
G Q 1515	I.G. FARBEN LEUNAWERKE (MERSEBURG) Synthetic Oil	Annual output 480,000 tons fuel and large capacity fixation of nitrogen.

/ANNEX "C"

SECRET

G.169087/DS/2/50/30.

ESTIMATED WEIGHT OF ATTACK FOR DECISIVE DAMAGE.

ANNEX "C"
to Air Ministry letter
S.40368/DCAS dated 14 February 1942.

1	2	3	4	5	6	7
Selected Area	Size of total area (sq.miles)	Size of built-up area (sq.miles)	Size of Central vulnerable area (sq. miles)	Population of total area	Weight of attack required on a basis of 7 tons per sq. mile and 50% efficiency.	Weight of attack required on a basis of 1 ton per 800 pop. and 50% efficiency.
A. ESSEN	70	25	9	650,000	1,000 tons	1,600 tons
B. DUISBERG	55	16	3	440,000	800 tons	1,100 tons
C. DUSSELDORF	62	18	3	500,000	850 tons	1,200 tons
D. COLOGNE	100	30	5	750,000	1,400 tons	1,800 tons

SECRET

APPENDIX 11

THE THOUSAND BOMBER RAID ON COLOGNE

COPY

BOMBER COMMAND OPERATION ORDER NO. 148

(This supersedes B.C.O.O. NO. 147
which is to be destroyed).

COPY NO. 45

DATE: 26 May 1942

APPENDIX "A" - SUMMARY OF FORCES

INFORMATION

It has been decided that an attack of exceptional weight is to be made on HAMBURG.

2. All Bomber aircraft and crews that can be provided by Army Co-operation and Flying Training Commands will supplement the full resources of the Operational and O.T.U. Groups of Bomber Command.

3. An attack in such force has never remotely been approached in the past either by ourselves or by the enemy. It should strike a severe blow at the morale of the German people in addition to causing unprecedented damage to the most important single industrial city in Germany.

INTENTION

4. To destroy the port and city of HAMBURG.

EXECUTION

Code Name

5. This operation will be known as the THOUSAND PLAN.

Date

6. The operation will take place on the night of May 27/28 or on the first suitable night thereafter until the night of May 31/June 1 1942.

Forces Taking Part

7. (a) All available aircraft from Nos. 1, 3, 4 and 5 Groups. Leave is to be restricted so that every serviceable aircraft can be employed. Aircraft and crews of Conversion Flights are to be included.
- (b) All available suitable aircraft from Nos. 91 and 92 Groups. Aircraft are to be manned by the instructional staffs of the O.T.U.'s though crews may be made up with u/t personnel at the discretion of the A.O.'s C.
- (c) All available suitable aircraft from Army Co-operation Command.
- (d) All available suitable aircraft from Flying Training Command.

A Summary of the forces taking part is attached at Appendix "A".

Alternative Target

8. If conditions are unfavourable for an attack on HAMBURG, COLOGNE is to be attacked. The decision as to which target is to be attacked will be communicated to all concerned not later than 1200 hours on the day of the operation.

SECRET

/ATTACK

G.169087/IS/2/50/30

ATTACK ON HAMBURG

Route

9. All aircraft will be routed as follows:-

BASE

Position "X" (54 degrees, 30' N, 08 degrees 06' E)

TARGET

HOLLENSTEDT (53 degrees 22' N, 09 degrees 43' E)

Position "Y" (54 degrees N, 08 degrees 00' E)

BASE

Thus the RIVER ELBE will be on the right hand, both going in to the target and coming out again.

Timing

10. ZERO HOUR is to be the time that the attack on the target begins. The attack is to end at Z plus one hour. ZERO HOUR in Double Summer Time will be notified to all concerned as early as possible on the day of the operation and not later than 1700 hours.

11. Nos. 1 and 3 Groups are to open the attack with all available T.R. aircraft at Z hours. This attack is to be completed by Z hours plus 10 minutes.

12. All available heavies from Nos. 4 and 5 Groups are to attack at Z hours plus 45 minutes. This attack is to be completed by Z hours plus 1 hour.

13. Commands and Groups are to arrange that the remaining aircraft are evenly distributed between Z hours plus 10 minutes and Z hours plus 50 minutes.

Rule for Turning Back

14. In order to avoid aircraft which are late owing to delays in taking off, or through faulty navigation or any other reason, being intercepted in daylight during the return journey, the following rule is to be observed:-

All aircraft are to turn for home not later than Z plus one hour, wherever they may be and whether they have dropped their bombs or not.

Aiming Points

<u>FORCE</u>	<u>AIMING POINT</u>
15. 1 and 3 Groups and all aircraft of other Groups and Commands operating from their stations.)	"D"
4 Group and all aircraft of other Groups and Commands operating from its stations.) Army Co-operation Command.) 92 Group.)	"E"
5 Group and all aircraft of other Groups and Commands operating from its stations.) 91 Group.)	"F"

Withdrawal from the Target Area

16. After dropping their bombs all aircraft are to increase speed and lose height, coming down to less than 1,000 feet when over the sea.

ATTACK ON COLOGNERoute to and from the Target

17. All aircraft will be routed as follows:-

BASE
 OUDORP (51° 47' N, 03° 50' E)
 TARGET
 EUSKIRCHEN (50° 38' N, 06° 47' E)
 NOORDLAND (51° 38' N, 03° 36' E)
 BASE

Timing

18. ZERO HOUR will be the time that the attack on the target begins. The attack is to end at Z plus one hour thirty minutes. ZERO HOUR in Double Summer Time will be notified to all concerned as early as possible on the day of the operation and not later than 1700 hours.

19. Nos. 1 and 3 Groups are to open the attack with all available T.R. aircraft at Z hours. This attack is to be completed by Z hours plus 15 minutes.

20. All available heavies from Nos. 4 and 5 Groups are to attack at Z hours plus 1 hour 15 minutes. This attack is to be completed by Z hours plus 1 hour 30 minutes.

21. Commands and Groups are to arrange that the remaining aircraft are evenly distributed between Z hours plus 15 minutes and Z hours plus 1 hour 15 minutes.

Rules for Turning back.

22. In order to avoid aircraft which are late owing to delays in taking off, or through faulty navigation or any other reason, being intercepted in daylight during the return journey, the following rule is to be observed:-

All aircraft are to turn for home not later than Z plus one hour thirty minutes, wherever they may be and whether they have dropped their bombs or not.

Aiming Points

23.	<u>FORCE</u>	<u>AIMING POINT</u>
	1 and 3 Group and all aircraft of other Groups and Commands operating from their stations. }	"A"
	4 Group and all aircraft of other Groups and Commands operating from its stations, Army Co-operation Command. 92 Group. }	"X"
	5 Group and all aircraft of other Groups and Commands operating from its stations. 91 Group }	"Y"

A.L.2. 23A. If crews are unable to identify COLOGNE they are to set course direct for ESSEN where the aiming point is STOAT "B" with any build up area seen in the RUHR as a last resort target. Route home for aircraft attacking ESSEN or last resort targets is not to be the route home given in paragraph 17 above, but is to be direct, avoiding, as far as possible, heavily defended zones.

Withdrawal from Target Area.

24. After dropping their bombs all aircraft are to increase speed and lose height.

Navigation and Target Maps.

25. Flying Training Command and Army Co-operation Command will provide their crews with navigation maps. Target maps showing the aiming points will be supplied by this Headquarters.

Height of Attack.

26. At discretion of A.O.'s C. but the minimum height is to be 8,000 feet.

26A. All crews are, as far as is possible, to avoid flying in cloud. A.L.2.

Flares.

27. As the operation is to be carried out in moonlight, no reconnaissance flares are to be dropped by any crews. No identification flares are to be used.

Bomb Loads.

28. All aircraft are to carry the maximum economical load of 4 lb. and 30 lb. incendiary bombs, made up as necessary with H.E. bombs. Where H.E. bombs must be used to make up loads, large H.C. and G.P. bombs are to be given preference, and in any event, none smaller than the 500 lb. should be carried. All incendiaries are to be dropped in stick with distributor setting of 0.1 seconds. As many as possible incendiaries X.4 lb. are to be dropped by aircraft of 3, 4 and 5 Groups and the greater proportion is to be carried by aircraft in the first wave. A.L.2.

Intruders.

29. The maximum "INTRUDER" action is to be carried out against enemy night fighter aerodromes by aircraft of 2 Group. Fighter Command will also co-operate in this task.

Fighter Cover

30. Fighter Command will provide cover for the returning bombers by carrying out sweeps in force as far as possible out to sea from the East Coast.

Reconnaissance Reports

31. Nos. 1, 3, 4 and 5 Groups are each to detail two experienced crews to bomb the target just before end of period of attack. They are to take night photographs and to make a visual report of the result of the attack.

Accuracy of Timing

32. Owing to the large numbers of aircraft operating and the limited hours of darkness, the importance of adhering strictly to the timing detailed in paragraphs 10 and 18 above, cannot be overstressed.

Administrative

33. Separate Administrative Supplement and Bomber Command Signals Instruction No. 11 have been issued separately. All reference to Coastal Command in these instructions is to be DELETED.

34. ACKNOWLEDGE BY TELEPRINTER.

R. Saundby
Air Vice Marshal,
Senior Air Staff Officer,
BOMBER COMMAND

AHQ/T14/24/3/853
BC/S.27210/ops.

/Moves

ISSUED BY D.R.L.S. AT 1800 HOURS

G.169087/IS/2/50/30

Moves of Units and Squadrons taking
part in the THOUSAND Plan.

COMMAND OR GROUP	SQDN. OR O.T.U.	TYPE OF A/C	NO. OF A/C	OPERATING FROM.	
				STATION	GROUP
Flying Training Command	-	Hampdens	7	Syerston	5 Grp.
	-	Whitleys	3	Driffield	4 "
	-	Wellingtons	4	Feltwell	3 "
Army Co-op. Command	-	Elenheims	8	Wattisham	2 "
	-	Elenheims	8	West Raynham	2 "
Coastal Command	144	Hampdens	12	N.Luffenham	5 "
	455	"	12	"	5 "
	415	"	12	Wigsley	5 "
	489	"	12	"	5 "
	311	Wellingtons	12	E.Wretham	3 "
	304	Wellingtons	12	Lindholme	1 "
	58	Whitley	6	M.St.George	4 "
	51	"	12	Dishforth	4 "
	77	"	12	"	4 "
	91 Group	O.T.U.			
18		Wellingtons	10	Hemswell	1 "
21		"	10	Snaith	1 "
22		"	10	Elsham	1 "
23		"	5	Stradishall	3 "
23		"	5	Oakington	3 "
23		"	5	Bourne	3 "
92 Group	26	"	10	Tempsford	3 "
	26	"	5	Graveley	3 "
	26	"	5	Mildenhall	3 "

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30/31 MAY THOUSAND BOMBER RAID ON COLOGNE

TARGET	GROUP	TYPE	No. of Sorties	A/C CLAIMING TO ATTACK		A/C FAILING TO BOMB PRIMARY				Not over Enemy Territory	Result not known	CASUALTIES**				INTERCEPTIONS		
				Primary	Primary Area	Reached Target Area		Over Enemy Territory				Missing	Damaged by Flak	Damaged by Enemy Aircraft	Not due to Enemy Action	Attacked	Not Attacked	
						Bombed other Target	Abortive	Bombed other Target	Abortive									
COLOGNE	1	Wellington IC	24*		22					1		1	1 E 2 m	2 AC		2		
		Wellington II	36*		29					4		3	2 m			1 E+		1
		Wellington III	18		16					1	1		1 AC	1 m		1 E+	1	
		Wellington IV	68*		62			2		2		2	4 m			1 AC	1	1
		Wellington 423	5*		5													
		Whitley	3*		2					1								
	91 Group attached to 1 Group	Wellington IC	26*		21					4		1	1 AC 1 m					
		Wellington IV	1*		1													
	3	Wellington IC	36*		32					3		1	3 A 1 m				3	1
		Wellington III	91		77		1		2	6		5	1 AC 1 m			1 E	6	6
		Wellington 423	6		5							1						
		Stirling	69 19*		73				3	10		2	6 m	1 B		1 E 1 B	4	4
	Flying Training Command attached to 3 Group	Wellington 1A	4*		3							1						
	91 Group attached to 3 Group	Wellington 1C	17*		15				1	1								
	92 Group attached to 3 Group	Wellington 1C	20*		17							3	1 m	1 m		2 E		
	4	Whitley	7*		2				1	3		1						
		Wellington II	9*		3					4		2						
		Halifax	99 32*		108		2	3	2	12	1	3	1 AC 17 m	1 A		1 E 1 B	4	1
	5	Hampden	34*		31				1	2			1 m			1 E	1	2
		Manchester	46*		35				1	6		4	1 B 1 AC 6 m			1 B		2
Lancaster		59 14*		67			1	1	3		1	4 m	1 m		1 B 1 AC	2	5	
91	Whitley	21*		21								3 m	1 B			1		
	Wellington	194*		168			7	5	7		7	1 B 10 AC 1 A 8 m	1 E 1 B 1 AC		1 B 1 AC	4	5	
92	Hampden	45*		42				1	1		1	1 m			2 E			
	Wellington	43*		41					1		1	1 AC 4 m	1 m		1 B	1		
TOTAL			1046		898		3	14	17	72	2	40	85	12	19			
JOVINCOURT A/D	2 Group & Army Co-operation Command	Blenheim	9*	7						1		1						
St. TROND A/D		Blenheim	8*	6					1	1								
VENLO A/D		Blenheim	6*	6														
TWENTE A/D		Blenheim	10*	7		2	1						1 m					
VECHTA A/D		Blenheim	9*	1		1	1		3	2		1						
BONN A/D	Blenheim	8*	8															
			1096	35	898	3	5	15	20	76	2	42	1 E 2 B 16 AC 4 A 63 m	1 E 3 B 3 AC 1 A 4 m	10 E 6 B 3 AC	29	30	
			*Not fitted T.R.1335				Total Abortive 101											
			**Including Categories of damaged aircraft.															

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Enemy Aerodromes Attacked by Bomber, Fighter
and Army Co-operation Commands in support of the
Thousand Raid on Cologne, 30/31 May, 1942.

Juvincourt	2355 - 0018 hours	(B)
St. Trond	0008 - 0032 "	(B)
	0015 "	(B)
	0140 - 0335 "	(F)
Bonn	0034 - 0115 "	(B)
Gilze-Rijen	0000 - 0050 "	(F)
	0120 - 0145 "	(F)
Eindhoven	2355 - 0040 "	(F)
Venlo	0002 - 0036 "	(B)
	0130 - 0140 "	(F)
	0200 - 0225 "	(F)
Deelan	0000 - 0030 "	(F)
Soesterburg	2355 - 0010 "	(F)
	0100 - 0200 "	(F)
Schipol	2350 - 0005 "	(F)
Twente	0024 - 0110 "	(B)
	0145 - 0205 "	(F)
Leeuwarden	2325 - 0035 "	(F)
Vechta	0315 "	(B)
Ardorf	0058 "	(B)

Legend.

ORS/BC
Night Raid Report No. 74

B.....By Bomber or Army Co-op A/C
F.....By Fighter Command A/C

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APPENDIX 12

CONSOLIDATED BOMBARDMENT INSTRUCTIONS

OCTOBER 1942.

Copy

Abbey 3411

C.S. 15803/A.S.P.1.

Air Ministry,

LONDON, S.W.1.

SECRET

29 October 1942

Sir,

BOMBARDMENT POLICY

I am directed to inform you that, as a result of a recent review of the general policy governing our air warfare, it has been decided to issue the following revised and consolidated instructions.

1. Bombardment Policy in Enemy-occupied Countries.

The following rules govern our Bombardment Policy in British, Allied or Neutral territory occupied by the enemy:-

- (A) Bombardment is to be confined to military objectives and must be subject to the following general principles:-
- (i) The intentional bombardment of civilian populations, as such, is forbidden.
 - (ii) It must be possible to identify the objectives.
 - (iii) The attack must be made with reasonable care to avoid undue loss of civilian life in the vicinity of the target and, if any doubt exists as to the possibility of accurate bombing and if a large error would involve the risk of serious damage to a populated area, no attack is to be made.
 - (iv) The provisions of Red Cross Conventions are to be observed.
- (B) The following military objectives may be attacked (in these categories the term 'military' is used in its widest sense to include all armed forces of the enemy):-
- (i) Military forces, including Naval auxiliaries of whatever description and whether or not attendant on the Fleet, troop transports and military supply ships, whether at sea or in port.
 - (ii) Military works and fortifications.
 - (iii) Military establishments and depots, including barracks, camps, billets and Naval dockyards, (but these targets should be specifically selected for attack only in cases where it has been definitely established that they are in use or occupation by Axis forces); aerodromes, whether designated Military or Civil; stores and dumps of Military supplies.
- Note: Lighthouses are not to be attacked.
- (iv) Shipyards, factories and other establishments engaged in the manufacture, assembly or repair of military material, equipment or supplies; power stations ancillary thereto.
(Note: those power stations whose destruction would cause

SECRET

/extensive

extensive flooding in Holland by putting out of action electrically driven pumps are not to be attacked); fuel and oil-producing plants, refineries and storage installations.

- (v) Lines of communication and transportation and means of inter-communication serving military purposes, but subject to the following special provisos relating to attacks on trains:-

(i) Occupied France. - by day, only locomotives (but not those attached to passenger trains) and goods trains may be attacked.

- by night, all classes of trains and locomotives may be attacked.

(ii) Holland and Belgium. - by day, the same rules apply as for Occupied France above;

- by night, all classes of trains and locomotives may be attacked, but between 2300 hours and 0400 hours only, and in addition, in Holland, only in the area south of the River Waal-Rhine.

C. Provided that the principles set out in paragraph (A) above are observed, other objectives, the destruction of which is an immediate military necessity, may be attacked for particular reasons.

D. In attacks on objectives in the Channel Islands the following instructions are to be strictly observed:-

(i) Attacks are not to be made unless such action is necessitated by operational considerations of real importance;

(ii) When attacks are necessary, they are to be confined to the important objectives against which they have been ordered;

(iii) Owing to the difficulty of discriminating between troops and civilians, machine-gun attacks on personnel are not to be made.

2. German, Italian and Japanese Territory.

Consequent upon the enemy's adoption of a campaign of unrestricted air warfare, the Cabinet have authorised a bombing policy which includes the attack of enemy morale. The foregoing rules governing the policy to be observed in enemy-occupied countries do not, therefore, apply in our conduct of air warfare against German, Italian and Japanese territory, except that the provisions of Red Cross Conventions are to continue to be observed. Bomber operations henceforth are to be conducted in accordance with directives issued from time to time by the Air Ministry (as approved by the Cabinet) or overseas by the A.O.C.-in-C. concerned, special care being taken to observe any restriction on bombing which they may contain.

I am, Sir,
Your obedient Servant,

(Sgd.)

Air Vice-Marshal
Assistant Chief of Air Staff (Policy)

SECRET

APPENDICES 13 - 21

NOTE ON SOURCES.

In preparing the Tables at Appendices 13 - 21 it has been necessary to consult four independent sources, namely:

The Air Ministry War Room Manuals of Bomber Command Operations.
Air Ministry State Room Records.
Bomber Command Operational Research Section Reports.
Admiralty Minelaying Department Records.

This was unavoidable as no one set of figures could be broken down sufficiently to illustrate the various aspects of the operational effort and wastage during the period covered by this Volume. It has therefore been necessary to use them all either separately or in combination. Inevitably some discrepancies have arisen, but, as will be seen, these are not very great and while it is not claimed that the figures quoted in these Appendices are necessarily final, they are the most accurate which can be produced under the circumstances. Footnotes have been given throughout which clearly indicate the sources used but some explanation must be made here of the reasons for their selection in each case.

Sorties and Tonnage. The two most reliable contemporary records of sorties and tonnage available are the War Room Manuals and the O.R.S. Night and Day Raid Reports. The War Room figures have been used throughout these Tables (except where otherwise indicated) as, in contradistinction to the O.R.S., they include missing aircraft in the totals of aircraft attacking and tonnage dropped. Since missing aircraft were more usually shot down either over the target after their bombing run or on the return journey, their inclusion in the effective effort is considered more accurate.

Minelaying: War Room figures have also been used to show the minelaying effort, with the single exception of Appendix 19 which indicates the number of mines laid by areas during the period. This table has been obtained from the Admiralty who hold the only available records. Discrepancies will be noted between Appendices 13 and 15 in the numbers laid monthly but the totals in each case differ by only 8 mines.

Wastage: The figures given in Appendices 13 and 20 have been obtained from statistics prepared by the Aircraft State Room for a Government post-war White Paper which, in the event, was never published. These are the most accurate overall figures available, but they cannot be broken down any further and for the purpose of Appendix 15, recourse has been made to the O.R.S. Reports which are the most reliable contemporary records of aircraft losses. The discrepancy in this case is rather greater, the Aircraft State Room showing 77 more aircraft lost (missing and Cate. E) during the whole period than the O.R.S.

The use of a number of independent sources in the preparation of statistical Tables must eventually result in some such discrepancies. This in itself is a clear indication of the danger of placing too much reliance on any one set of figures. In the absence of final and authoritative statistics, only a judicious comparison of all the sources available can produce a fair and reasonable estimate.

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SORTIES DESPATCHED, AIRCRAFT LOST, TONNAGE DROPPED AND NUMBER OF MINES LAID (Monthly)

ALL OPERATIONS

Month	Aircraft Despatched					Aircraft Lost (Missing and Cat. E)				Tonnage Dropped				Number of Mines Laid		
	By Day	% of Total	By Night	% of Total	Total	By Day	By Night	Total	% of Sorties Despatched	By Day	By Night	Total	Per Aircraft Lost	By Day	By Night	Total
March	170	7.1	2224	92.1	2394	3	104	107	4.5	94.4	2580.1	2674.5	25	53	303	356
April	264	6.6	3752	93.4	4016	8	169	177	4.4	194.9	4237.5	4432.4	25	2	567	569
May	109	3.9	2699	96.1	2808	2	137	139	5.0	82.4	3151.5	3233.9	23.3	-	1023	1023
June	209	4.2	4788	95.8	4997	7	241	248	5.0	150.1	6695.0	6845.1	27.6	-	1167	1167
July	351	8.2	3914	91.8	4265	15	183	198	4.6	241.6	6126.0	6367.6	32.2	-	897	897
August	365	12.9	2455	87.1	2820	19	165	184	6.0	115.9	4045.9	4161.9	22.6	-	968	968
September	306	8.0	3504	92.0	3810	20	210	230	6.0	83.3	5511.8	5595.1	24.3	-	1101	1101
October	574	20.4	2234	79.6	2808	35	122	157	5.6	457.8	3351.4	3809.2	24.3	-	982	982
November	433	17.0	2114	83.0	2547	16	83	99	3.1	108.4	2314.5	2422.9	24.5	-	1156	1156
December	472	21.2	1757	78.8	2229	28	103	131	5.9	135.7	2578.5	2714.2	20.4	-	987	987
Jan/43	616	19.4	2555	80.6	3171	15	108	123	3.9	216.8	4127.9	4344.7	33.6	18	1267	1285
Total	3869	10.8	31996	89.2	35865	168	1625	1793	5.0	1881.3	44720.1	46601.4	25.9	73	10418	10491

Note on Sources:

Sorties)
Tonnage)
Mines)

AHB/JH/84

~~A. E. W. P. Manual of~~

~~Bomber Command Operations 1942/43.~~

Losses:- Aircraft State Room.

G. 169087/HC/2/50/30

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APPENDIX 13

BOMB RAIDS

SORTIES DESPATCHED AND ATTACKING, TONS DROPPED

Month	(a) By Day					(b) By Night					(c) By Day and Night				
	Aircraft		Tonnage			Aircraft		Tonnage			Aircraft		Tonnage		
	Des- patched	Attack- ing	H. E.	Incd.	Total	Des- patched	Attack- ing	H. E.	Incd.	Total	Des- patched	Attack- ing	H. E.	Incd.	Total
March	151	99	94.4	-	94.4	1898	1577	2043.2	535.3	2578.5	2049	1676	2137.6	535.3	2672.9
April	243	211	194.9	-	194.9	3345	2735	2808.6	1427.4	4236.0	3588	2946	3003.5	1427.4	4430.9
May	109	91	82.1	.3	82.4	2188	1848	1550.7	1582.3	3133.0	2297	1939	1632.8	1582.6	3215.4
June	206	176	150.1	-	150.1	4218	3596	2394.1	4294.0	6688.1	4424	3772	2544.2	4294.0	6838.2
July	313	187	236.6	3.4	240.0	3450	2929	3945.3	2178.0	6123.3	3763	3116	4181.9	2181.4	6363.3
August	193	141	99.1	10.3	109.4	2039	1762	2300.3	1744.2	4044.5	2232	1903	2399.4	1754.5	4153.9
September	135	93	80.3	.6	80.9	3027	2611	2862.4	2646.4	5508.8	3162	2704	2942.7	2647.0	5589.7
October	400	306	329.8	126.4	456.2	1753	1522	1422.6	1926.7	3349.3	2153	1828	1752.4	2053.1	3805.5
November	144	97	99.2	3.4	102.6	1449	1215	1188.1	1126.4	2314.5	1593	1312	1287.3	1129.8	2417.1
December	200	159	117.8	16.5	134.3	1286	1100	1111.9	1466.6	2578.5	1486	1259	1229.7	1483.1	2712.8
Jan/43	394	227	210.9	5.9	216.8	1917	1544	1887.8	2240.1	4127.9	2311	1771	2098.7	2246.0	4344.7
Total	2488	1787	1695.2	166.8	1862.0	26570	22439	23515.0	21167.4	44682.4	29058	24226	25210.2	21334.2	46544.4

Note on Source: *AHB/TH/34**A. M. R. Manual of Bomber Command Operations, 1942/43.*

TOTAL SORTIES DESPATCHED, AIRCRAFT LOST, TONS DROPPED
AND NUMBER OF MINES LAID.
MARCH 1942 - JANUARY 1943

(a) By Day

Type of Operation	Sorties Despatched	% of Total	A/C* Lost	Tons Dropped	Number of mines laid
Bomb Raids	2488	64.3	123	1862.0	-
Anti-submarine etc. ϕ	1328	34.3	36	19.3	-
Minelaying	53	1.4	1	-	73
Leaflets	-	-	-	-	-
Total	3869	100%	160	1881.3	73

(b) By Night

Type of Operations	Sorties Despatched	% of Total	A/C* Lost	Tons Dropped	Number of mines laid
Bomb Raids	26570	83.0	1402	44682.4	-
Anti-submarine etc. ϕ	-	-	-	-	-
Minelaying	4867	15.3	15.7	37.7	10418
Leaflets	559	1.7	7	-	-
Total	31996	100%	1566	44720.1	10418

(c) By Day and Night

Type of Operations	Sorties Despatched	% of Total	A/C* Lost	Tons Dropped	Number of mines laid
Bomb Raids	29058	81.0	1525	46544.4	-
Anti-submarine etc. ϕ	1328	3.7	36	19.3	-
Minelaying	4920	13.7	158	37.7	10491
Leaflets	559	1.6	7	-	-
Total	35865	100%	1726	46601.4	10491

ϕ Includes Anti-submarine, anti-shipping and convoy escort.

* Mining and Cat. "E".

2.

SORTIES DESPATCHED, AIRCRAFT LOST, TONS DROPPED AND NUMBER OF MINES LAID
BY TYPE OF OPERATION (Monthly)

Month	Type of Operation	(a) By Day				(b) By Night				(c) By Day and Night			
		Sorties Despatched	A/C* Lost	Tons Dropped	Mines Laid	Sorties Despatched	A/C* Lost	Tons Dropped	Mines Laid	Sorties Despatched	A/C* Lost	Tons Dropped	Mines Laid
March	Bomb Raids	151	2	94.4	-	1898	88	2578.5	-	2049	90	2672.9	-
	Anti-submarine etc.	-	-	-	-	-	-	-	-	-	-	-	-
	Minelaying	19	-	-	53	247	10	1.6	303	266	10	1.6	356
	Leaflets	-	-	-	-	79	-	-	-	79	-	-	-
April	Bomb Raids	243	15	194.9	-	3345	143	4236.0	-	3588	158	4430.9	-
	Anti-submarine etc.	-	-	-	-	-	-	-	-	-	-	-	-
	Minelaying	21	-	-	2	323	12	1.5	567	344	12	1.5	569
	Leaflets	-	-	-	-	84	2	-	-	84	2	-	-
May	Bomb Raids	109	1	82.4	-	2188	117	3133.0	-	2297	118	3215.4	-
	Anti-submarine etc.	-	-	-	-	-	-	-	-	-	-	-	-
	Minelaying	-	-	-	-	450	12	18.5	1023	450	12	18.5	1023
	Leaflets	-	-	-	-	61	2	-	-	61	2	-	-
June	Bomb Raids	206	2	150.1	-	4218	239	6688.1	-	4424	241	6838.2	-
	Anti-submarine etc.	3	-	-	-	-	-	-	-	3	-	-	-
	Minelaying	-	-	-	-	516	10	6.9	1167	516	10	6.9	1167
	Leaflets	-	-	-	-	54	-	-	-	54	-	-	-
July	Bomb Raids	313	17	240.0	-	3450	172	6123.3	-	2763	189	6363.3	-
	Anti-submarine etc.	38	-	1.6	-	-	-	-	-	38	-	1.6	-
	Minelaying	-	-	-	-	434	11	2.7	897	434	11	2.7	897
	Leaflets	-	-	-	-	30	-	-	-	30	-	-	-
August	Bomb Raids	193	15	109.4	-	2039	140	4044.5	-	2232	155	4153.9	-
	Anti-submarine	172	7	6.5	-	-	-	-	-	172	7	6.5	-
	Minelaying	-	-	-	-	382	17	1.4	968	382	17	1.4	968
	Leaflets	-	-	-	-	34	-	-	-	34	-	-	-
September	Bomb Raids	135	5	80.9	-	3027	182	5508.8	-	3162	187	5589.7	-
	Anti-submarine etc.	171	4	2.4	-	-	-	-	-	171	4	2.4	-
	Minelaying	-	-	-	-	468	19	3.0	1101	468	19	3.0	1101
	Leaflets	-	-	-	-	9	-	-	-	9	-	-	-
October	Bomb Raids	400	18	456.2	-	1753	100	3349.3	-	2153	118	3805.5	-
	Anti-submarine etc.	174	9	1.6	-	-	-	-	-	174	9	1.6	-
	Minelaying	-	-	-	-	461	18	2.1	982	461	18	2.1	-
	Leaflets	-	-	-	-	20	-	-	-	20	-	-	-
November	Bomb Raids	144	12	102.6	-	1449	56	2314.5	-	1593	68	2417.1	-
	Anti-submarine etc.	289	4	5.8	-	-	-	-	-	289	4	5.8	-
	Minelaying	-	-	-	-	582	18	-	1156	582	18	-	1156
	Leaflets	-	-	-	-	83	1	-	-	83	1	-	-

* Missing and Cat. "E"

/December

SORTIES DESPATCHED, AIRCRAFT LOST, TONS DROPPED AND NUMBER OF MINES LAID BY TYPE OF OPERATION (MONTHLY) (CONT.)

Month	Type of Operation	(a) By Day				(b) By Night				(c) By Day and Night			
		Sorties Despatched	A/C* Lost	Tons Dropped	Mines Laid	Sorties Despatched	A/C* Lost	Tons Dropped	Mines Laid	Sorties Despatched	A/C* Lost	Tons Dropped	Mines Laid
December	Bomb Raids	200	18	134.3	-	1286	82	2578.5	-	1486	100	2712.8	-
	Anti-submarine etc.	272	10	1.4	-	-	-	-	-	272	10	1.4	-
	Minelaying	-	-	-	-	421	11	-	987	421	11	-	987
	Leaflets	-	-	-	-	50	1	-	-	50	1	-	-
Jan./43	Bomb Raids	394	18	216.8	-	1917	83	4127.9	-	2311	101	4344.7	-
	Anti-submarine etc.	209	2	-	-	-	-	-	-	209	2	-	-
	Minelaying	13	-	-	18	583	19	-	1267	596	19	-	1285
	Leaflets	-	-	-	-	55	1	-	-	55	1	-	-

* Missing and Cat. "E"

Note on Sources:

Sorties) A.M.W.R. Manual of
 Tonnage) Bomber Command Operations
 Mines) 1942/43

AHB/TW/H/84

Aircraft Lost - BC/ORS. Final Night and Day
 Raid Reports.

TONNAGE DROPPED BY CATEGORY OF TARGET (Monthly)

Month	Industrial Towns	Troops and Defences	Transportation	Naval Targets	Oil Targets	Airfields and Aircraft Factories	Specific Industries	Miscellaneous Targets	Total Tonnage
March	1711	-	-	298	-	32	510	124	2675
April	2667	-	70	847	-	243	397	209	4433
May	2383	-	11	231	-	304	211	94	3234
June	6087	-	-	223	11	390	36	98	6845
July	5246	-	11	896	-	99	22	94	6368
August	3828	61	-	110	-	34	15	114	4162
September	5256	-	-	103	-	125	16	95	5595
October	3124	-	-	394	1	183	37	70	3809
November	1700	-	9	662	-	8	9	35	2423
December	2497	-	34	24	-	7	88	64	2714
Jan/43	2925	-	30	1212	-	66	49	63	4345
Total	37424	61	165	5000	12	1491	1390	1060	46603

Note on Source:

AMB/IIH/84

A. M. W. R. Manual of Bomber Command Operations 1939-45.

TERRITORIAL DISTRIBUTION OF TONNAGE (Monthly)
(To nearest Ton)

Month	Germany	% of Total	France	Low Countries	Norway	Denmark	Italy	Targets at Sea	Total	Comparison with 1941/42	
										Total	Germany
March	1897	70.9	711	52	13	-	-	2	2675	1744 ¹⁹⁴¹	1166 ¹⁹⁴¹
April	3097	69.9	1076	83	161	-	13	3	4433	2396	1406
May	2738	84.7	420	57	-	-	-	19	3234	2846	2224
June	6474	94.6	258	106	-	-	-	7	6845	4310	3473
July	6208	97.5	54	87	-	8	-	11	6368	4384	3190
August	3950	94.9	145	56	-	-	-	11	4162	4242	3689
September	5486	98.1	48	44	2	6	-	9	5595	2889	2000
October	2992	78.5	195	43	-	-	574	5	3809	2984	2223
November	830	34.3	42	27	-	-	1512	12	2423	1907	1374
December	1835	67.6	42	96	-	-	740	1	2714	1794	799
Jan/43	2968	68.3	1284	84	-	7	-	2	4345	2292 ¹⁹⁴²	985 ¹⁹⁴²
Total	38475	82.6	4275	735	176	21	2839	82	46603	31788	22529
									February 1942	1011	705

Note on Source: **AMB/GH/84**

A. M. W. R. Manual of Bomber Command Operations, 1939-45.

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APPENDIX 17

MONTHLY ANALYSIS OF OPERATIONAL EFFORT

March, 1942 - January, 1943.

(a) By Night

Month					NO. OF NIGHTS INVOLVING SORTIES OF:-				
	No operations undertaken	Mining or leaflets only	Bombing Operations	Total number of nights operated	0-49	50-149	150-299	300-499	500 and over
March	14	3	14	17	7	2	7	1	-
April	9	1	20	21	-	7	10	4	-
May	13	6	12	18	5	9	3	-	1
June	6	6	18	24	5	7	10	-	2
July	9	11	11	22	7	5	5	4	1
August	10	8	13	21	5	9	6	1	-
September	7	9	14	23	8	4	8	3	-
October	8	13	10	23	11	7	5	-	-
November	7	11	12	23	11	7	5	-	-
December	8	9	14	23	13	6	11	-	-
Jan/43	9	4	18	22	6	6	10	-	-
Total	100	81	156	237	78	69	73	13	4

(b) By Day

Month	No operations undertaken	0-49 Sorties	50-149 Sorties	Total Number of days operated
March	14	17	-	17
April	14	16	-	16
May	19	12	-	12
June	14	16	-	16
July	8	22	1	23
August	3	28	-	28
September	2	28	-	28
October	6	23	2	25
November	1	28	1	29
December	0	30	1	31
Jan/43	2	26	3	29
Total	843	246	8	254

Note on Source: AHB/IIH/54

~~A. M. W. R. Manual of Bomber Command Operations, 1942/43~~

OPERATIONAL ("F.B") WASTAGE (Monthly)
(a) By Day

Month 1942	Missing	Lost (Cat "E")		Total Lost (Missing and cat "E")	% of sorties Despatched	Damaged (Cat "B")		Damaged (Cat "AC")		Total Damaged	Total "F.B" Wastage	% of sorties Despatched
		Enemy Action	Not E/A			Enemy Action	Not E/A	Enemy Action	Not E/A			
March	1	-	2	3	1.8	2	4	3	2	11	14	8.2
April	5	2	1	8	3.0	2	-	10	1	13	21	8.0
May	2	-	-	2	1.8	1	-	4	-	5	7	6.4
June	5	1	1	7	3.3	1	-	11	-	12	19	9.1
July	13(1)	1	1	15(1)	4.3	-	-	8	6	14	29(1)	8.3
August	13	4	2	19	5.2	6	-	5	4	15	34	9.3
September	15	-	5(2)	20(2)	6.5	-	1(1)	6	5	12(1)	32(3)	10.5
October	27(3)	1	7(2)	35(5)	6.1	-	4	11	4	19	52(5)	8.9
November	11	-	5(1)	16(1)	3.7	-	4(1)	5(1)	4	13(2)	29(3)	6.7
December	18(3)	2	8(4)	28(7)	5.9	2	1(1)	4	7(1)	14(2)	42(9)	8.9
Jan/43	10(1)	2	3(1)	15(2)	2.4	1	3	5	4(2)	13(2)	28(4)	4.5
Total	120(8)	13	35(10)	168(18)	4.3	15	17(3)	72(1)	37(3)	141(7)	307(25)	7.9

Note: Figures in Brackets indicate casualties to O.T.U. Aircraft already included in totals.

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APPENDIX 20

(b) By Night

Month 1942	Missing	Lost (Cat "E")		Total Lost (Missing and Cat "E")	% of sorties Despatched	Damaged (Cat "B")		Damaged (Cat "AC")		Total Damaged	Total "F.B" Wastage	% of sorties Despatched
		Enemy Action	Not E/A			Enemy Action	Not E/A	Enemy Action	Not E/A			
March	81	8	15	104	4.7	4	12	39	19	74	178	8.0
April	136	11	22	169	4.5	16	10	54	19	99	268	7.1
May	115(16)	8(2)	14(2)	137(20)	5.1	5(3)	10(4)	42(13)	14(1)	71(21)	208(41)	7.7
June	197(46)	12	32(2)	241(48)	5.0	14(1)	22(3)	48(15)	19(2)	103(21)	344(69)	7.2
July	163(23)	4	16(2)	183(25)	4.7	8(1)	19(2)	48(7)	18	93(10)	276(35)	7.1
August	142	7	16	165	6.7	7	7	36	20(1)	70(1)	235(1)	9.6
September	170(30)	18(6)	22(2)	210(38)	6.0	8(2)	8(1)	63(11)	23(7)	102(21)	312(59)	8.9
October	88	6	28	122	5.5	2	11	22	13(1)	48(1)	170(1)	7.6
November	54	4	25	83	3.9	7	6	17	18	48	131	6.2
December	73(1)	6	24(1)	103(2)	5.9	6	7	20(1)	5	38(1)	141(3)	8.0
Jan/43	92(4)	3	13	108(4)	4.2	2	8	21(2)	25(1)	56(3)	164(7)	6.4
Total	1311(120)	87(8)	227(9)	1625(137)	5.1	79(7)	120(10)	410(49)	193(13)	802(79)	2427(216)	7.6

Note: Figures in brackets indicate casualties to O.T.U. Aircraft already included in totals.

(c) By Day and Night

Month 1942	Missing	Lost (Cat "E")		Total Lost (Missing and Cat "E")	% of sorties Despatched	Damaged (Cat "B")		Damaged (Cat "AC")		Total Damaged	Total "F. B" Wastage	% of sorties Despatched
		Enemy Action	Not E/A			Enemy Action	Not E/A	Enemy Action	Not E/A			
March	82	8	17	107	4.5	6	16	42	21	85	192	8.0
April	141	13	23	177	4.4	18	10	64	20	112	289	7.2
May	117(16)	8(2)	14(2)	139(20)	5.0	6(3)	10(4)	46(13)	14(1)	76(21)	215(41)	7.7
June	202(46)	13	33(2)	248(48)	5.0	15(1)	22(3)	59(15)	19(2)	115(21)	363(69)	7.3
July	176(24)	5	17(2)	198(26)	4.6	8(1)	19(2)	56(7)	24	107(10)	305(36)	7.2
August	155	11	18	184	6.0	13	7	41	24(1)	85(1)	269(1)	9.2
September	185(30)	18(6)	27(4)	230(40)	6.0	8(2)	9(2)	69(11)	28(7)	114(22)	344(62)	9.0
October	115(3)	7	35(2)	157(5)	5.6	2	15	33	17(1)	65	222(6)	7.9
November	65	4	30(1)	99(1)	3.1	7	10(1)	22(1)	22	61(2)	160(3)	6.3
December	91(4)	8	32(5)	131(9)	5.9	8	8(1)	24(1)	12(1)	52(3)	183(12)	8.2
Jan/43	102(5)	5	16(1)	123(6)	3.9	3	11	26(2)	29(3)	69(5)	192(11)	6.1
Total	1431(128)	110(8)	262(19)	1793(155)	5.0	94(7)	137(13)	482(50)	230(16)	941(86)	2734(241)	7.7

Note: 1. The figures in brackets indicate casualties to O. T. U. Aircraft already included in totals.

2. The above figures have been obtained from Statistics prepared by the Aircraft State Room for a Government White Paper (not published).

DIARY OF BOMBER COMMAND OPERATIONS

Page 1.

March 1942 - January 1943

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses *	Aircraft
1942						
March						
2	Den Helder (Shipping)	4	-	-	-	Boston
3/4	Paris (Renault)	235	222	457.0	4	Wellington, Stirling Whitley, Halifax, Hampden, Manchester
	Soesterburg/Schipol Airfields	4	-	-	-	Blenheim
	Emden	4	4	5.8	1	Wellington
	Sea-mining	4	4	16 mines	-	Lancaster
	Leaflets	2	2	-	-	Whitley
7/8	St Nazaire	17	15	22.5	-	Whitley, Wellington Hampden
	Sea-mining	17	8	8 mines	1	Hampden
8	Comines (Power Stn.)	6	4	3.1	-	Boston
	Abbeville (Marshalling Yard)	6	6	5.4	-	Boston
	Poissy	12	8	7.1	1	Boston
8/9	Essen	211	177	294.8	9	Wellington, Stirling, Halifax, Hampden, Manchester
	Ostend	6	4	2.0	-	Blenheim
	Soesterburg/Schipol Airfields	6	2	0.9	-	Blenheim
	Le Havre	13	13	24.4	-	Wellington, Stirling
	Sea mining	12	8	17 mines	-	Hampden, Manchester
	Leaflets	1	1	-	-	Hampden
9	Mazingarbe (Synthetic Petrol)	6	-	-	-	Boston
9/10	Essen	187	136	221.8	6	Wellington, Stirling, Halifax, Hampden, Manchester
	Boulogne (Docks)	9	5	10.6	-	Wellington, Stirling
	Sea-mining	5	2	2 mines	-	Hampden
10	Zandvoort area (shipping)	4	-	-	-	Boston
10/11	Essen	126	85	137.2	7	Wellington, Stirling Hampden, Manchester, Lancaster
	Boulogne (Docks)	24	2	3.3	-	Wellington, Whitley, Hampden
	Leaflets	3	3	-	-	Hampden
12/13	Emden	40	25	36.4	3	Wellington, Whitley
	Kiel (Deutsche Werke)	68	53	84	5	Wellington
	Sea-mining	27	21	21 mines	-	Hampden, Manchester
	Leaflets	1	1	-	-	Hampden
13	Hazebrouck (Rail centre)	11	10	8.9	-	Boston

* Losses include Missing and Cat. E.

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>March</u>						
13/14	<u>Cologne</u>	135	112	159.8	3	Wellington, Stirling, Halifax, Lancaster, Hampden, Manchester
	Dunkirk	19	10	17.4	2	Wellington, Stirling
	Boulogne	20	1	10.5	3	Wellington, Whitley
	Soesterburg/Schipol Airfields	2	-	-	-	Blenheim
	Sea-mining	5	4	4 mines	-	Hampden
	Leaflets	7	5	-	-	Hampden
14	Le Havre (Shipping)	6	-	-	-	Boston
15	Brittany Coast (Shipping)	6	-	-	-	Boston
15/16	Soesterburg/Schipol Airfields	3	1	0.4	-	Blenheim
17	Essen	1	-	-	-	Wellington
18	Essen	5	-	-	-	Wellington
19	Essen	1	-	-	-	Wellington
20	Essen	2	-	-	-	Wellington
20/21	Sea-mining	19	11	52 mines	1	Lancaster, Manchester
21	Essen	1	-	-	-	Wellington
23/24	Sea-mining	17	14	29 mines	-	Stirling, Manchester, Hampden
24	Abbeville (Marshalling yards)	6	5	4.5	-	Boston
	Comines (Power Stn.)	12	12	10.7	-	Boston
24/25	Sea-mining	35	31	59 mines	2	Stirling, Lancaster, Manchester, Hampden
25	Le Trait (Shipyards)	9	9	8.0	-	Boston
25/26	<u>Essen</u>	254	190	298.9	11	Wellington, Stirling, Manchester, Lancaster, Hampden
	St. Nazaire	37	26	47.0	1	Wellington, Stirling, Whitley
	Sea-mining	38	26	26 mines	1	Hampden, Stirling, Manchester
	Leaflets	30	30	-	-	Wellington, Whitley, Hampden
26	Le Havre (Shipping)	24	20	17.9	1	Boston
26/27	Essen	115	98	140.6	11	Wellington, Stirling
	Le Havre	8	8	11.8	-	Wellington, Stirling
	Leeuwarden/Soesterburg Airfields	11	6	2.6	2	Blenheim
	Sea-mining	36	28	59 mines	2	Hampden, Manchester
	Leaflets	15	15	-	-	Whitley, Hampden, Manchester
27	Ostend (Power Stn)	12	12	10.5	-	Boston
27/28	St. Nazaire (Special Op.)	62	3	3.4	4	Wellington, Whitley
	Soesterburg/Schipol Airfields	8	4	2.0	1	Blenheim
	Sea-mining	18	13	13 mines	3	Hampden

SECRET

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 March						
28/29	Lubeck	234	204	303.9	12	Wellington, Stirling Hampden, Manchester
	Schipol/Soesterburg Airfields	2	2	1.0	-	Blenheim
	Sea-mining	7	6	6 mines	-	Hampden
	Leaflets	14	13	-	-	Wellington, Hampden
29/30	Sea-mining	26	23	37 mines	2	Hampden, Manchester
	Leaflets	6	5	-	-	Hampden, Whitley
30/31	Trondheim (Tirpitz)	34	5	13.4	1	Halifax
31	N.W. Germany (Patrols)	11	1	0.9	-	Hampden
	Essen	6	-	-	-	Wellington
April						
31/1	Essen	4	1	1.8	-	Wellington
1	Boulogne (Armed M/V)	12	11	9.4	2	Boston
1/2	Poissy (Matford Works)	41	34	53.1	1	Wellington, Whitley
	Le Havre	57	46	58.1	1	Wellington, Hampden, Manchester
	N.W. Germany (Railways)	49	21	31.8	13	Wellington, Hampden
	Eindhoven/Leeuwarden Airfields	3	-	-	-	Blenheim
	Sea-mining	15	11	41 mines	-	Stirling, Wellington, Manchester
	Leaflets	5	4	-	-	Hampden, Manchester
2/3	Poissy (Matford Works)	50	44	97.0	1	Wellington, Stirling
	Le Havre	26	26	47.1	-	Wellington, Hampden, Manchester
	Sea-mining	30	26	31 mines	2	Wellington, Hampden
4	St. Omer (Rail Junction)	12	12	10.7	-	Boston
	Essen	3	-	-	-	Wellington
	Enden	1	-	-	-	Wellington
	Sea-mining	21	2	2 mines	-	Hampden
5/6	Cologne	224)	219	314.7	7)	Wellington, Stirling Hampden, Manchester
	Cologne (Humboldt Dentz)	39))	
	Le Havre	18	14	19.4	-	Wellington, Stirling, Whitley
	Gennevilliers (Gnome & Rhone)	20	14	19.4	-	Whitley
	St. Trond/Venlo/ Leeuwarden/ Soesterburg/Schipol Airfields	6	3	1.5	-	Blenheim
	Leaflets	11	10	-	-	Hampden, Wellington
6/7	Essen	157	50	74.2	5	Wellington, Stirling Hampden, Manchester
8	Dutch Coast (Sweep)	4	2	18	-	Boston
8/9	Hamburg	227)	175	262.9	6	Wellington, Stirling, Halifax, Hampden, Manchester, Lancaster
	Hamburg (Blohm & Voss)	45)				

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942	Le Havre	13	7	10.3	-	Wellington
April	Leeuwarden/Soesterburg Gilze Rijen/Schipol/ Eindhoven Airfields	3	3	1.5	-	Blenheim, Wellington
	Sea-mining	24	17	36 mines	-	Wellington, Stirling, Hampden, Lancaster
	Leaflets	16	12	-	-	Hampden, Manchester
9	Essen	7	1	2.0	-	Wellington
10/11	Essen	254	172	222.3	14	Wellington, Stirling, Halifax, Hampden, Manchester, Lancaster
	Le Havre	39	26	42.8	1	Wellington, Stirling, Halifax, Hampden, Manchester
	Soesterburg/Schipol Airfields	3	-	-	-	Blenheim
	Sea-mining	3	2	6 mines	-	Stirling, Wellington
	Leaflets	5	4	-	-	Hampden, Manchester
12	Hazebrouk (Railway Centre)	9	8	7.1	1	Boston
12/13	Essen	251	173	279.5	14	Wellington, Stirling, Halifax, Hampden, Manchester
	Le Havre	27	22	40.6	-	Wellington, Stirling
	Holland (Airfields)	4	3	2.0	-	Blenheim
	Genoa	18	6	6.7	-	Whitley
	Sea-mining	20	17	27 mines	-	Wellington, Stirling, Hampden, Manchester
	Leaflets	7	6	-	-	Lancaster, Manchester, Hampden
13/14	Boulogne	4	1	1.2	-	Wellington
	Sea-mining	47	33	87 mines	2	Wellington, Stirling, Hampden, Manchester
	Leaflets	3	-	-	-	Wellington
14	Mondeville (Power Station)	12	12	10.7	-	Boston
14/15	Dortmund	208	39	203.0	14	Wellington, Stirling, Halifax, Hampden, Manchester
	Le Havre	23	20	29.3	1	Wellington, Halifax, Hampden
	Soesterburg/Leeuwarden/ Schipol Airfields	5	2	1.0	-	Blenheim
	Sea-mining	3	1	4 mines	-	Stirling
	Leaflets	1	1	-	-	Stirling
15	Cherbourg	12	9	8.0	-	Boston
15/16	Dortmund	152	87	110.1	4	Wellington, Stirling, Hampden, Manchester
	Le Havre	8	8	13.4	-	Wellington

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>April</u>	St Nazaire	18	16	20.8	-	Whitley
	Amsterdam/Soesterburg/ Leeuwarden Airfields	4	3	1.5	-	Blenheim
	Sea-mining	11	10	25 mines	-	Stirling, Hampden, Manchester
	Leaflets	4	4	-	-	Hampden, Manchester
16	Le Havre (Power Station)	12	12	10.5	-	Boston
16/17	Le Havre	4	1	1.3	-	Wellington
	Lorient	17	13	19.3	-	Whitley, Wellington, Halifax
	Sea-mining	21	14	27 mines	2	Wellington, Stirling, Hampden, Manchester
	Leaflets	11	11	-	-	Wellington, Hampden, Manchester
17	Calais (Parachute factory)	6	6	5.4	-	Boston
	Cherbourg	12	12	10.7	1	Boston
	Rouen (Grandquevilly Power station and Docks)	12	12	10.8	-	Boston
	Augsburg (Naval Armaments)	12	8	14.3	7	Lancaster
17/18	<u>Hamburg</u>	173	103	172.1	10	Wellington, Stirling, Hampden, Manchester
	Le Havre	4	2	3.6	-	Wellington, Stirling
	St. Nazaire (Submarine Base)	22	14	18.5	-	Whitley
	Leeuwarden/Soesterburg/ Airfields	8	2	1.0	1	Blenheim
	Sea-mining	9	8	17 mines	-	Stirling, Hampden, Manchester
19/20	Sea-mining	51	32	71 mines	3	Stirling, Hampden, Manchester, Wellington, Lancaster
22/23	Cologne	69	51	85.7	4	Wellington, Stirling
	Le Havre	23	21	37.9	1	Wellington, Stirling, Whitley, Halifax
	Sea-mining	63	47	134 mines	1	Wellington, Stirling, Hampden, Manchester
	Leaflets	1	1	-	-	Hampden
23/24	<u>Rostock</u> Rostock (Heinkel Works)	143) 18)	144	239.2	5	Wellington, Stirling Whitley, Hampden, Manchester, Lancaster
24	Flushing	12	12	10.5	-	Boston
	Abbeville (Railway Centre)	6	-	-	-	Boston
24/25	<u>Rostock</u> Rostock (Heinkel Works)	91) 34)	112	172.6	1	Wellington, Stirling, Whitley, Hampden, Manchester, Lancaster

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 April	Leeuwarden Airfield	4	3	1.5	1	Blenheim
	Leaflets	3	3	-	-	Stirling, Manchester
	Dunkirk	47	43	78.2	-	Wellington, Stirling, Halifax, Hampden
25	Cherbourg	6	6	5.4	1	Boston
	Dunkirk	6	6	5.4	1	Boston
	Le Havre	12	11	9.8	-	Boston
	Abbeville (Railway Centre)	6	6	5.3	-	Boston
	Morlaix/Ploujean Airfield	6	-	-	-	Boston
25/26	Rostock	110)				Wellington, Stirling, Whitley, Hampden, Manchester, Lancaster
	Rostock (Heinkel Works)	18)	114	193.4	4	
	Dunkirk	32	21	45.9	-	Wellington, Stirling, Hampden
	Pilsen (Skoda Works)	6	5	13.0	1	Stirling
	Leeuwarden Airfield	1	1	0.5	-	Blenheim
	Leaflets	5	5	-	-	Wellington, Stirling
26	St. Omer (Railway Station)	6	6	5.4	-	Boston
	Hazebruck (Railway Yard)	6	5	4.5	-	Boston
26/27	Rostock (Heinkel Works)	55)				Wellington, Stirling, Whitley, Hampden, Halifax, Manchester, Lancaster
	Rostock	52)	96	137.4	3	
	Dunkirk	24	22	26.1	-	Wellington, Blenheim, Stirling, Whitley, Halifax
	Leeuwarden/Eindhoven Airfields	3	3	1.5	1	Blenheim
	Sea-mining	4	3	9 mines	-	Wellington, Hampden, Manchester
	Leaflets	7	7	-	-	Whitley
27	Ostend (Power Station)	6	4	4.5	1	Boston
	Lille (Sequedin Power Station)	12	12	10.7	1	Boston
27/28	Cologne	92	82	148.3	7	Wellington, Stirling, Halifax
	Dunkirk	12	11	20.0	2	Wellington, Whitley, Halifax
	Trondheim (Naval Base)	43	32	58.2	5	Halifax, Lancaster
	Sea-mining	11	6	29 mines	1	Wellington, Stirling, Hampden, Lancaster
	Leaflets	5	3	-	2	Wellington
28	St. Omer	6	6	5.4	-	Boston
28/29	Kiel	88	61	88.3	6	Wellington, Stirling, Halifax, Hampden.

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 April	Langerbrugge (Power Station)	6	5	2.6	1	Blenheim
	Trondheim (Naval Base)	34	30	58.8	2	Lancaster, Halifax
	Soesterburg/Schipol Airfields	4	3	1.5	-	Blenheim
	Sea-mining	6	4	13 mines	-	Wellington, Manchester
29	Dunkirk	6	6	5.4	-	Boston
29/30	Gennevilliers (Gnome and Rhone)	88	85	150.4	4	Wellington, Stirling, Hampden
	Ostend	20	17	30.8	2	Wellington, Whitley, Halifax
	Schipol/Leeuwarden/Soesterburg Airfields	6	6	2.9	-	Blenheim
	Sea-mining	5	3	12 mines	1	Manchester
30	Le Havre	6	6	5.4	-	Boston
	Flushing	6	6	5.4	-	Boston
	Morlaix (Airfield)	6	6	4.4	-	Boston
	Abbeville (Marshalling Yard)	6	6	5.4	-	Boston
MAY 1	Calais (Parachute Factory)	6	6	5.4	-	Boston
	St. Omer (Railway Station)	6	6	5.4	-	Boston
2/3	Sea-mining	96	69	219 mines	2	Wellington, Stirling, Hampden, Manchester, Lancaster
	Leaflets	11	10	-	-	Hampden, Manchester
3	Dunkirk	6	5	4.0	-	Boston
3/4	Hamburg	81	59	120.3	6	Wellington, Stirling, Halifax, Hampden
	St. Nazaire	9	7	11.4	-	Wellington, Stirling
	Eindhoven/Gilzerijen Airfields	4	-	-	-	Blenheim
	Sea-mining	2	2	8 mines	-	Wellington, Lancaster
	Leaflets	8	7	-	-	Wellington, Manchester, Lancaster
4	Le Havre (Power Station)	6	6	5.4	-	Boston
4/5	Stuttgart	69)				Wellington, Stirling,
	Stuttgart (R. Bosch A.G. Factory)	51)	83	131.9	4	Halifax, Lancaster, Hampden
	Nantes	9	4	7.3	1	Wellington, Stirling
	Pilsen (Skoda Works)	5	4	10.7	1	Stirling
	Sea-mining	8	8	23 mines	-	Hampden, Manchester
	Leaflets	6	5	-	1	Wellington, Stirling, Halifax, Manchester

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
5	Zeebrugge (Coke Ovens)	6	6	5.4	-	Boston
	Lille (Sequedin Power Station)	6	-	-	-	Boston
5/6	Stuttgart	41)				Wellington, Stirling,
	Stuttgart (R. Bosch A.G. Factory)	36)	59	104.3	7	Halifax, Lancaster
	Nantes	19	6	10.9	-	Wellington, Halifax
	Schipol Airfield	4	4	1.2	-	Blenheim
	Leaflets	10	10	-	-	Stirling, Halifax, Hampden, Manchester, Lancaster
6	Caen (Power Station)	6	3	2.7	-	Boston
	Boulogne	6	6	5.4	-	Boston
	Calais (Parachute Factory)	6	6	5.4	-	Boston
6/7	Stuttgart	97	63	99.4	7	Wellington, Stirling, Halifax, Hampden, Lancaster
	Nantes	19	12	21.2	-	Wellington, Stirling, Hampden, Manchester
	Schipol/Leeuwarden/Soesterburg/Eindhoven Airfields	4	3	1.5	1	Blenheim
	Leaflets	9	9	-	-	Stirling, Halifax, Manchester
7	Zeebrugge (Coke Ovens)	6	6	4.3	-	Boston
	Ostend (Power Station)	6	6	5.1	-	Boston
7/8	Sea-mining	81	66	193 mines	2	Wellington, Stirling, Hampden, Manchester, Lancaster
	Leaflets	1	1	-	-	Halifax
	St. Nazaire	5	2	3.8	-	Wellington, Stirling
8	Dieppe	6	6	5.4	-	Boston
8/9	Warnemunde	34)				Wellington, Stirling,
	Warnemunde (H.E. Airframe Factory)	147)	167	316.4	20	Halifax, Hampden, Manchester
	Warnemunde area (Searchlights)	12)				
	Leeuwarden Airfield	3	3	1.5	-	Blenheim
	Sea-mining	3	3	10 mines	-	Wellington, Manchester
9	Hazebruck (Marshalling Yard)	6	6	5.4	-	Boston
	Bruges (Oil Tankerage)	6	6	5.4	-	Boston
9/10	Sea-mining	20	16	-	-	Wellington, Hampden, Manchester, Lancaster
13	Essen	4	-	-	-	Wellington
15/16	Sea-mining	50	43	86 mines	4	Wellington, Hampden, Lancaster
16/17	Sea-mining	14	13	60 mines	-	Manchester, Lancaster

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
17	Boulogne	12	10	8.9	-	Boston
17/18	Boulogne	27	3	9.1	2	Wellington, Stirling
	Sea-mining	61	48	141 mines	7	Wellington, Stirling
	Leaflets	1	1	-	-	Stirling
19/20	<u>Mannheim</u>	197	167	313.9	11	Wellington, Stirling Halifax, Hampden Manchester
	St. Nazaire	65	43	78.3	1	Wellington, Stirling, Halifax, Manchester
	Sea-mining	9	8	13 mines	-	Wellington, Hampden
	Leaflets	13	10	-	1	Wellington, Halifax, Hampden, Manchester, Lancaster
21/22	Sea-mining	48	18	57 mines	-	Wellington, Stirling
22/23	St. Nazaire	27	3	6.0	-	Halifax
	Sea-mining	31	15	64 mines	-	Wellington, Lancaster
25	Dutch Coast (Shipping)	4	-	-	-	Boston
26/27	Sea-mining	4	2	8 mines	-	Lancaster
29/30	Gennevilliers (Gnome and Rhone works)	77	60	157.5	5	Wellington, Stirling Halifax, Hampden, Lancaster
	Dieppe	17	3	4.4	-	Wellington
	Cherbourg	31	7	119.2	1	Wellington, Stirling, Hampden,
	Sea-mining	24	20	86 mines	1	Wellington, Stirling, Hampden, Lancaster
	Leaflets	3	3	-	-	Manchester
30/31	<u>Cologne</u>	1,046	940	1515.9	52	Wellington, Whitley, Stirling, Halifax, Hampden, Manchester, Lancaster
	Airfields	50	36	17.3	2	Blenheim
31	Cologne	5	4	2.8	1	Mosquito
31/ June 1	Cologne	2	2	1.8	-	Wellington
1	Flushing	12	12	10.7	-	Boston
	Cologne	2	2	1.4	1	Mosquito
1/2	<u>Essen</u>	956	797	1335.8	36	Wellington, Whitley, Stirling, Halifax, Hampden, Manchester, Lancaster
	Airfields	48	26	12.0	3	Blenheim
2	Essen	3	2	1.3	-	Mosquito
	Dieppe	6	6	5.4	-	Boston
2/3	<u>Essen</u>	195	159	324.7	13	Wellington, Stirling, Halifax, Hampden, Lancaster

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>June</u>	Dieppe	6	4	5.8	-	Wellington
	Sea-mining	10	6	12 mines	1	Wellington, Hampden
	Leaflets	4	3	-	-	Hampden
3	Cherbourg (Docks)	6	6	5.4	-	Boston
	Le Havre (Power Station)	6	6	5.1	-	Boston
3/4	<u>Bremen</u>	170	144	278.4	14	Wellington, Stirling, Halifax, Hampden, Manchester, Lancaster
	Dieppe	4	3	7.1	-	Wellington, Stirling
	Leeuwarden/Vechta/ Ardorf Stade Airfields	9	2	1.1	-	Blenheim
	Sea-mining	7	6	22 mines	-	Hampden, Lancaster
	Leaflets	5	5	-	-	Hampden, Manchester
4	Boulogne	6	6	4.7	-	Boston
	Dunkirk	6	6	5.1	1	Boston
4/5	Schipol Airfield	13	10	4.5	1	Blenheim
	Dieppe	20	8	15.1	-	Wellington, Stirling, Lancaster, Hampden
	Leaflets	2	1	-	-	Manchester, Hampden
5	Morlaix Airfield	12	12	8.8	-	Boston
	Le Havre (Power Station)	6	6	5.4	-	Boston
	Ostend (Power Station)	6	5	4.5	-	Boston
	Photo Reconnaissance	1	1	-	-	Mosquito
5/6	<u>Essen</u>	180	129	258.6	16	Wellington, Stirling, Halifax, Lancaster, Hampden
	Sea-mining	15	13	37 mines	1	Wellington, Lancaster, Manchester, Hampden
	Leaflets	3	2	-	-	Wellington, Manchester
6	<u>Fecamp Docks</u>	11	-	-	-	Boston
6/7	<u>Emden</u>	233	206	411.0	20	Wellington, Stirling, Halifax, Hampden, Manchester, Lancaster
	Leeuwarden/Ardorf Airfields	6	3	1.4	-	Blenheim
7/8	Sea-mining	43	41	133 mines	-	Wellington, Stirling, Lancaster, Hampden
	Leaflets	3	3	-	-	Lancaster, Hampden
8	Bruges	12	12	10.7	-	Boston
8/9	<u>Essen</u>	170	132	264.2	18	Wellington, Stirling, Halifax, Hampden, Lancaster
	Dieppe	19	11	27.9	1	Wellington, Stirling, Hampden, Lancaster

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>JUNE</u>						
	Venlo/Twente Airfields	6	1	0.5	1	Blenheim
	Leaflets	1	1	-	-	Stirling
9/10	Sea-mining	54	48	119 mines	-	Wellington, Stirling, Lancaster
10	Lannion Airfield	23	11	8.0	18	Boston
11/12	Sea-mining	91	81	218 mines	4	Wellington, Stirling, Hampden, Lancaster
12	Essen	4	-	-	-	Wellington
16/17	<u>Essen</u>	106	24	59.0	9	Wellington, Stirling, Halifax, Lancaster
	Sea-mining	12	6	6 mines	-	Hampden
	Leaflets	9	8	-	-	Wellington, Stirling
17/18	St. Nazaire	26	8	20.3	1	Wellington, Stirling
	Sea-mining	46	39	106 mines	-	Wellington, Lancaster, Hampden
	Leaflets	2	2	-	-	Stirling
18	Bremen	2	-	-	-	Mosquito
	Bremerhaven	1	-	-	-	Mosquito
18/19	Sea-mining	65	52	148 mines	1	Wellington, Stirling, Hampden, Lancaster
19/20	<u>Enden</u>	194	140	280.3	10	Wellington, Stirling, Halifax, Hampden, Lancaster
	Leeuwarden/Ardorf/ Vechta Airfields	6	4	2.0	-	Blenheim
	Leaflets	5	5	-	-	Stirling, Halifax
20	Enden	2	1	1.3	-	Mosquito
	Le Havre (Power Station)	12	12	10.7	-	Boston
20/21	<u>Enden</u>	185	165	346.9	8	Wellington, Stirling, Halifax, Hampden, Lancaster
	Leeuwarden/Ardorf/ Twente Airfields	5	2	1.5	-	Blenheim
	Leaflets	3	2	-	-	Halifax, Hampden
21	Dunkirk	12	12	9.6	-	Boston
21/22	Sea-mining	56	48	123 mines	1	Wellington, Hampden, Lancaster
	Leaflets	2	2	-	-	Stirling, Hampden
22	Dunkirk	12	6	5.4	-	Boston
22/23	<u>Enden</u>	227	200	399.9	6	Wellington, Stirling, Halifax, Lancaster, Hampden

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 June	Ardorf/Leeuwarden Airfields	10	7	3.5	-	Blenheim
	Leaflets	2	2	-	-	Stirling
23	Dunkirk	12	12	10.7	-	Boston
	Morlaix Airfield	6	6	4.1	-	Boston
23/24	St. Nazaire (Submarine Base)	14	3	5.0	1	Wellington, Stirling
	Sea-mining	52	39	88 mines	3	Wellington, Hampden, Lancaster
	Leaflets	1	1	-	-	Lancaster
24/25	St. Nazaire	21	16	37.9	2	Wellington, Stirling, Hampden, Lancaster
25/26	Bremen	739)				Wellington, Whitley,
	Bremen (Deutsche Schiff Works)	20)	705	1,235.1	51	Stirling, Halifax, Hampden, Manchester,
	Bremen (Focke Wolf Factory)	142)				Lancaster, Blenheim
25/26	St. Trond/Leeuwarden/) Gilze - Rijen/Bergen/) Valkenburg/Twente/) Haamstede/Venlo/Jever/) Jagel/Stade/Vechta/) Ardorf Airfields)	59	36	21.7	2	Blenheim, Boston, Mosquito
26	Essen	2	-	-	-	Mosquito
	Le Havre (Power Station)	12	11	9.8	-	Boston
	Photo. Reconnaissance	2	2	-	-	Mosquito
26/27	Sea-mining	39	36	65 mines	-	Wellington, Hampden
27/28	Bremen	144	127	284.8	10	Wellington, Stirling, Halifax, Lancaster
	Sea-mining	15	15	50 mines	-	Wellington, Lancaster
	Leaflets	6	5	-	-	Halifax
28/29	St. Nazaire	14	9	21.7	1	Stirling, Wellington, Lancaster
	Sea-mining	4	3	15 mines	-	Lancaster
	Leaflets	1	1	-	-	Stirling
29	Hazebruck	12	12	10.0	-	Boston
29/30	Bremen	253	217	498.2	14	Wellington, Stirling, Halifax, Lancaster
	Leeuwarden/Venlo/ Vechta Airfields	8	5	2.5	-	Blenheim
	Herdla Airfield (Special Operation)	12	-	-	-	Blenheim
	Sea-mining	7	7	14 mines	-	Wellington
	Leaflets	5	5	-	-	Wellington, Halifax

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 JULY						
1	Kiel Attack and Photo. Recce.	1	1	.7	-	Mosquito
1/2	Sea-mining	4	4	20 mines	-	Lancaster
2	Flensburg (Shipbuilding Yards)	6	5	3.8	2	Mosquito
2/3	Bremen	325	279	534.0	12	Wellington, Stirling, Halifax, Hampden, Lancaster
	Ardorf/Leeuwarden/Twente/ Enschede/St. Trond/ Venlo/Vechta Airfields	24	15	7.3	1	Blenheim
3/4	Sea-mining	6	4	16 mines	2	Lancaster
4	De Kooy/Bergen/ Haamstede/Valkenburg Airfields	12	3	2.2	3	Boston
5/6	Sea-mining	14	12	24 mines	-	Wellington
6/7	Sea-mining	42	26	58 mines	3	Wellington, Hampden, Lancaster
7/8	Sea-mining	102	91	229 mines	-	Wellington, Stirling
8/9	Wilhelmshaven (Naval Dockyard)	285	250	578.8	5	Wellington, Stirling, Halifax, Lancaster, Hampden
8/9	Leaflets	5	4	-	-	Halifax
9	Wilhelmshaven	1	1	0.7	-	Mosquito
9/10	Sea-mining	59	37	82 mines	1	Wellington, Stirling, Hampden
10	Duisburg	4	-	-	-	Wellington
	Dusseldorf	4	-	-	1	Wellington
11	Bremen (Roving Patrol)	6	1	0.9	-	Hampden
	Flensburg (Ship- building Yards)	6	4	2.6	1	Mosquito
	Danzig (Submarine Slips)	44	28	56.3	2	Lancaster
	Met. Reconnaissance	1	1	-	-	Mosquito
11/12	Sea-mining	49	18	73 mines	2	Wellington, Stirling
12	Abbeville/Drucat Airfield	12	11	7.6	-	Boston
12/13	Sea-mining	55	43	143 mines	1	Wellington, Stirling, Lancaster, Hampden
	Leaflets	1	1	-	-	Lancaster
13	Boulogne-Outreau (Marshalling Yards)	12	12	10.7	-	Boston

/Duisberg

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 JULY						
13/14	Duisberg	194	173	368.1	11	Wellington, Stirling, Halifax, Lancaster
	Twente-Enschede/Venlo/ Deelen Airfields	10	10	5.8	-	Blenheim
	Leaflets	6	6	-	-	Stirling, Halifax
14/15	Sea-mining	52	47	120 mines	-	Wellington, Stirling, Hampden, Lancaster
	Leaflets	4	3	-	-	Halifax, Lancaster
16	Essen	2	-	-	-	Wellington
	Ijmuiden (Iron and Steel Works)	2	2	1.6	-	Mosquito
	Wilhelmshaven (Naval Dockyards)	1	1	0.7	1	Mosquito
	Vegesack (Bremer Vulcan Naval Shipyards)	1	-	-	-	Mosquito
	Lubeck (Flenderwerke Shipyards)	21	10	26.8	2	Stirling
17	Essen	7	2	2.7	-	Wellington
	Wilhelmshaven	3	-	-	-	Wellington
	Emden	6	1	2.0	-	Wellington
	Met. Reconnaissance	1	1	-	-	Hampden
	Anti-Submarine Patrol	4	1	10 depth charges	-	Lancaster
18	Essen	10	3	8.0	-	Lancaster
	Met. Reconnaissance	1	1	-	-	Hampden
	Anti-Submarine Patrol	4	-	-	-	Lancaster
19	Essen	10	-	-	1	Wellington, Lancaster
	Chocques/Gosnay/Beuvry/ MazinGarbe/Verdin/ Courrieres/Comines/ Lille Airfields	20	5	4.9	2	Boston
	Anti-Submarine Patrol	4	-	-	-	Lancaster
	N.W. Germany (Roving Patrol)	5	-	-	1	Hampden
	Met. Reconnaissance	2	2	-	-	Hampden
19/20	Vegesack (Bremer Vulcan Shipyards)	99	85	251.3	5	Stirling, Halifax, Lancaster
	Sea-mining	19	15	30 mines	1	Wellington
20	Lille Power Station	2	2	1.8	-	Boston
	Pont A Vendin (Power Station)	2	-	-	-	Boston

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>JULY</u>	Bremen	12	1	2.0	-	Wellington
	Anti-Submarine Patrol	4	-	-	-	Lancaster
20/21	Leaflets	1	1	-	-	Stirling
21	Essen	1	-	-	-	Mosquito
	Duisberg	1	1	0.7	-	Mosquito
	Dusseldorf	1	-	-	-	Mosquito
	Bremen	1	1	0.9	-	Mosquito
	Emden	1	-	-	-	Mosquito
	Osnabruck	1	1	0.9	-	Mosquito
21/22	<u>Duisberg</u>	291	266	567.3	12	Wellington, Stirling, Halifax, Hampden, Lancaster
	Venlo/Vechta/Twente/ St. Trond Airfields	8	5	2.5	1	Blenheim
	Sea-mining	11	10	36 mines	-	Wellington, Hampden, Lancaster
	Leaflets	6	5	-	-	Halifax, Lancaster
22	Munster	1	-	-	-	Mosquito
	Essen	1	-	-	-	Wellington
	Sluiskil (Chemical Works)	2	2	1.3	-	Boston
	Caen (Power Station)	2	-	-	-	Boston
	Langerbrugge (Power Station)	2	2	1.8	-	Boston
	Ghent (Terneuzen Canal Oil Installations)	2	-	-	-	Boston
23	Cologne (Quadrath Power Station)	1	-	-	-	Mosquito
	Cologne (Knapsack Power Station)	1	-	-	-	Mosquito
	Brauweiler (Transformer Station)	1	-	-	-	Mosquito
	Ijmuiden (Iron and Steel Works)	1	-	-	-	Mosquito
	Anti-Submarine Patrol	6	-	-	-	Lancaster
23/24	<u>Duisberg</u>	215	193	472.3	8	Wellington, Stirling, Halifax, Lancaster
	Vechta/Twente/Venlo/ St. Trond Airfields	8	5	3.0	-	Blenheim
	Sea-mining	13	12	49 mines	-	Wellington, Stirling, Hampden, Lancaster
25	Mannheim	1	1	0.9	-	Mosquito

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 JULY	Frankfurt	1	1	0.9	-	Mosquito
	Comines/Pont A Verdon/ Mazingarbe/Langerbrugge Airfields	8	-	-	-	Boston
	Sluiskil (Chemical Works)	2	2	1.3	-	Boston
	Ghent (Terneuzen Canal Oil Installations)	2	-	-	-	Boston
	Lunteren	12	-	-	-	Boston
	Anti-Submarine Patrol	6	-	-	-	Lancaster
25/26	Duisberg	313	264	569.3	12	Wellington, Stirling, Halifax, Hampden, Lancaster
	Twente/Deelan/St. Trond/ Leeuwarden/Venlo/ Rheine/Vechta Airfields	21	13	7.1	2	Blenheim
	Sea-mining	8	5	25 minos	1	Hampden, Lancaster
	Leaflets	7	7	-	-	Halifax
26	Essen	1	-	-	-	Mosquito
	Cologne	1	-	-	-	Mosquito
	Duisberg	1	1	1.4	-	Mosquito
	Anti-Submarine Patrol	4	-	-	-	Lancaster
26/27	Hamburg	403	344	740.8	31	Wellington, Stirling, Halifax, Hampden, Lancaster
	Borkum/Jever/Ardorf/ Leeuwarden/Stade/ Jagel/Westerland/ Vechta/Gilze-Rijen/ Rheine Airfields	22	19	10.0	1	Blenheim, Boston
27	Bremen	8	3	6.0	2	Wellington
28	Lubeck	2	2	0.9	-	Mosquito
	Essen	2	2	1.8	1	Mosquito
	Cologne	1	1	0.9	-	Mosquito
	Duisberg	1	-	-	-	Mosquito
28/29	Leeuwarden/Soesterburg/ Gilze-Rijen/Schipol/ De Kooy/Bergen/Valken- burg/Venlo/Jever/ Borkum/Ardorf/Jagel/ Stade/Westerland/Vechta/ Rheine/Twente Airfields	43	18	8.8	3	Boston, Blenheim
	Hamburg	256	98	191.0	33	Wellington, Stirling, Whitley
29	Munster	1	1	.7	-	Mosquito
	Dusseldorf	1	-	-	-	Mosquito

/OBERLAHNSTEIN

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>JULY</u>						
	Oberlahnstein (Railway Centre)	1	-	-	-	Mosquito
29/30	Saarbrücken	291	255	586.8	10	Wellington, Stirling, Halifax, Hampden, Lancaster
30	Abbeville/Drucat Airfield	6	-	-	-	Boston
	Lubeck (Ship-building Yards)	1	1	0.4	-	Mosquito
	Hamborn (Thyssen Steel Works)	1	-	-	-	Mosquito
	Frankfurt	1	-	-	-	Mosquito
	Hamburg/Misburg Oil Refinery	1	-	-	-	Mosquito
30/31	Twente/Rheine - Salzbergen Airfields	6	1	0.5	-	Blenheim
31	Duisberg	1	1	0.4	-	Mosquito
	Abbeville/Drucat Airfield	12	12	8.4	-	Boston
	St. Malo Harbour	12	12	10.7	-	Boston
31/1	Düsseldorf	630	511	995.5	30	Wellington, Whitley, Halifax, Stirling, Hampden, Lancaster
	Twente/Venlo/St. Trond Airfields	6	3	1.5	1	Blenheim
<u>August</u>						
1	Bremen	1	1	0.7	1	Mosquito
	Frankfurt	1	1	0.4	1	Mosquito
	Kiel	1	-	-	-	Mosquito
	Hanover	1	1	0.4	-	Mosquito
	Wilhelmshaven	1	1	0.4	-	Mosquito
	Flushing	6	6	5.4	2	Boston
3	Vegesack (Vulcan Shipyards)	1	-	-	-	Mosquito
	Hagen (Submarine Battery Factory)	1	-	-	-	Mosquito
	Hamburg	10	-	-	-	Halifax
	Anti-Submarine Patrol	4	-	-	-	Lancaster
3/4	Sea-mining	8	6	29 mines	-	Lancaster
4	Bremen	2	-	-	-	Wellington
	Stuttgart	1	-	-	-	Mosquito
	Ruhr	1	-	-	-	Mosquito

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>August</u> <u>4/5</u>	Essen	38	18	50.0	1	Wellington, Halifax, Lancaster
	Sea-mining	45	35	77 mines	2	Wellington, Hampden, Lancaster
5	Stuttgart	1	-	-	-	Mosquito
	Ijmuiden (Iron and Steel Works)	1	-	-	-	Mosquito
	Brauweiler (Transformer Station)	1	-	-	-	Mosquito
	Anti-Submarine Patrol	5	-	-	-	Lancaster
5/6	Essen	17	3	10.8	2	Wellington, Stirling, Lancaster
	Bochum (Steel Works)	8	6	21.4	4	Halifax
	Sea-mining	58	53	178 mines	1	Lancaster, Wellington, Hampden, Stirling, Lancaster
	Leaflets	14	12	-	-	Stirling, Wellington, Halifax, Hampden
6	Kiel	1	-	-	-	Mosquito
	Essen	1	-	-	-	Mosquito
	Hanover	1	-	-	-	Mosquito
	Anti-Submarine Patrol	4	-	-	-	Lancaster
6/7	<u>Duisburg</u>	216	184	440.2	7	Wellington, Halifax, Stirling, Lancaster, Hampden
	Le Havre (Docks)	5	-	-	-	Wellington, Stirling
	Venlo/Twente/Gilze- Rijen Airfields	6	1	0.5	-	Blenheim
	Sea-mining	1	1	5 mines	-	Lancaster
7	Kiel	1	-	-	-	Mosquito
	Manheim	1	-	-	-	Mosquito
	Munster	1	-	-	-	Mosquito
8/9	Sea-mining	12	10	50 mines	-	Lancaster
9	Cologne	1	-	-	-	Mosquito
	Frankfurt	1	1	0.7	-	Mosquito
	Kiel	1	-	-	-	Mosquito
	Anti-Submarine Patrol	4	-	-	-	Lancaster
9/10	<u>Osbnabruck</u>	192	175	424.4	6	Wellington, Stirling, Halifax, Lancaster
	Le Havre	18	14	29.7	-	Wellington, Stirling, Lancaster

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>AUGUST</u>						
	Leeuwarden/Twente/Venlo/ Vechta Airfields	13	5	2.6	-	Blenheim
	Sea-mining	3	3	7 mines	-	Hampden, Lancaster
10	Cologne	1	1	0.7	-	Mosquito
	Essen	1	-	-	-	Mosquito
	Osnabruck	1	-	-	-	Mosquito
	Anti-Submarine Patrol	4	2	12 depth charges	-	Lancaster
10/11	Sea-mining	52	31	130 mines	2	Wellington, Stirling, Lancaster
11	Convoy Escort	3	-	-	-	Lancaster
11/12	<u>Mainz</u>	154	140	338.1	17	Wellington, Stirling, Halifax, Lancaster
	Le Havre	16	14	35.4	2	Wellington, Halifax, Hampden, Lancaster
	Venlo/St.Trond/Gilze- Rijen/Juvin-court/ Leeuwarden/Ardorf/ Jever Airfields	10	3	1.5	-	Blenheim
	Sea-mining	9	3	4 mines	-	Hampden
	Leaflets	3	3	-	-	Lancaster
12	Wiesbaden (Biebrich Chemical Works)	1	1	0.7	-	Mosquito
	Convoy Escort	5	-	-	-	Lancaster
	Anti-Submarine Patrol	2	-	-	-	Whitley
12/13	<u>Mainz</u>	138	106	234.7	6	Wellington, Stirling, Hampden, Lancaster
	Juvin-court/Venlo/ St.Trond Airfields	6	2	1.0	-	Blenheim
	Sea-mining	9	8	24 mines	-	Wellington, Lancaster
	Leaflets	2	2	-	-	Lancaster
15	Essen	1	-	-	-	Mosquito
	Shipping Sweep	7	1	0.7	-	Boston
	Convoy Escort	3	3	-	-	Lancaster
	Anti-Submarine Patrol	6	-	-	-	Whitley, Lancaster
13/14	Sea-mining	36	23	90 mines	1	Stirling, Lancaster, Wellington
14	Mannheim	1	-	-	-	Mosquito

Date	Target or Purpose	Despatched	Attacking	Tonage	Losses	Aircraft
1942 AUGUST						
15	Mainz	1	-	-	1	Mosquito
15/16	Dusseldorf	131	103	243.9	4	Wellington, Halifax, Stirling, Hampden, Lancaster
	Sea-mining	9	7	38 mines	1	Stirling, Lancaster
16	Vege sack (Shipbuilding yards)	1	-	-	-	Mosquito
	Convoy Escort	1	-	-	-	Lancaster
	Anti-Submarine Patrol	9	-	-	-	Lancaster, Whitley
16/17	Sea-mining	56	45	132 mines	2	Wellington, Stirling, Lancaster
17	Kiel	1	-	-	-	Mosquito
	Anti-Submarine Patrol	15	-	-	-	Lancaster, Whitley
17/18	Osnabruck	129	115	277.1	3	Wellington, Halifax, Hampden, Lancaster Stirling Blenheim
	Airfields	8	3	1.5	-	
	Sea-mining	4	3	12 mines	-	Wellington, Hampden, Lancaster
18	Hamburg	1	1	0.7	-	Mosquito
	Anti-Submarine Patrol	7	-	-	-	Lancaster, Whitley
18/19	Flensburg	118	99	233.7	4	Wellington, Stirling, Halifax, Lancaster, Hampden
19	Bremen	1	1	0.7	1	Mosquito
	Dieppe (gun Batteries)	56)				
	Dieppe/Rouen (Tanks)	6)				
	Dieppe area. (Smoke Screen)	27)	85	61.6	-	Boston
	Anti-Shipping Patrol	7	3	4.5	3	Lancaster
	A/S Patrol	6	-	-	-	Whitley
20	Ferrol ('Altmark')	16	-	-	-	Lancaster
	Anti-Shipping Patrol	3	-	-	1	Lancaster
	Anti-Submarine Patrol	6	-	-	-	Whitley
20/21	Sea-mining	60	46	130 mines	8	Wellington, Stirling, Lancaster
	Leaflets	5	3	-	-	Halifax
21	Photo- Reconnaissance	1	1	-	-	Mosquito
	Anti-Submarine Patrol	3	-	-	-	Lancaster

/Anti-Shipping Patrol

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>AUGUST</u>						
	Anti-Shipping Patrol	1	-	-	-	Lancaster
22	Anti-Submarine Patrol	7	-	-	2	Whitley
22/23	Leaflets	3	3	-	-	Halifax
22	Flensburg	1	-	-	-	Mosquito
	Bremen	6	-	-	-	Wellington
	Anti-Submarine Patrol	4	-	-	-	Whitley
24	Anti-Submarine Patrol	7	-	-	-	Whitley
24/25	<u>Frankfurt</u>	226	187	436.2	17	Wellington, Stirling, Halifax, Lancaster
	Bingen	1	1	1.4	-	Lancaster
	Mayen	1	1	1.8	-	Lancaster
	Kreuznach (Western Army H.Q.)	1	1	1.8	-	Lancaster
	Sea-mining	6	5	mines	-	Wellington
25	Hanover	1	-	-	-	Mosquito
	Cologne-Quadrath/ Knapsack/ Brauweiler Power Stations	3	2	1.8	1	Mosquito
26	Anti-Submarine Patrols	7	-	-	-	Whitley
27	Veogesack Shipbuilding Yards	2	1	0.9	1	Mosquito
	Langerbrugge Power Station	1	1	0.7	-	Mosquito
	Sluiskil Chemical Works	1	1	0.7	-	Mosquito
	Anti-Submarine Patrol	6	-	-	1	Whitley
	Air Sea Rescue	1	-	-	-	
	Abbeville/Drucat Airfield	12	11	9.8	1	Boston
27/28	<u>Kassel</u>	306	256	563.0	33	Wellington, Stirling, Lancaster, Halifax, Hampden
	Odynia (Graf Zeppelin)	9	6	14.5	-	Lancaster
	Leaflets	4	3	-	-	Stirling, Lancaster
28	Anti-Submarine Patrols	5	-	-	-	Whitley
28/29	<u>Nurnberg</u>	159	120	298.7	23	Wellington, Stirling, Halifax, Lancaster

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 AUGUST						
	Saarbrücken	113	88	132.7	11	Wellington, Stirling, Halifax, Hampden
	Leaflets	3	2	-	-	Halifax
29	Anti-Submarine Patrol	8	1	4 depth charges	-	Whitley
	Ostend	12	11	9.8	-	Boston
	Comines/Pont A Verdin Power Stations	8	4	3.6	2	Boston
30	Anti-Submarine Patrol	6	-	-	-	Whitley
31	Anti-Submarine Patrol	6	-	-	-	Whitley
31/1 Sept.	Sea-mining	5	2	10 mines	-	Lancaster
SEP- TEMBER						
1	Anti-Submarine Patrol	6	-	-	-	Whitley
	Anti-Shipping Patrol	8	-	-	-	Boston
1/2	Saarbrücken	231	208	447.9	8	Wellington, Halifax, Stirling, Lancaster, Hampden
2	Sluiskil (Chemical Works)	1	-	-	-	Mosquito
	IJmuiden (Iron and Steel Works)	1	-	-	-	Mosquito
2	Ghent-Terneuzen Canal (Oil Storage)	1	1	0.9	-	Mosquito
	Cologne	1	1	0.9	-	Mosquito
	Essen	1	1	0.9	-	Mosquito
	Osnabruck	1	1	0.9	-	Mosquito
2/3	Karlsruhe	200	177	387.5	8	Wellington, Halifax, Stirling, Lancaster, Hampden
	Sea-mining	3	3	10 mines	-	Wellington, Stirling
3/4	Emden	11	8	19.1	2	Wellington, Stirling, Halifax
4	Sluiskil (Chemical Works)	1	-	-	-	Mosquito
	IJmuiden (Iron and Steel Works)	1	-	-	-	Mosquito
	Ghent-Terneuzen Canal (Oil Storage)	1	-	-	-	Mosquito
	Cologne (Rail Centre)	1	1	0.7	-	Mosquito

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>SEP-</u> <u>TEMBER</u>	Essen (Krupps Works)	1	1	0.7	-	Mosquito
	Munster	1	1	0.7	-	Mosquito
	Anti-Submarine Patrol	1	-	-	-	Whitley
	Convoy Escort	5	-	-	-	Whitley
4/5	Bremen	227)	221	515.4	15	Wellington, Halifax, Stirling, Lancaster
	Bremen (Focke-Wulf Assembly Shop)	24)				
	Sea-mining	3					3	6 mines	-	Wellington
5	Anti-Submarine Patrol	6	-	-	1	Whitley
6	Bremen	1	-	-	-	Mosquito
	Wilhelmshaven	1	-	-	-	Mosquito
	Ijmuiden	1	1	0.9	-	Mosquito
	Karlsruhe	1	1	0.7	-	Mosquito
	Frankfurt	1	-	-	1	Mosquito
	Boulogne	12	10	8.7	-	Boston
	Anti-Submarine Patrol	7	-	-	-	Whitley
6/7	Duisburg	207	187	445.7	10	Wellington, Stirling, Halifax, Lancaster, Hampden
	Sea-mining	9	9	27 mines	-	Wellington, Stirling, Lancaster
	Leaflets	5	5	-	-	Wellington, Halifax, Lancaster
7	Emden	1	1	0.9	-	Mosquito
	Essen	1	1	0.9	-	Mosquito
	Cologne	1	1	0.9	-	Mosquito
	Wilhelmshaven	1	-	-	-	Mosquito
	Bremerhaven	1	1	0.9	-	Mosquito
	Anti-Submarine Patrol	8	1	4 depth charges	-	Whitley
7/8	Warnemunde (Heinkel Works)	16	-	-	-	Wellington, Stirling, Halifax
	Sea-mining	43	37	72 mines	1	Wellington, Stirling, Hampden
8	Le Havre (Whale Oil Vessel)	6	6	5.4	-	Boston

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>SEP-</u> <u>TEMBER</u>						
	Cherbourg (Whale Oil Vessel)	6	6	5.4	-	Boston
	Anti-Submarine Patrol	9	-	-	-	Whitley
8/9	Frankfurt	249	200	442.9	13	Wellington, Halifax, Stirling, Lancaster, Hampden
9	Osnabruck	3	2	1.8	-	Mosquito
	Munster	3	3	2.7	-	Mosquito
	Anti-Submarine Patrol	5	-	-	-	Whitley
	Fishing Patrols	3	-	-	-	Whitley
9/10	Sea-mining	34	28	111 mines	2	Wellington, Stirling, Lancaster
10	Anti-Submarine Patrol	5	-	-	-	Whitley
10/11	Dusseldorf	476	395	744.5	38	Wellington, Stirling, Halifax, Lancaster, Hampden, Whitley
11	Anti-Submarine Patrol	5	-	-	-	Whitley
12	Anti-Submarine Patrol	5	-	-	-	Whitley
13	Anti-Submarine Patrol	8	-	-	-	Whitley
13/14	Bremen	446	374	742.8	27	Wellington, Stirling, Halifax, Lancaster, Hampden, Whitley
14	Wilhelmshaven	1	1	0.9	-	Mosquito
	Kiel	1	1	0.9	-	Mosquito
	Hamburg	1	-	-	-	Mosquito
	Bremen	1	-	-	-	Mosquito
	Emden	1	1	0.9	-	Mosquito
	Anti-Submarine Patrol	5	1	4 depth charges	1	Whitley
14/15	Wilhelmshaven	202	185	414.3	2	Wellington, Stirling, Halifax, Lancaster, Hampden
	Cherbourg (Whale Oil Factory Ship)	12	12	10.5	-	Boston
	Anti-Submarine Patrol	8	-	-	-	Whitley
15/16	Sea-mining	40	35	98 mines	-	Wellington, Stirling,
16	Den Helder	9	-	-	-	Boston

/Wiesbaden.

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>SEP-</u> <u>TEMBER</u>						
16	Wiesbaden/Bieberich (Chemical factory)	6	5	3.0	-	Mosquito
	Anti-Submarine patrol	6	-	-	-	Whitley
16/17	<u>Essen</u>	368	271	534.1	42	Wellington, Stirling, Halifax, Lancaster, Hampden, Whitley.
17	Anti-Submarine Patrol	5	-	-	-	Whitley
17/18	Leaflets	3	3	-	-	Halifax
18	Bremerhaven	1	-	-	-	Mosquito
	Wilhelmshaven	1	-	-	-	Mosquito
	Anti-Submarine Patrol	6	-	-	-	Whitley
	Emden	1	-	-	-	Mosquito
18/19	Sea-mining	115	98	340 mines	6	Wellington, Stirling, Lancaster,
	Leaflets	1	1	-	-	Halifax
19	Berlin	6	2	1.8	-	Mosquito
	Anti-Submarine Patrol	6	-	-	-	Whitley
19/20	<u>Saarbrücken</u>	118	95	165.7	5	Wellington, Stirling, Halifax.
	Munich	89	84	186.0	6	Lancaster, Stirling.
21	Anti-Submarine Patrol	9	1	4 depth charges	2	Whitley
21/22	Sea-mining	17	11	26 mines	3	Wellington, Stirling,
22	Ijuiden (Iron and Steel Works)	6	4	3.6	-	Mosquito
	Lille area (Power Stations)	18	9	7.6	2	Boston
	Anti-Submarine Patrol	7	-	-	-	Whitley
23	Anti-Submarine Patrol	5	-	-	-	Whitley
23/24	Veegesack (Ship- building yards)	24	5	16.3	1	Stirling
	Flensburg (Shipbuilding yards)	28	21	63.1	5	Halifax
	Wismar	83	54	110.2	4	Lancaster
	Sea-mining	33	28	69 mines	2	Wellington, Stirling.
24	Anti-Submarine Patrol	5	-	-	-	Whitley
24/25	Sea-mining	51	44	128 mines	1	Wellington, Stirling, Lancaster.
25	Oslo	4	3	2.2	1	Mosquito
	Anti-Submarine Patrol	7	-	-	1	Whitley
25/26	Sea-Mining	10	10	20 mines	-	Wellington

Date	Target or Purpose	Despatched	Attacking	Tpnnage	Losses	Aircraft
1942 Sept. 26	Anti-Submarine Patrol	6	-	-	-	Whitley
26/27	Flensburg (Ship building yards)	28	2	6.0	1	Halifax
	Sea-mining	71	36	75 mines	1	Wellington, Stirling.
27	Anti-Submarines Patrol	5	-	-	-	Whitley
28	Lingen	6	-	-	1	Wellington
29	Anti-Submarine Patrol	9	1	4 depth charges	-	Whitley
29/30	Sea-mining	14	2	6	1	Lancaster
30	Anti-Submarine Patrol	8	1	4 depth charges	-	Whitley
30/1 OCT.	Sea-mining	25	21	57 mines	2	Wellington, Stirling.
<u>OCTOBER</u>						
1	Sluiskil (Chemical Works)	1	1	0.9	-	Mosquito
	Ghent-Terresuzen (Canal Oil Depot)	2	1	0.9	-	Mosquito
	Anti-Submarines Patrol	5	-	-	-	Whitley
1/2	Lubeck	25	20	46.4	3	Stirling
	Flensburg	27	23	62.1	12	Halifax
	Wismar	78	62	154.1	3	Lancaster
2	Liege (Ougree Armanent & Steel Works)	6	5	4.5	-	Mosquito
	Anti-Submarine Patrol	6	2	8 depth charges	-	Whitley
2/3	Krefeld	188	155	311.2	8	Wellington, Stirling Lancaster, Halifax
	Sea-mining	3	3	6 mines	-	Wellington
3	Anti-Submarine Patrol	5	-	-	-	Whitley
5	Frankfurt	1	-	-	-	Mosquito
5/6	Aachen	257	196	484.1	17	Wellington, Stirling, Halifax, Lancaster.
6	Bremen	1	1	0.7	-	Mosquito
	Essen	1	-	-	-	Mosquito
	Trier	1	-	-	-	Mosquito

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Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 OCT. 6	Hengelo (Diesel Engine Works)	4	3	2.5	-	Mosquito
	Anti-Submarine Patrol	8	-	-	-	Whitley
6/7	Osnabruck	237	216	502.0	6	Wellington, Stirling, Lancaster, Halifax.
8	Saarbucken	1	-	-	-	Mosquito
	Anti-Submarine Patrol	10	-	-	1	Whitley
8/9	Sea-mining	57	45	141 mines	2	Wellington, Stirling, Halifax.
9	Dusseldorf	1	-	-	-	Mosquito
	Gelsenkirchen	1	-	-	-	Mosquito
	Duisberg	2	-	-	1	Mosquito
	Saarlautern	1	-	-	-	Mosquito
	Anti-Submarine Patrol	6	-	-	-	Whitley
9/10	Sea-mining	14	13	26 mines	-	Wellington
10/11	Sea-mining	47	42	119 mines	-	Wellington, Stirling, Halifax.
11	Saarbrucken	1	-	-	-	Mosquito
	Hanover	6	3	2.7	2	Mosquito
	Sluiskil (Chemical Works)	1	1	0.9	-	Mosquito
	Anti-Submarine Patrol	7	1	4 depth charges	-	Whitley
11/12	Sea-mining	84	69	161 mines	3	Wellington, Stirling, Halifax
12	Anti-Submarine Patrol	5	-	-	-	Whitley
12/13	Wismar	40	51	103.5	2	Lancaster
	Wismar Aircraft Factory	19				
	Sea-mining	47	39	86 mines	3	Wellington, Stirling
13	Anti-Submarine Patrol	9	-	-	1	Whitley
13/14	Kiel	288	246	562.4	14	Halifax, Lancaster, Wellington, Stirling.
14/15	Sea-mining	5	2	4 mines	-	Wellington
15	Le Havre	23	23	20.3	-	Boston
	Hengelo (Diesel Engine Works)	4	4	3.6	-	Mosquito

/Den Helder

SECRET

G.169087/MBF/7/50/30.

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 OCT. 15.	Den Helder	1	1	0.7	-	Mosquito
	Anti-Submarine Patrol	9	-	-	1	Whitley
15/16	Cologne	289	258	604.5	21	Halifax, Lancaster, Wellington, Stirling.
16	Le Havre (Neumark)	6	-	-	-	Boston
	Hengelo (Diesel Engine Works)	6	6	5.4	-	Mosquito
	Anti-Submarine Patrol	5	-	-	-	Whitley
16/17	Sea-mining	34	27	66 mines	4	Wellington, Stirling.
	Leaflets	5	4	-	-	Wellington
17	Le Havre (Shipping)	11	-	-	-	Boston
	Le Havre (Diversion)	6	-	-	-	Boston
	Le Creusot (Schneider Works)	88	81	149.2	-	Lancaster
	Montchanin (Trans- former Station)	6	5	11.6	1	Lancaster
17/18	Sea-mining	7	5	15 mines	-	Stirling
20	Bremen	1	1	0.9	-	Mosquito
	Hanover	1	-	-	1	Mosquito
	Kassel	1	-	-	-	Mosquito
	Emden	1	-	-	-	Mosquito
	Osnabruck	1	-	-	-	Mosquito
	Munster	1	-	-	-	Mosquito
	Anti-Submarine Patrol	6	-	-	-	Whitley
21	Hamburg	1	-	-	-	Mosquito
	Hanover	1	-	-	-	Mosquito
	Bremen	1	-	-	-	Mosquito
	Anti-Submarine Patrol	10	-	-	-	Whitley
21/22	Sea-mining	14	6	36 mines	1	Wellington, Stirling
22	Essen	17	9	16.9	-	Wellington
	Lingen	5	5	8.9	-	Wellington
	Photo Reconnaissance	1	1	-	-	Mosquito
22/23	Genoa	112	100	179.2	1	Lancaster
	Sea-mining	12	11	38 mines	-	Stirling

/Essen

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 OCT. 23	Essen	11	6	10.9	-	Wellington
	Oldenburg (Marshalling Yard)	1	-	-	-	Mosquito
	Hengelo (Diesel Engine Works)	4	3	2.7	1	Mosquito
	Krefeld	15	4	5.4	-	Wellington.
23/24	Genoa	122	92	156.1	6	Halifax, Stirling, Wellington.
	Sea-mining	17	14	28 mines	1	Wellington
24	Milan	88	77	137.5	4	Lancaster
	Photo Reconnaissance	1	1	-	-	Mosquito
	Anti-Submarine Patrol	9	1	4 depth charges	-	Whitley
24/25	Milan	71	43	63.9	7	Wellington, Stirling, Halifax.
	Sea-mining.	25	18	36 mines	2	Wellington
	Leaflets	11	11	-	-	Wellington
25	Bremen	1	-	-	-	Mosquito
	Munster	1	-	-	-	Mosquito
	Osnabruck	1	-	-	-	Mosquito
	Le Havre	12	-	-	-	Boston
	Anti-Submarine Patrol	8	-	-	-	Whitley
26	Anti-Submarine Patrol	6	-	-	-	Whitley
26/27	Sea-mining	24	21	59 mines	-	Wellington, Stirling
27	Flensburg (Ship building Yards)	3	2	1.8	-	Mosquito
	Schelle (Power Station)	2	-	-	-	Mosquito
	Ijmuiden (Iron and Steel Works)	1	1	0.9	-	Mosquito
	Ghent-Terneuzen (Canal Oil Installation)	1	-	-	-	Mosquito
	Den Helder	1	1	0.9	-	Mosquito
	Anti-Submarine Patrol	13	-	-	1	Halifax, Whitley.
27/28	Sea-mining	36	30	90 mines	-	Wellington, Stirling, Lancaster
	Leaflets	4	4	-	-	Wellington
28	Anti-Submarine Patrol	9	-	-	1	Halifax, Whitley.

/Convoy

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> OCT. 28	Convoy Escort	1	-	-	-	Whitley
28/29	Sea-mining	9	5	10 mines	1	Wellington
29	IJmuiden (Iron and Steel Works)	1	-	-	-	Mosquito
	Borkum/Langeoog/ Wangerooge/Spiekerdog/ Airfields.	4	2	1.8	-	Mosquito
	Norderney (Seaplane Base)	1	-	-	-	Mosquito
	Ruhr (Roving Patrol)		1	2.0	3	Wellington
	Photo. Recce.	1	1	-	-	Mosquito
	Anti-Submarine Patrol	9	-	-	2	Halifax, Whitley
30	Leeuwarden/ Woensdrecht/ Gilze-Rijen/ Flushing/Deelen/ Jevver Airfields.	7	2	1.8	2	Mosquito
	Lingen	1	1	.9	-	Mosquito
	Anti-Submarine Patrol	9	-	-	1	Halifax, Whitley.
	Photo Reconnaissance	1	-	-	-	Mosquito
30/31	Sea-mining	4	3	6 mines	-	Wellington
31	Comines/Mazingarbe/ Gosnay/Pont Avendin Power Stations	17	4	3.6	1	Boston
	Essen	6	2	3.6	2	Wellington
	Emden	8	7	9.4	-	Wellington
	Anti-Submarine Patrols	9	-	-	1	Halifax, Whitley.
31/1 NOV.	Sea-mining	22	17	36 mines	1	Wellington, Stirling
<u>NOV-</u> <u>EMBER</u> 1	St. Omer (Longuenesse) Airfield	6	3	1.6	1	Boston
	Anti-Submarine Patrol	7	-	-	-	Whitley
2	Anti-Submarine Patrol	3	-	-	-	Whitley
	Convoy Escort	6	-	-	-	Halifax
3	Hengelo (Diesel Engine Works)	3	-	-	-	Ventura

/Lingen

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 NOV- EMBER						
3	Lingen	3	2	5.6	-	Stirling
	Anti-Submarine Patrol	8	-	-	-	Whitley
	Convoy Escort	4	-	-	-	Halifax
3/4	Sea-mining	29	24	48 mines	1	Wellington
4	Anti-Submarine Patrol	5	-	-	-	Whitley
	Convoy Escort	4	-	-	-	Halifax
5	Anti-Submarine Patrol	5	-	-	-	Whitley
6	Essen	6	-	-	-	Wellington
	Wilhelmshaven	8	4	5.4	-	Wellington
	Osnabruck	5	2	10.7	-	Lancaster
	Caen/Carpinet Airfield	12	12	5.4	-	Boston
	Maasluis (Lubricating Oil Works)	4	-	-	-	Ventura
	Roosendaal (Marshalling Yard)	2	-	-	-	Ventura
	Ijmuiden (Iron and Steel Works)	2	-	-	-	Ventura
	Den Helder	2	-	-	-	Ventura
	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
6/7	Genoa	72	67	116.7	4	Lancaster
	Sea-mining	65	42	123 mines	4	Wellington, Stirling, Halifax.
	Leaflets	4	4	-	-	Wellington
7	Bordeaux (Shipping)	6	6	5.4	1	Mosquito
	Essen	5	-	-	-	Wellington
	Ghent/Terneuzen (Oil Installations)	2	-	-	-	Boston
	Terneuzen	2	-	-	-	Boston
	Ghent	2	-	-	-	Boston
	Sveveghen (Power Station)	3	-	-	-	Ventura
	Courtrai (Marshalling Yard)	3	2	1.8	1	Boston
	Willebrouch (Coke Ovens)	3	-	-	-	Ventura
	Anti-Submarine Patrol	4	-	-	-	Whitley
	Gironde River (Convoy)	6	6	5.4	1	Halifax

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 NOV- EMBER 7/8	Genoa	175	147	251.3	10	Halifax, Stirling, Wellington, Lancaster.
	Sea-mining	36	27	54 mines	1	Wellington
8	Anti-Submarine Patrol	7	-	-	-	Whitley
	Gironde River (Convoy)	4	3	6.0	1	Halifax
8/9	Bordeaux (Docks)	3	-	-	-	Halifax
	Sea-mining	70	55	132 mines	4	Lancaster, Halifax, Wellington
	Leaflets	26	24	-	-	Stirling
9	Le Havre	12	12	10.5	-	Boston
	Anti-Submarine Patrol	11	-	-	1	Whitley
9/10	Hamburg	213	155	389.9	16	Lancaster, Halifax, Wellington, Stirling.
	Leaflets	15	15	-	-	Stirling
10	Le Havre	18	16	12.7	2	Boston
	Anti-Submarine Patrols	14	-	-	-	Halifax, Whitley
10/11	Sea-mining	42	37	167 mines	2	Lancaster, Stirling, Wellington
11	Anti-submarine Patrols	10	1	9 depth- charges	-	Halifax, Whitley
11/12	Sea-mining	31	20	40 mines	-	Wellington
12	Anti-Submarine Patrol	5	-	-	-	Whitley
13	Emden	6	1	1.8	-	Wellington
	Flushing	2	2	1.8	2	Mosquito
	Convoy Escort	1	-	-	-	Halifax
	Anti-Submarine Patrol	8	-	-	1	Halifax, Whitley
13/14	Genoa	76	70	127.7	-	Stirling, Lancaster
	Sea-mining	12	9	18 mines	-	Wellington
14	Anti-Submarine Patrol	5	-	-	-	Whitley
	Convoy Escort	3	-	-	-	Halifax
15	Anti-Submarine Patrol	8	1	4 depth charges	-	Halifax, Whitley
15/16	Genoa	78	68	117.5	3	Lancaster, Stirling, Halifax
	Sea-mining	22	12	24 mines	1	Wellington

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>NOV-</u> <u>EMBER</u>						
16	Julich (Railway Workshops)	2	2	1.8	-	Mosquito
	Lingen (Railway Workshops)	2	2	1.8	-	Mosquito
	Emmerich (Railway Workshops)	2	2	1.8	-	Mosquito
	Anti-Submarine Patrols	10	-	-	-	Whitley
16/17	Sea-mining	65	55	150 mines	3	Lancaster, Wellington, Stirling
	Leaflets	5	4	-	-	Halifax
17	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
	Convoy Escort	1	-	-	-	Halifax
17/18	Sea-mining	43	38	94 mines	-	Lancaster, Wellington, Stirling
	Leaflets	14	13	-	1	Halifax, Wellington, Whitley
18	Anti-Submarine Patrols	11	1	9 depth charges	-	Whitley, Halifax
18/19	Turin	77	71	126.6	1	Lancaster, Wellington, Halifax, Stirling
	Leaflets	5	4	-	1	Wellington
19	Anti-Submarine Patrol	9	-	-	-	Whitley, Halifax
19/20	Sea-mining	11	9	18 mines	1	Wellington
20	Anti-Submarine Patrol	9	-	-	-	Whitley, Halifax
	Photo Reconnaissance	1	1	-	-	Mosquito
20/21	Turin	154	200	349.5	6	Halifax, Lancaster, Stirling, Wellington
	Turin (Fiat Works)	78				
	Sea-mining	4	4	16 mines	-	Stirling, Wellington
	Leaflets	8	8	-	-	Wellington
21	Anti-Submarine Patrol	9	-	-	-	Whitley, Halifax
21/22	Sea-mining	30	27	82 mines	-	Wellington, Stirling, Lancaster
22	Anti-Submarine Patrol	9	-	-	1	Whitley, Halifax
22/23	Stuttgart	222	191	368.0	10	Wellington, Halifax, Lancaster, Stirling
	Leaflets	1	1	-	-	Wellington

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>NOV-</u> <u>EMBER</u> 23	Anti-Submarine Patrol	12	-	-	-	Halifax, Whitley
23/24	Sea-mining	35	30	76 mines	-	Wellington, Halifax, Lancaster
24	Anti-Submarine Patrols	11	1	6 depth charges	-	Halifax, Whitley
25	Essen	6	-	-	1	Wellington
	Yechta Airfield	1	-	-)	
	Quakenbruck Airfield	1	-	-)	
	Bad Zwischenahn	1	-	-	)	2 Lancaster
	Friesoythe	1	-	-)	
	Haselunne	1	-	-)	
	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
25/26	Sea-mining	22	11	22 mines	-	Halifax, Wellington
26	Anti-Submarine Patrol	9	-	-	1	Halifax, Whitley
26/27	Sea-mining	30	23	44 mines	-	Lancaster, Halifax, Wellington
27	Velsen (Ijmuiden) Steel Works	2	2	1.8	-	Boston
	Maasluis Oil Works	2	-	-	-	Boston
	Bruges	2	-	-	-	Boston
	Anti-Submarine Patrol	9	1	9 depth charges	-	Halifax, Whitley
27/28	Stettin	32	-	Recalled	-	Stirling, Lancaster
	Sea-mining	10	6	14 mines	-	Wellington, Stirling, Lancaster
28	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
28/29	<u>Turin</u>	228	195	379.9	3	Wellington, Lancaster, Halifax, Stirling.
	Sea-mining	19	15	30 mines	1	Wellington, Stirling
	Leaflets	5	5	-	-	Wellington
29	Anti-Submarine Patrol	9	1	6 depth charges	-	Halifax, Whitley
29/30	Turin (Fiat Works)	36	20	34.9	3	Lancaster, Stirling
	Haine St. Pierre (Locomotive Works)	1	1	0.9	-	Mosquito
	Montzen	1	1	0.9	-	Mosquito

SECRET

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>NOV-</u> <u>EMBER</u> 29/30	Liege (Railway Centre)	1	1	0.9	-	Mosquito
	Tamines	1	1	0.9	-	Mosquito
	Mons	1	1	0.9	-	Mosquito
30	Anti-Submarine Patrol	8	-	-	1	Whitley
	Anti-Shipping Patrol	3	-	-	-	Halifax
30/ 1 Dec.	Sea-mining	6	6	12 mines	-	Wellington
<u>DEC-</u> <u>EMBER</u> 1	Anti-Submarine Patrol	12	1	6 depth charges	-	Halifax, Whitley
2	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
2/3	<u>Frankfurt</u>	112	84	208.4	6	Lancaster, Halifax, Stirling, Wellington.
	Leaflets	4	2	-	-	Wellington
3	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
4	Anti-Submarine Patrol	5	-	-	-	Halifax, Whitley
4/5	Sea-mining	29	23	112 mines	-	Wellington, Stirling, Lancaster
	Leaflets	3	2	-	-	Wellington
5	Anti-Submarine Patrol	8	1	6 depth charges	-	Halifax, Whitley
5/6	Sea-mining	6	6	12 mines	-	Wellington
6	Eindhoven (Phillips' Radio Works)	93	83	62.4	15	Boston, Mosquito, Ventura
	Photo.Reconnaissance	1	-	-	-	Mosquito
	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
6/7	<u>Mannheim</u>	272	229	580.0	15	Wellington, Halifax, Stirling, Lancaster
	Sea-mining	14	13	49 mines	-	Wellington, Lancaster
7	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
7/8	Sea-mining	36	33	122 mines	-	Lancaster, Wellington, Stirling
8	Den Helder	1	-	-	1	Mosquito
	Ijmuiden (Iron and Steel Works)	1	-	-	-	Mosquito

SECRET

/Leer

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 DEC- EMBER 8	Leer	1	)		-	Mosquito
	Papenburg	1	)		-	Mosquito
	Lingen	1	)	3	2.7	Mosquito
	Lathen	1	)		-	Mosquito
	Aurich	1	)		-	Mosquito
	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
8/9	<u>Turin</u>	133	119	269.5	2	Stirling, Halifax, Wellington, Lancaster
	Sea-mining	80	60	218 mines	7	Stirling, Halifax, Wellington, Lancaster
9	Hengelo Power Station	1	1	0.9	-	Mosquito
	Amiens/Chalons area. Railway targets	4	4	3.5	-	Mosquito
	Anti-Submarine Patrol	9	-	-	1	Halifax, Whitley
	Air Sea Rescue	1				
	Convoy Escort	1	-	-	-	Whitley
9/10	<u>Turin</u>	227	200	401.4	5	Stirling, Halifax, Wellington, Lancaster
	Sea-mining	2	2	12	-	Stirling
	Leaflets	12	11	-	1	Wellington, Whitley
10	Anti-Submarine Patrol	3	-	-	-	Halifax
11	Anti-Submarine Patrols	8	-	-	1	Halifax, Whitley
11/12	<u>Turin</u>	82	31	59.3	6	Stirling, Halifax, Wellington, Lancaster.
	Sea-mining	26	21	42 mines	-	Wellington
	Leaflets	4	3	-	-	Wellington
12	Anti-Submarine Patrol	8	-	-	-	Halifax, Whitley
12/13	Sea-mining	15	14	28 mines	-	Wellington
13	Ghent/Courtrai/ Laon/Criel/Amiens/ Tergnier. (Railway Targets)	8	3	2.5	-	Boston, Mosquito
	Anti-Submarine Patrol	5	-	-	-	Whitley
	Convoy Escort	2	-	-	-	Halifax
13/14	Sea-mining	6	2	4 mines	-	Wellington

SECRET

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>DEC-</u> <u>EMBER</u>						
14	Roosendaal/Ghent/ Courtrai Railway Targets	4	1	0.9	-	Mosquito
	Anti-Submarine Patrol	13	-	-	1	Halifax, Whitley
	Photo Reconnaissance	1	-	-	-	Mosquito
14/15	Sea-mining	68	33	76 mines	-	Wellington, Lancaster
15	Anti-Submarine Patrol	12	-	-	1	Halifax, Whitley
15/16	Sea-mining	5	5	9 mines	-	Wellington
16	Anti-Submarine Patrol	4	-	-	-	Halifax
16/17	Diepholz Aircraft Park	8	4	14.1	2	Stirling
	Sea-mining	20	-	-	-	Wellington, Lancaster, Stirling
17	Leer	6	-	-	-	Wellington
	Courtrai	1	1	0.9	-	Mosquito
	Ghent	1	1	0.9	-	Mosquito
	Roosendaal	2	2	1.8	-	Mosquito
	Anti-Submarine Patrol	12	-	-	1	Halifax, Whitley
17/18	Fallersleben Opel Works	22	13	37.2	8	Wellington, Stirling
	Neustadt	5	2	4.6	2	Lancaster
	Nienburg	6	6	13.2	2	Lancaster
	Soltau	6	-	-	3	Lancaster
	Damme	2	1	4.5	-	Lancaster
	Diepholz	2	2	6.7	1	Lancaster
	Quakenbrouck	2	2	8.9	-	Lancaster
	Cloppenburg	2	2	9.0	1	Lancaster
	Bersenbrouck	2	-	-	-	Lancaster
	Sea-mining	50	22	78 mines	3	Wellington, Halifax, Lancaster, Stirling
	Leaflets	5	5	-	-	Wellington
18	Anti-Submarine Patrol	9	-	-	1	Halifax, Whitley
	Air Sea Rescue	1	-	-	-	
19	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
19/20	Sea-mining	15	15	30 mines	-	Wellington
20	Leer/Meppen/Rheine	11	5	4.0	1	Mosquito
	Anti-Submarine Patrols	8	-	-	1	Halifax, Whitley

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1942 DEC- EMBER 20/21	Duisburg	232	205	537.1	15	Wellington, Halifax, Lancaster, Stirling
	Lutterade Power Station	6	3	2.0	-	Mosquito
	Leaflets	4	4	-	-	Wellington
21	Den Helder	6	-	-	-	Ventura
	Ghent/Courtrai/ Valenciennes/ Monceau (Railway Targets)	9	2	2.2	-	Boston, Ventura
	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
21/22	Munich	137	122	262.4	13	Wellington, Lancaster, Stirling
22	Emden	6	4	5.4	-	Wellington
	Buckholz	1	-	-	-	Mosquito
	Rotenburg	1	-	-	-	Mosquito
	Bremen	1	1	0.9	-	Mosquito
	Alost/Malines/ Termonde (Railway Targets)	3	2	1.8	1	Mosquito
	Anti-Submarine Patrol	8	-	-	-	Halifax, Whitley
22/23	Hamborn/Rheinhausen Steel Works	4	2	1.4	-	Mosquito
	Leaflets	4	4	-	-	Wellington
23	St. Malo (Docks)	18	18	15.6	-	Boston
	Den Helder	6	6	6.6	-	Ventura
	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
23/24	Essen/Rheinhausen/ Hamborn/Meiderich (Steel Works)	5	4	2.7	-	Mosquito
24	Anti-Submarine Patrol	12	-	-	2	Halifax, Whitley
24/25	Essen/Meiderich (Steel Works)	3	2	1.4	-	Mosquito
25	Anti-Submarine Patrol	5	-	-	-	Whitley
26	Anti-Submarine Patrol	2	-	-	-	Halifax
27	Anti-Submarine Patrol	8	-	-	-	Halifax, Whitley
28	Anti-Submarine Patrol	8	-	-	1	Halifax, Whitley
	Convoy Escort	1	-	-	-	Whitley

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1942</u> <u>DEC-</u> <u>EMBER</u> 28/29	Sea-mining	6	6	16 mines	-	Wellington, Stirling
29	Amiens/Tergnier/Laon Railway Targets	6	5	4.2	-	Mosquito
	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
29/30	Melderich/Essen Railway Targets	3	3	2.0	-	Mosquito
	Sea-mining	14	14	56 mines	-	Lancaster
30	Anti-Submarine Patrol	13	-	-	-	Halifax, Whitley
31	Mons/Raismes/ Blanc-Misseron/ Monceau Sur Sombre Railway Targets	6	5	4.5	-	Mosquito
	Anti-Submarine Patrols	7	-	-	-	Halifax, Whitley
31/ 1 Jan.	Dusseldorf	10	9	27.0	1	Lancaster, Mosquito
	Florennes	3	2	1.3	-	Mosquito
	Sea-mining	35	24	66 Mines	1	Wellington, Lancaster
	Leaflets	8	6	-	-	Wellington
<u>JAN-</u> <u>UARY</u> 2	Mons (Railway)	1	-	-	-	Mosquito
	Cherbourg (Whale Oil Ship)	12	-	-	-	Boston
	Anti-Submarine Patrol	6	-	-	-	Whitley
	Convoy Escort	6	2	-	-	Halifax
2/3	Sea-mining	42	31	88 mines	-	Wellington, Lancaster
	Leaflets	2	2	-	-	Wellington
3	Amiens/Tergnier (Marshalling Yards)	3	3	2.7	-	Mosquito
	Cherbourg (Whale Oil Ship)	11	-	-	-	Boston
	Anti-Submarine Patrol	7	-	-	-	Halifax, Whitley
3/4	Essen	22	17	50.7	3	Mosquito, Lancaster
	Sea-mining	45	38	139 mines	1	Wellington, Lancaster
	Leaflets	2	-	-	-	Wellington
4	Anti-Submarine Patrol	4	-	-	-	Halifax, Whitley

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1943 JAN- UARY 4/5	Essen	33	23	64.1	2	Mosquito, Lancaster
5	Anti-Submarine Patrol	11	-	-	-	Whitley
6	Anti-Submarine Patrol	5	-	-	1	Whitley
7	Anti-Submarine Patrol	3	-	-	-	Whitley
7/8	Essen	22	17	47.3	-	Mosquito, Lancaster
8	Anti-Submarine Patrol	5	-	-	-	Whitley
8/9	Duisburg	41	36	121.7	3	Mosquito, Lancaster
	Sea-mining	79	42	178 mines	3	Wellington, Lancaster, Stirling
	Leaflets	2	2	-	-	Wellington
9	Ijmuiden (Blast Furnaces)	12	12	12.7	-	Ventura
	Abbeville/Drucat Airfield	12	-	-	-	Boston
	Rouen (Marshalling Yard)	6	5	4.5	1	Mosquito
	Mons (Marshalling Yard)	1	1	0.9	-	Mosquito
9/10	Essen	52	38	125.0	4	Mosquito, Lancaster
	Sea-mining	120	97	197 mines	5	Wellington, Stirling, Halifax
10	Anti-Submarine Patrol	4	-	-	-	Whitley
11	Anti-Submarine Patrol	5	-	-	-	Whitley
11/12	Essen	76	54	176.8	1	Mosquito, Lancaster
12	Anti-Submarine Patrol	11	-	-	-	Halifax, Whitley
12/13	Essen	62	49	158.5	1	Mosquito, Lancaster
	Sea-mining	32	23	62 mines	1	Wellington, Stirling, Lancaster
	Leaflets	5	4	-	-	Wellington
13	St.Omer/Fort Rouge Airfield	12	8	6.4	-	Boston
	Abbeville/Drucat Airfield	18	18	14.7	-	Ventura
	N.E. France (Marshalling Yards)	6	6	5.4	-	Mosquito
	Sea-mining	6	5	10 mines	-	Wellington
	Anti-Submarine Patrol	8	-	-	-	Whitley

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1943</u> <u>JAN-</u> <u>UARY</u> 13/14	Essen	69	53	177.2	6	Mosquito, Lancaster
14	Leer	6	1	1.7	-	Wellington
	Sea-mining	7	4	8 mines	1	Wellington
	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
14/15	<u>Lorient</u>	123	103	231.1	2	Lancaster, Halifax, Wellington, Stirling
	Sea-mining	46	37	99 mines	-	Wellington, Stirling, Lancaster
	Leaflets	15	13	-	1	Whitley, Wellington
15	Cherbourg (Whale Oil Ship)	10	6	4.9	-	Boston
	Norden	6	1	1.3	-	Wellington
	Anti-Submarine Patrol	8	-	-	-	Halifax, Whitley
15/16	<u>Lorient</u>	147	133	291.4	2	Wellington, Stirling, Halifax
	Sea-mining	9	9	18 mines	-	Wellington
	Aachen	2	2	1.3	-	Mosquito
	Leaflets	3	3	-	-	Wellington
16	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
16/17	<u>Berlin</u>	201	147	381.4	1	Lancaster, Halifax
	Duisburg	2	1	0.7	-	Mosquito
17	Anti-Submarine Patrol	6	-	-	-	Halifax, Whitley
	Convoy Escort	3	-	-	-	Halifax
17/18	<u>Berlin</u>	187	142	352.7	23	Lancaster, Halifax
18	Caen/Carpique Airfield	18	-	-	-	Ventura
	Cherbourg (Shipping)	12	-	-	-	Boston
	Anti-Submarine Patrol	9	-	-	-	Halifax, Whitley
18/19	Sea-mining	29	27	90 mines	-	Stirling, Wellington
19	Anti-Submarine Patrol	14	-	-	-	Halifax, Whitley
20	Hengelo (Stork Diesel Engine Works)	8	6	5.4	-	Mosquito
	Anti-Submarine Patrol	10	-	-	-	Halifax, Whitley
20/21	Sea-mining	8	8	15 mines	-	Wellington

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
1943 JAN- UARY 21	Caen (Carpiquet Airfield)	15	11	10.3	-	Ventura
	Tricqueville Airfield	12	6	3.0	-	Boston
	Cherbourg (Docks)	12	6	5.4	-	Boston
	Flushing (Dry Docks)	12	12	10.0	-	Boston
	Anti-Submarine Patrol	6	-	-	-	Halifax, Whitley
	Convoy Escort	3	-	-	-	Halifax
21/22	Essen	82	56	195.6	4	Mosquito, Lancaster
	Sea-mining	85	70	184 mines	7	Stirling, Halifax, Wellington, Lancaster
22	Ghent (Oil Installations)	12	11	19.2	3	Mitchell
	Abbeville/Drucat Airfield	11	11	7.0	-	Boston
	St. Omer/Fort Rouge Airfield	12	12	8.5	-	Boston
	Cherbourg/Maupertus Airfield	18	16	15.9	2	Ventura
	Anti-Submarine Patrol	5	-	-	-	Whitley
	Convoy Escort	1	-	-	-	Halifax
22/23	Cologne	2	2	1.3	-	Mosquito
23	Oldenburg/Osnabruck Area	4	2	1.8	1	Mosquito
	Esens	6	2	2.7	-	Wellington
	Anti-Submarine Patrols	5	-	-	-	Whitley
23/24	Dusseldorf	83	60	204.6	2	Mosquito, Lancaster
	Lorient	116	111	293.5	3	Lancaster, Halifax, Stirling, Wellington
	Leaflets	4	4	-	-	Whitley
24	Anti-Submarine Patrol	5	-	-	-	Whitley
25	Flushing (Dry Dock)	12	10	8.9	1	Boston
	Anti-Submarine Patrol	3	-	-	-	Halifax
26	Bruges (Engine Sheds)	12	6	6.7	-	Ventura
	Morlaix (Railway Viaduct)	12	-	-	1	Ventura
	Abbeville (Engine Sheds)	12	-	-	-	Boston
	Anti-Submarine Patrol	8	-	-	-	Whitley

Date	Target or Purpose	Despatched	Attacking	Tonnage	Losses	Aircraft
<u>1943</u> <u>JAN-</u> <u>UARY</u>						
26/27	<u>Lorient</u>	156	137	203.5	5	Lancaster, Halifax, Stirling, Wellington
	Gironde River (Shipping)	9	3	4.0	-	Halifax
	Leaflets	18	17	-	-	Whitley, Wellington
27	Copenhagen (Diesel Engine Works)	9	8	7.1	2	Mosquito
	Anti-Submarine Patrol	8	-	-	1	Whitley
27/28	Dusseldorf	162	138	442.7	7	Mosquito, Lancaster, Halifax
	Sea-mining	54	49	161 mines	2	Wellington, Stirling, Lancaster
28	Anti-Submarine Patrol	6	-	-	-	Whitley
29	Morlaix (Railway Viaduct)	12	12	10.7	1	Boston
	Ijmuiden (Coke Ovens)	12	2	2.1	-	Ventura
	Anti-Submarine Patrol	5	-	-	-	Whitley
29/30	<u>Lorient</u>	116	80	155.0	7	Wellington, Halifax
	Sea-mining	17	7	14 mines	1	Wellington
	Leaflets	5	2	-	1	Wellington
30	Berlin	6	6	4.0	1	Mosquito
	Eindhoven, Nijmegen, Cleve, Emmerich	17	-	-	-	Boston
	Emden	8	6	9.3	2	Wellington
	Oldenburg	11	2	2.7	2	Wellington
	Anti-Submarine Patrol	3	-	-	-	Whitley
30/31	<u>Hamburg</u>	148	99	338.9	8	Lancaster, Halifax, Stirling
	Cologne	1	1	0.7	-	Mosquito
	Essen	1	1	0.7	-	Mosquito
	Aachen	1	1	0.7	-	Mosquito
	Bochum	1	1	0.7	-	Mosquito
	Sea-mining	17	11	22 mines	-	Wellington, Halifax

Note on Sources:-

AMB/SH/84
 Air Ministry War Room Manual and Monthly Summaries of Bomber Command
 Operations. O.R.S. Final Day and Final Night Raid Reports.
 Bomber Command Operations Record Books.

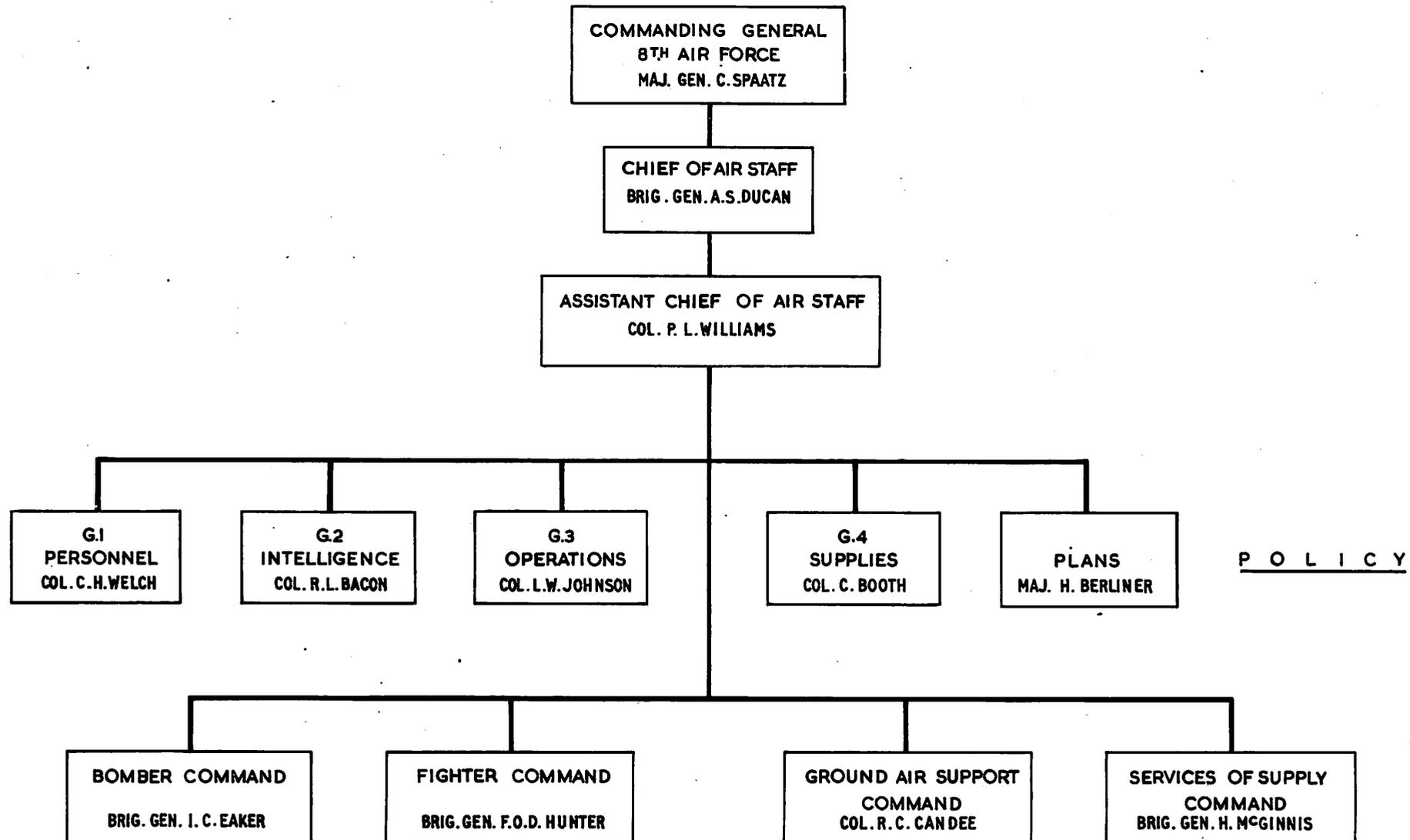
BOMBS IN USE IN 1942

(a) High Explosive

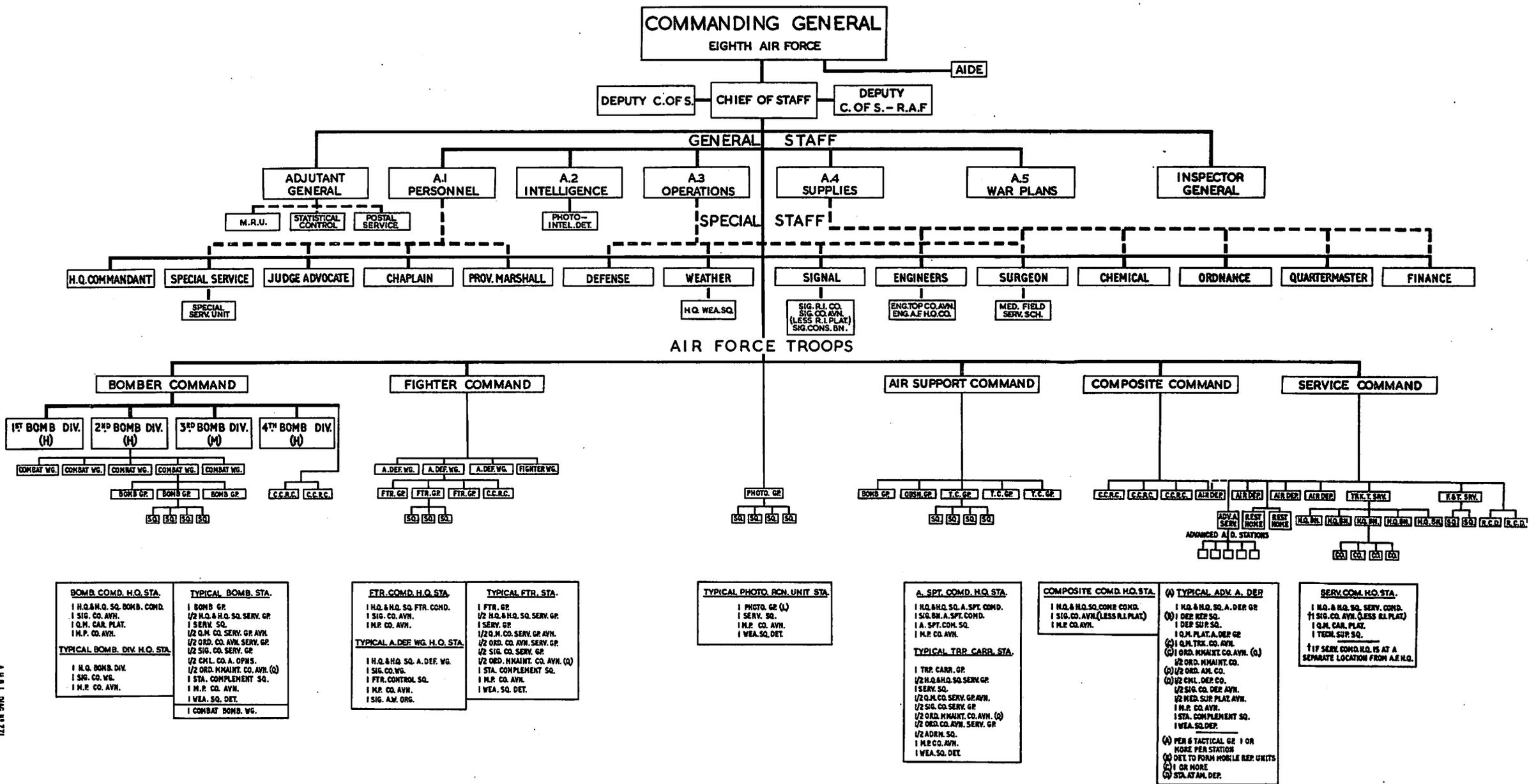
Type	Description	Purpose	Introduced	Remarks
40 lb General Purpose	thick cased, streamlined	Anti-personnel	Pre-1939	Normally carried in 250 lb Small Bomb Containers (6)
20 lb Fragmentation	-do-	-do-	-do-	Normally carried in S.B.Cs (12)
250 lb Semi-armour-piercing 500 lb -do-	-do-	For penetration of resistant targets such as re-inforced concrete or medium armoured targets where explosion required after penetration	-do-	
A. 250 lb General Purpose B. 500 lb -do- C. 1000 lb -do- D. 1900 lb -do- E. 4000 lb -do-	-do-	For attacks on targets not strongly protected where penetration and fragmentation more important than blast	A. Pre-1939 B. -do- C. -do- D. 1940 E. 1942	
500 lb Medium capacity	Medium cased, parallel sided	For attacks on targets not strongly protected; increased blast performance their main asset	Mid-1942	One of the eventual successors to the G.P. bomb; improved design and H.E. filling ratio giving much better performance.
A. 2000 lb High Capacity B. 4000 lb -do- C. 8000 lb -do-	Thin cased, blunt nosed	General bombardment of targets where penetration unimportant but maximum blast effect required	A. March, 1941 B. -do- C. April, 1942	The 8000 lb bomb was formed from sections of 4000 lb bombs, the latter being the largest that could be handled by filling factories at the time
2000 lb Armour Piercing	Thick cased, parallel sided, with heavy reinforced sharp nose.	Attacks on heavily armoured targets; e.g. ships - when explosion must occur after penetration	Pre-1939	
(b) Incendiary				
4 lb Incendiary	Hexagonal; magnesium alloy case. Filling and case highly inflammable	General Incendiarism	September 1939	Carried in (a) 250 lb S.B.Cs for scatter bombing (b) Bomb cluster projectiles to give reasonable aiming trajectory
4 lb H.E./Incendiary	As above but with small delayed H.E. charge in nose	General incendiarism with H.E. as deterrent to fire-fighters	March, 1942	
30 lb Incendiary	Light case, liquid filled. Adapted from 30 lb. L.C. (chemical warfare) bomb.	General incendiarism with moderate penetration.	February, 1941	Carried in 250 lb S.B.Cs.
250 lb Incendiary	As above adapted from 250 lb L.C. bomb	-do-	1941	Carried on bomb racks
4000 lb Incendiary	Liquid filled; 4000 lb H.C. case	General Incendiarism	Early 1942	Used in small quantities only as special operations.

Note on Source: A.H.B. Armament Monograph

CHAIN OF COMMAND OF THE UNITED STATES ARMY AIR FORCES IN UNITED KINGDOM



ORGANISATION OF THE EIGHTH AIR FORCE



SECRET

- 1 -

FORECAST BUILD UP OF THE U.S.A.A.F.
IN BRITAIN IN 1942.

PRIME MINISTER.

You asked me through General Ismay to let you have our latest information about the arrival of American air forces in this country.

I attach a table which gives the latest estimates available.

It is not possible to say what period would elapse between the arrival of a Group and its readiness for operations. We think that the Group equipped with Spitfires will have taken 6 weeks before it is ready to fight, but it should be possible to reduce this time a little for Groups flying the American aircraft to which they are accustomed. I think it would be advisable to set back the dates in the top line one month if you wish to estimate the strength of aircraft fit for operations at any time.

You will realise that American forecasts have proved optimistic in the past and that too much reliance should not be placed upon the information now given to us.

3.7.42.

C.A.S.

Source: ⁹⁴⁶ ID/12/141

SECRET

STRENGTH OF U.S. AIR FORCES IN U.K. ON THE DATES SHOWN.

Type of Unit	Aircraft Estab't per Group	In U.K. on 3.7.42.		Estimated on 31.7.42.		Estimated total on 31.8.42.		Estimated total on 31.9.42.		Total expected on 1.4.43.	
		Groups	Aircraft	Groups	Aircraft	Groups	Aircraft	Groups	Aircraft	Groups	Aircraft
Heavy Bomber	35	1	-	1	35	4	140	7	245	17	595
Medium Bomber	57	-	-	-	-	2	114	3	171	10	570
Light Bomber	57	2 Sqds	-	2 Sqds	-	2 Sqds	-	2 Sqds	-	6	342
Fighter	80	2	80	2	160	5	400	6	480	12	960
Transport	52	1	-	1	52	4	208	4	208	8	416
Observation	57	-	-	-	-	1	57	1	57	7	399
Total Aircraft			80		247		919		1161		3282

NOTES:- 1. The 2 light bomber squadrons were originally intended to be equipped with Turbinlites. This has been cancelled and no information is available as to the date or type of aircraft with which they will be equipped.

2. One of the fighter groups in the U.K. at present is equipped with Spitfires (80), and is expected to be operational early in August.

3. No estimate can be given of when any other units are likely to be operational.

3.7.42.

G.169087/ES/3/50/30.

JOINT AMERICAN/BRITISH DIRECTIVE ON DAY BOMBER
OPERATIONS INVOLVING FIGHTER CO-OPERATION

AIM

The aim of the day bombardment by Allied Air Forces based in Great Britain is to achieve continuity in the bombing offensive against the Axis.

ALLOCATION OF RESPONSIBILITY

2. The primary instrument for night air bombardment is the British Bomber Command. Day bombardment will be the primary responsibility of the Eighth Air Force.

METHODS OF ACHIEVING THE AIM

3. Night bombardment methods will remain as defined in present Air Ministry directives to the British Bomber Command. The method of achieving the aim of day bombardment is by the destruction and damage of precise targets vital to the Axis war effort.

DEVELOPMENT OF DAY OFFENSIVE

4. The day bomber offensive is to be developed in the following three phases:-

(a) Phase 1.

American day bomber forces under British fighter protection reinforced by American fighter forces are to attack suitable objectives within the radius of action of British fighter cover.

(b) Phase 2.

American day bomber forces under British and American fighter protection are to attack suitable objectives within the radius of action of British and American fighter types. In this phase, the direct protection of the bomber forces is to be provided by American fighter forces. British fighter forces are to be used principally for diversionary sweeps and withdrawal cover. During this phase the range characteristic of the American type fighter aircraft is to be exploited to increase the depth of penetration of the bomber force and also to widen the frontage of attack. It will be the responsibility of the Eighth Air Force to develop the tactics of deep penetration of the enemy day fighter defence.

(c) Phase 3.

The Eighth Air Force will develop its full day bomber offensive receiving such support and co-operation as may be required from the British short-range fighter force.

OBJECTIVES

5. Objectives suitable for the day bomber offensive under Phase 1 will be determined periodically, within existing strategy, between the Commanding General, Eighth Air Force and A.C.A.S. (Ops.) as occasion demands.

ROLE OF BRITISH DAY BOMBER FORCE

6. During the development of the day offensive, British day bomber forces are to be used in the secondary role to add weight to British diversionary operations, and to maintain the attack during periods unsuitable for the operation of the American heavy day bombers.

/MACHINERY

MACHINERY FOR IMPLEMENTING THE PLAN

7. During Phase 1, it will be the responsibility of the Commanding General of the American Bomber Command to initiate offensive operations, making preliminary arrangements for fighter co-operation with the Commanding General, the American Fighter Command. It will be the responsibility of the latter to ensure full consultation with the Air Officer Commanding-in-Chief, Fighter Command. When the general plan is settled, it will be the responsibility of the Air Officer Commanding-in-Chief, Fighter Command to nominate the British Fighter Group Commander, who is to draw up the detailed fighter plans, reinforcing the Fighter Group as necessary in conjunction with the Commanding General, American Fighter Command in respect of American pursuit reinforcements. Thereafter, detailed planning and the conduct of the fighter operation will be the responsibility of the Commanding General, American Bomber Command, and the British Fighter Group Commander concerned.

8. When Phase 3 is reached, it will be the responsibility of the Commanding Generals of the American Bomber and Fighter Commands together to make the general and detailed plans and to conduct the operations under the direction of the Commanding General, Eighth Air Force. It will be the responsibility of the Commanding General of the American Fighter Command to arrange with the Air Officer Commanding-in-Chief, Fighter Command for such ground facilities and fighter co-operation as may be required from the British Fighter Command.

9. The Air Officers Commanding-in-Chief, Bomber, Fighter and Coastal Commands and the Commanding Generals of the American Bomber and Fighter Commands will at all times keep each other informed of operational intentions and together make such adjustments to plans as may be necessary to ensure proper co-ordination.

10. At some moment during Phase 2 it will be necessary to change from the co-ordination machinery for Phase 1 to that agreed for Phase 3. The moment of change-over will be decided by the Commanding General, Eighth Air Force and the British Air Ministry (A.C.A.S. (Ops.)) conjointly, having regard to the available strength of American pursuit forces available which are armed with American type fighters, and the degree of operational experience which they have acquired.

20.8.42.

Source: CS. 16536

SECRET

DIARY OF U.S. VIII BOMBER COMMAND OPERATIONS
August 1942 - January 1943

Date	Target or Purpose	Des- patched	Attack- ing	Tonnage	Losses	Aircraft
<u>AUGUST</u>						
<u>1942</u>						
17	Rouen (Sotteville Marshalling Yards)	12	12	56.2	-	Fortress
19	Abbeville/Drucat Airfields	24	22	28.7	-	"
20	Amiens (Longueau Marshalling Yards)	12	11	19.6	-	"
21	Wilton (Shipyards)	12	-	-	-	"
24	Le Trait	12	12	21.4	-	"
27	Wilton (Shipyards)	9	7	11.6	-	"
28	Meaulte-Potez	14	11	20.0	-	"
29	Courtrai Wevelghem Airfield Steen Airfield	13	12	26.2	-	"
<u>SEPTEMBER</u>						
5	Rouen (Railway Yards)	37	31	64.3	-	"
6	St.Omer (Longuenesse) St.Omer (Rouge) Meaulte Potez	54	43	84.0	2	"
7	Rotterdam Wilton (Shipyards) Utrecht	29	9	15.6	-	"
26	Morlaix-Ploujean (Airfields)	46	-	-	-	"
<u>OCTOBER</u>						
2	Meaulte-Potez St.Omer (Longuenesse)	49	36	68.3	-	"
9	Lille, Courtrai Roubaix St.Omer (Longuenesse)	108	79	151.8	4	(Fortress Liberator)
21	Lorient (U-Boat Pens) Cherbourg Maupertus (Airfield)	107	23	33.9	3	(Fortress Liberator)
<u>NOVEMBER</u>						
7	Brest (U-Boat Pens)	68	34	79.9	-	(Fortress Liberator)
8	Lille (Locomotive Works) Abbeville-Drucat Airfield	53	41	89.9	1	Fortress
9	St. Nazaire (U-Boat Pens)	47	43	101.3	3	(Fortress Liberator)
14	St. Nazaire (U-Boat Pens)	34	24	50.9	-	(Fortress Liberator)
17	St. Nazaire (U-Boat Pens) Cherbourg Maupertus Airfield	69	35	84.4	1	(Fortress Liberator)

SECRET

Date	Target or Purpose	Des- patched	Attack- ing	Tonnage	Losses	Aircraft
<u>NOVEMBER</u>						
1942 18	Lorient (U-Boat Pens) } St. Nazaire } La Paluce (U-Boat } Pens) }	65	51	118.5	1	(Fortress (Liberator
22	Lorient (U-Boat Pens)	76	11	15.2	-	(Fortress, (Liberator
23	St. Nazaire	58	36	70.1	5	(Fortress, (Liberator
<u>DECEMBER</u>						
6	Lille } Abbeville/Drucat } Airfield }	85	42	85.3	2	(Fortress, (Liberator
12	Abbeville/Drucat } Airfield } Rouen (Sotteville } Marshalling Yards) }	90	17	35.9	2	(Fortress (Liberator
20	Romilly-Sur-Seine	101	72	147.8	7	(Fortress, (Liberator
30	Lorient	77	40	71.4	3	Fortress
<u>JANUARY</u>						
<u>1943</u>						
3	St. Nazaire	85	68	152.7	10	(Fortress, (Liberator
13	Lille	72	64	142.8	3	Fortress
23	Lorient (U-Boat } Bases) } Kerlin Bastard } Brest }	90	54	118.5	5	(Fortress, (Liberator
27	Wilhelmshaven } Emden }	91	55	122.8	3	(Fortress (Liberator

Source Reference: ^{AHB/} ITH/179.