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R.A.F. NARRATIVE
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VOL 3

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

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VOLUME III

AREA BOMBING AND
THE MAKESHIFT FORCE
JUNE 1941-FEBRUARY 1942

AIR HISTORICAL BRANCH(1)
AIR MINISTRY

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Downgraded to RESTRICTED-AHB1 (RAF) S259 d/d 11/12/73.

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(First Draft)

THE RAF IN THE BOMBING OFFENSIVE

AGAINST GERMANY

VOLUME III

AREA BOMBING AND THE MAKESHIFT FORCE

JUNE 1941 - FEBRUARY 1942

AIR HISTORICAL BRANCH (1)

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Alphabetical Index and Key to References Used.

AHB.....Air Ministry Air Historical Branch.
 AHB/EMS....." " " " translations of German documents.
 AMWR Man. of
 B.C.Ops.....Air Ministry War Room Manual of Bomber Command Operations.
 AMWR.R.O.(2).....Air Ministry War Room Record of Operations.
 BCIR.....Bomber Command Intelligence Report.
 BCNO.....Bomber Command Narrative of Operations.
 BCOO.....Bomber Command Operation Order.
 BC/S.....Bomber Command Secret File.
 CAS/Misc.....Miscellaneous File of Chief of Air Staff.
 CC/S.....Secret File of Coastal Command.
 COS..and COS/(O). Meetings (indicated by '--th' or Papers of the Chiefs of Staff Sub-Committee).
 CS.....Air Ministry Secret File.
 Cyph.Sig.....Air Ministry Cypher Signal.
 DA.K.....Damage Assessment "K" Report.
 D.B.Ops.....Director of Bomber Operations File.
 D.B.Ops. Arch... " " " Archive, or subject-folder.
 DFS.....Personal File of A.O.C.No.2 Group, A/V/M Stevenson.
 DO.....Minutes of Papers of the Defence Committee.
 ERP.....Minutes or Papers of the Expansion and Re-equipment Policy Committee.
 HQBC.ORB... ..Bomber Command Operations Record Book.
 HQBC.Admin.ORB..Bomber Command Administrative Branch Record Book.
 HQBC.ORB Appx...Appendix to B.C. Operations Record Book.
 IDR.....Ministry of Economic Warfare Industrial Damage Report.
 INT/TAC.....Bomber Command Interception Tactics Report.
 ITR.....Ministry of Economic Warfare Industrial Target Report.
 JCS.....Personal File of A.O.C. No.5 Group, A/V/M Slessor.
 JEAB.....Personal File of A.O.C. No.3 Group, A/V/M Baldwin.
 and, in Jan and Feb. 1942, of temporary A.O.C., Bomber Command.
 JP.....Paper of the Joint Planning Sub-Committee.
 LM.....Loose Minutes of Directorate of Organisation.
 ORS.....Report of Bomber Command Operational Research Section
 P.....See page () of this volume of the narrative.
 PISIR.....Report of Bomber Command Photographic Interpretation Section.
 PM.....Personal Minute by the Prime Minister.
 RECP.....Personal File of the A.O.C.-in-C. Bomber Command, Sir Richard Peirse.
 S.....Air Ministry Secret File.
 TIC.....Minute of Target Information Committee.
 Vol.....See Volume () of this narrative.
 WM.....Conclusions of the War Cabinet.
 WP.....Paper issued by the War Cabinet.
 1G.....No. 1 Group.....
 2G.....No. 2 Group.....
 3G.....No. 3 Group.....
 4G.....No. 4 Group.....
 5G.....No. 5 Group.....

INTRODUCTION.

The nine months from June 1941 to February 1942 are treated as a separate phase for the purpose of this narrative, because they were a period of transition for the bomber force and the policy it was to pursue, and, equally, a period of transition for the Allied cause. Moreover, the transition in each case was clearly recognisable at the time, so that decisions taken were usually designed with a view to the next phase of the war. It is therefore proposed to summarise at once the broad trend of events and ideas that marked it, so far as they affect the scope of this narrative.

Politically the British Empire and the Allied European Governments which it supported ceased to stand alone against Germany and Italy. The German attack on Russia in June 1941 (1.) and the Japanese coup at Pearl Harbour in December 1941 (2.) extended the war across the world and brought fresh commitments and new opportunities vitally affecting the work to be done in the air by British striking power. At home, after September 1941, peril of invasion receded, but the threat to our supply lines from the U-boat continued to increase, and only at the end of the period was the pre-occupation with the principal potential surface-raiders relieved.

Meanwhile the lines of future strategy were clearly emerging in the minds of those responsible for British policy, notwithstanding the revision and extension produced after collaboration with the United States on board H.M.S. Prince of Wales and in the various conversations of staff and mission. It was still too early to see the role of land power in the final beating down of Germany, but the tasks of Navy and Air Force seemed clear.

As regards air power, the main shape of the bombing offensive by the R.A.F. began to appear, as an idea yet to be turned into practice. The priority necessary to acquire the force desired was at least clearly stated, though its advocates had not finally dejected the arguments of opponents of an all-independent striking force. For the swing from defensive to offensive in the air certain principles, notably what is loosely defined as "area attack", were laid down, (3.) and some heresies, particularly regarding morale, were answered. (4.)

In this period, too, Bomber Command went through a most necessary transition. Broadly speaking, it ceased to be a force in which the courage and devotion to duty of its crews were accepted as the criterion of what it could accomplish. A more realistic outlook on the force was born. It became clear, and was openly acknowledged, that the night bomber crews faced insuperable difficulties as well as dangers; and much that policy sought to achieve was beyond their powers. It was high time that more help from the scientist was forthcoming, and at the end of the period, with the country well equipped for defence, this aid arrived. (5.)

There was, too, the obvious transition stage in which Bomber Command and the aircraft industry brought the first heavy bombers, laboriously and at length, through their "teething troubles." (6.)

Finally, there was a stage of transition between

- | | | |
|-----------------|-----------------------|------|
| (1.) See p.106. | (4.) See p.52. | |
| (2.) See p. 38. | (5.) See p.41 et seq. | /two |
| (3.) See p. 58. | (6.) See p.3 et seq. | |

two periods of intensive effort -- a stage imposed upon the bomber force by a long spell of bad autumn and winter weather, and also by the enemy's improved defences. A halt was called to the current rate of operational wastage, and orders were given to conserve the force to strike afresh, with better equipment in the spring of 1942. (1).

These were the highlights of the period, on which it is intended to focus attention in the following pages. The period will be discussed in three chapters, devoted to (i) the character and potentiality of the bomber force, (ii) the offensive bombing of the summer and autumn, and its restricted scope during the winter months; and (iii) the part played by Bomber Command in the very largely defensive war at sea.

1. See page 35.

PART I

THE MAKESHIFT FORCE

1. BOMBER COMMAND'S COMPOSITION.

(i) Squadrons Formed and Forming.

Throughout the period under review (June 1941 to February 1942) Bomber Command possessed a force that was still predominantly medium in character. The heavies, though becoming fairly substantial in numbers on paper, were in reality a minor part of the force, owing to causes that will be apparent. Their role was restricted, their effort almost insignificant, and the medium bomber had to carry out the great majority of bomber sorties, by night more than ten times the number flown by the heavies, and by day nearly twice the heavy bomber effort. In technique, too, there were really no important advances, and it is this inability to achieve a significant rate of expansion or improvement in technique that leads one to speak of the force at this time as "makeshift". The reasons will be more apparent when the next phase, a period of expansion and experiment, is treated. The light bombers, during the present phase, still had an important role to play until early winter 1941, but the period saw the decay and virtual disappearance of the Blenheim from the Bomber Command operational scene.

The composition of the bomber force on 1 June 1941, was as follows[■]:- (Squadrons non-operational are shown in parenthesis).

/Heavy

[■] Changes in the period under review and the position at 28th February, 1942, appear at Appendix "A".

Class and Type	Group	Squadrons (Non-operational squadrons in brackets)	Total	Squadron		
				I.E.	I.R.	
<u>HEAVY BOMBERS</u>						
Lancasters	-	None	-	-	-	<u>HEAVY BOMBERS</u>
Halifaxes	4	35, 76.	2	16	2	Total 8 Sqdns.
Manchesters	5	(207), (97), (61)	(3)	16	2	Total I.E. 120
Stirlings	3	7, 15.	2	16	2	Total I.E. 15
Fortresses	2	(90)	(1)	8	1	
<u>MEDIUM BOMBERS</u>						
Wellingtons Mk.I	1	103, 150, 300(P), 301(P) 304(P). 305(P)				
Mk.II		12, 142	8	16	2	
Mk.I	2	101	1	16	2	
	3	9, 40, 75 (NZ), 99, 115, 149, 214, 218. 311 (Czech)				<u>MEDIUM BOMBERS</u>
Mk.I		57	10	16	2	Total 33 Sqdns.
Mk.II		104				Total I.E. 576
	4	405 (R.C.A.F.)	2	16	2	Total I.R. 72
Hampdens	5	44, 49, 50, 83, 106, 144.	6	24	3	
Whitleys Mk.V	4	10, 51, 58, 77. 78, 102.	6	16	2	
<u>LIGHT BOMBERS</u>						
Blenheims Mk.IV	2	18, 21, 82, 105, 107, 110, 226, 139. (Excluding 114 lent to Coastal Command 88 in Northern Ireland 98 in Iceland).	8	16	4	<u>LIGHT BOMBERS</u>
						Total Sqdns. 8
						Total I.E. 128
						Total I.R. 32

(ii) The Medium Bombers.

The medium bombers, which were only here and there giving way to heavies, consisted of 33 squadrons formed or forming by 1 June 1941. Of these, 21 were Wellingtons, 6 Hampdens and 6 Whitleys. All 6 Hampden squadrons were already expanded to three-flight squadrons, so that the medium force amounted really to 36 standard (16 I.E. & 2 I.R.) squadrons, and possessed the considerable paper strength of 576 I.E. and 72 I.R. In fact, the numbers of aircraft and crews available at any one time were much smaller, for reasons to be given later.¹ In round figures, an average of 380 mediums (approx. 200 Wellingtons, 120 Hampdens and 60 Whitleys) was maintained as the force actually available for operations during the latter half of 1941, plus an average of only 40 heavies. After the end of 1941 the medium bomber figures declined sharply owing to transfers overseas, and re-equipping.

The Wellington remained the mainstay of the bomber force at the beginning of June (and through the period), with 16 squadrons of Mk Ic's., 4 of Mk IIIs and 1 of the Mk IV with American Wasp engines.

In mid-July No.1 Group consolidated its position as the second Wellington group, (the first being No.3 Group), by a transfer of airfields with No.5 Group. No.1 Group also moved its headquarters from Hucknall to Bawtry, thus consolidating its territorial position in N. Lincolnshire and S. Yorkshire.

(iii) The Heavy Squadrons.

As has been indicated, the heavy bombers were still an impotent part of the strategic bomber force. Ten months had elapsed since the formation of the first Stirling squadron, on 1 August 1940; and seven months since the formation of the first Halifax and Manchester squadrons, on 7 and 1 November 1940 respectively. On paper there were now eight heavy

1. See page 27.

bomber squadrons, of which six were officially operational (Nos. 35 and 76 with Halifaxes, Nos. 7 and 15 with Stirlings, Nos. 207 and 91 with Manchesters) and two non-operational (No. 61 with Manchesters and No. 90 with Fortresses Mk. I.) In fact, only eight Stirlings were operationally fit, the Halifaxes and Manchesters being involved in technical troubles.

HQBC ORB
1 June.

RECP/DO/1
26 Dec 1940.

It will be remembered that the first Stirlings were fitted with Hercules II engines of a single-blower type. These, on trial, gave an operational ceiling of only 10,000 ft -- a height at which the C-in-C naturally was not prepared to employ them over Germany. This was the over-riding factor, but there were others -- including a defect in the tail wheel arrangement which imposed a weight limitation of 50,000-lb. In January the Hercules X engine arrived, and by 10/11 February 1941 Stirlings were able to operate, and thereafter did so in small numbers.

Ibid

Trouble with the Halifaxes, on the other hand, persisted. The tail-wheel, again, was a cause of complaint up to the end of 1940, though the aircraft was in general popular. The first operations were tried in March, 1941, but in mid-April the Halifaxes were again out of commission as a result of hydraulic trouble which was not diagnosed until 20 May, and which necessitated the introduction of modified pumps and certain undercarriage components. Efforts were made at the same time to regulate more efficiently the cabin heating, since excessive warmth had given rise to a good deal of sickness among crews; and to rectify the fastenings of the front escape hatch, which tended to fly off in the air. These troubles were overcome sufficiently to enable a few Halifaxes to fly to the Ruhr on 11/12 June, at the start of a period of intensified bombing, and on subsequent nights. On 3 June there were 33 Halifaxes, with 23 crews, in the Command.

-5-

RECP/DO/1
25 Jan

As for the Manchesters, a more auspicious start had been made in November and December 1940 by No. 207 Sqdn, there being at first no sign of major engineering or structural defects, but a lack of certain facilities necessary for operations, such as an efficient method of heating. The Ministry of Aircraft Production took back a number of these early Manchesters to incorporate improvements of this kind at the end of January. On 24/25 February the Manchesters became operational, in a raid on Brest.

RECP/DO/1
3 June

But in the latter half of April and during May they were non-operational again for several short periods, owing to failure of bearings in the Vulture engines and proneness to catch fire in the air after engine failures. New engines with modified bearings were installed, but hopes of having the aircraft ready for the June moon were again frustrated by further engine failures during test on 1 June. It was three weeks later before they became effective. On 3 June the Command held 41 Manchesters, of which 14 were allotted to training, and there were 33 trained crews.

PM.M/610/1.
1 June

The seriousness of the heavy bomber position at this time, when it was desired to begin a strong offensive against Western Germany, while continuing the Battle of the Atlantic, was not lost on those ultimately responsible. Lord Beaverbrook himself informed the Prime Minister, on 28 May 1941, that the grounding of all Bomber Command Halifaxes was due to defective undercarriages, that heavy bomber undercarriages had been a source of weakness from the beginning, and that the problem must be forced to a conclusion. The C-in-C, in reply to the consequent query from Mr. Churchill, gave reasons why he was unable to use what he called "a formidable striking force" of Halifaxes and Manchesters, and warmly welcomed any assistance that Lord Beaverbrook could give in placing the needs of these heavy aircraft on the highest possible priority.

/But

But if troubles in the air were holding back the heavies from operations over Europe, troubles on the production line were even more serious. During the four months March to June 1941, in which each of the heavy types was making its first tentative bombing effort, production was only 54% of the level expected. The failure was most marked in the case of the Stirlings, for of 106 scheduled in March for production in the forthcoming four months, only 37 were produced. Corresponding figures were 42 out of 60 Halifaxes and 62 out of 96 Manchesters. (By way of comparison, medium bombers were only 13% down and light bombers only 5% down.)

Of the American heavy bomber types, only a few Fortress I aircraft were so far available for Bomber Command. No.2 Group was trying to make No.90 Squadron operational with these first Fortresses, and the first sorties were flown on 8 July 1941.

DDB/Ops.
DO 20
July.

Up to 20 July, however, only 20 Fortresses had been delivered to Britain, and of these 7 were in the new squadron, while most of the remainder were undergoing modifications -- principally the substitution of British for American oxygen equipment, the fitting of apparatus for de-misting windscreens, and the investigation of means to prevent excessive oil-throwing by the engines. Experience also proved that it was inadvisable to introduce a new type of aircraft into a new squadron - an arrangement which tended to accentuate difficulties.

Ibid

The supply of Liberators was even smaller than that of Fortresses. It had been hoped to equip one squadron (No. 150) with Liberators as a start, but the Mk Is had all been earmarked earlier for Coastal Command and only 17 had arrived. Delivery of Mark IIs had been postponed for a month owing to a crash of the prototype, so that only one was expected in August and 12 in September.

Ibid.

There was no doubt, in the minds of the Air Staff, that heavy bombers alone could carry out the attack on Germany

/in

B.C.18.

in sufficient weight. In August 1941 they issued an up-to-date revise of the "Ideal Bomber" paper of March 1938, embodying the results of war experience. This had shown, they said, that the number and size of bombs required to cause permanent or decisive damage, material or moral, was far greater than had been conceived before the war. The 1,000-lb., 2,000-lb., and 4,000-lb. bombs were now in general use, and it was clear the limit of optimum destructive value per unit had not yet been reached.

Comparing the merits of the three classes of bomber represented by the Hampden, Manchester and Halifax, they declared that to ensure a bombing offensive on the heaviest possible scale, but with economy of effort, they must have a bomber of at least the size of the Manchester, but that the Halifax class was daily proving even more suitable in the acid test of war.

(iv) The Light Bombers.

Coming to the light bombers, this force was already reduced, by 1 June 1941, to 8 squadrons of Blenheims, if one excludes No. 98 Squadron in Iceland; No. 114 Squadron, lent to Coastal Command; and No. 88 Squadron, in Northern Ireland. No. 226 Squadron had just been recalled from Northern Ireland to re-equip with Dostons, but, as will be seen, this was not then possible.

2. LONG-TERM EXPANSION AND RE-EQUIPMENT

(i) Position in mid-1941.

The position as regards expansion at the beginning of June 1941 was that, while still working towards Target Force "C" (i.e. 100 medium and heavy squadrons by mid-1942, of which half would be heavy bombers) and, on a shorter term basis, to Target Force "A" (i.e. 75 medium and heavy and 10 light bomber squadrons by December 1941), there was now in prospect the

BC/S.
21717/Org.
14 Nov.
1940.

/need

need to expand to a front-line strength of 4,000 I.E. aircraft (250 standard-size squadrons) -- an ambition embodied in the scheme known as Target Force "E", and approved for achievement by the spring of 1943.

(ii) Expansion to Three-flight Squadrons.

Originally this force of 4,000 bombers was to have been composed of 250 squadrons of 16 I.E. each, but for some time past, in an endeavour to economise on overheads, Bomber Command had been testing a scheme of gradual expansion by adding a third flight to each squadron, increasing its establishment to 24 + 3. This scheme had been applied first to the Hampdens, in which production was healthy, though it was envisaged that the same type of expansion would later prove equally suited to heavies. The expedient was forced on the Command by a reduction in the prospective programme of airfield construction, which clearly showed that the policy of operating one squadron from one station or satellite was (as A/V/M Harris had described it) a "Utopian policy which would never stand the urgency of war." The C-in-C (A/M Peirse) looked to this method of expansion, also, to bring forward junior commanders in the extra flight commander posts thus created.

By 4 June 1941 D.D.O.P. was able to report that, in the case of the Hampdens squadrons, the limited experience so far available suggested this method of expansion was a success. The necessary authority was given for an increase in accommodation at all new stations and satellites where this was being provided only on a two-flight basis -- a very large new commitment.

Bomber Command, in fact, endorsed the commendation of this scheme as providing a sound method of obtaining increased operational effort without unduly increasing overheads, and providing, in conjunction with a new grouping of stations (two satellites per station) a sound base for Target Force "E".

CS.67148
Min.11.
9 Mar.

BC/S.
21717/Org.
19 Mar.

S.67148
Min 5.

BC/S.
21717
19 Mar.

S.67148
Min 22.

Ibid.
Min 26.

HQBC.ORB
Admin.
15 Aug.

(iii) Planning of Target Force "E".

OS.9944
Min 3.
11 June

The detailed planning for this expansion was inaugurated in June 1941, and on 19 June Bomber Command produced their outline of the organisation required for operational formations and units only. The skeleton of organisation which was approved provided for:-

BC/S.
25224
14 July

Eight operational groups, each with:-
Seven or eight parent stations, each with:-
Two satellites, each station and satellite having:-
One squadron of 24 I.E.
Airfields totalling 168.

At this stage the old principle under which the Command headquarters staff and heads of Services dealt direct with parent stations was retained.

The main departure under this scheme was that each parent station would become responsible for two satellites instead of one. The necessary maintenance facilities for the satellites were to be spread, largely on a transportable basis, to an extent sufficient for local servicing and repairs to be made.

CS.9944
Min 4.

The rate of expansion, it was recognised, would be governed solely by the provision of aircraft and crews, though at times bottlenecks might arise in airfield progress, communications and provisioning. The aim was to form squadrons as early as possible, even though this meant retaining squadrons for a time in a non-operational state. The scheme was to be flexible in its application.

Ibid.
Min 7.

CS.9944
7a

Meanwhile, on the operational and flying control side, parallel decisions needed to be taken. This question belongs primarily to the province of the narrative on Flying Control. Briefly, it was decided to set up at Headquarters, Bomber Command, a central staff to assist Groups in planning diversions and in arranging for the use of aerodromes at short notice. It would be under the orders of the C-in-C and would keep itself fully informed as to weather conditions,

and the scope and progress of operations. It was decided to install this staff by 1 November 1941.

(iv) Revision in Light of Future Production.

Before planning had proceeded very far, Target Force "E" was revised. To the 168 heavy bomber squadrons were now to be added six medium squadrons (also at 24 I.E.) and 20 light bomber squadrons (each 16 I.E.). Of the latter, 15 were to be of the "speed bomber" type. This extension arose from a review by the E.R.P. Committee of the prospective supply of both British and American types of aircraft, which included 350 Mosquitos to be allotted to the home forces. It was tentatively suggested in September that the bomber version of the Mosquito would begin production in January 1942, and that a peak figure of 75 a month would be reached by mid-1943. It was hoped to form the first squadron in February 1942, and afterwards one a month up to the 15 squadrons laid down.

ERP 25th
31 July.

CS.9944

It was envisaged at this time that the Mosquito would have a day role; and as the C-in-C wished to build up a day light bomber group of 20 squadrons (at 16 - 4), housed on ten airfields, new problems of control were raised. Could a Group Commander control 20 squadrons, and could one airfield house two squadrons each of 16 I.E.? At a fresh conference these problems were answered satisfactorily, and the original grouping, plus the light bomber group, was agreed upon. 194 airfields would now be needed. *On this basis planning proceeded.*

~~On this basis planning proceeded. A further conference to examine the proposals was held on 24 November 1941, and a tentative lay-out of Bomber Command was issued on 25 December 1941. It included numerous sites still under consideration, and gaps where sites had yet to be found; but though re-shuffling would be inevitable the organisation was to be adhered to as rigidly as possible. Nowork of any kind not in line with this organisation was to be planned,~~

LM.15/
OP.3b.

/put the shortage

The Shortage of Bombers

The position with regard to aircraft was serious and an idea of the problem to be faced can be obtained from a paper written by the Organisation Forecasting branch of the A.M.S.O's department on 24 August 1941. In this paper it was shown that the average number of sorties per bomber wasted (all types) day and night in the summer of 1941 was in a region of 10 to 16⁽¹⁾ against a forecast of 20 - 25.

The actual numbers of bomber aircraft completely written off from all causes at home were:-

(Over 4 months April to July 1941)

Heavy	47
Medium	514
Light	215
	<u>776</u>

In addition 108 Medium and 312 Light Bombers had been sent overseas.

Against this, the latest programmes⁽²⁾ had aimed at producing over 2,000 bombers, compared with an actual production of 1715 bombers.⁽³⁾

/The

(1)	<u>Day</u>	<u>Night</u>	<u>Day & Night</u>	<u>Forecast</u>
<u>Heavy Bombers</u>	3.1	12.0	7.4	25
<u>Medium Bombers</u> (Hampden Wellington Whitley)	2.2	20.5	16.5	25
<u>Light Bombers</u> (Blenheims)	10.2	18.6	10.6	25

(2)	British Programmes			American Programmes	
	20/10/40	7/3/41	3/7/41	11/40	6/41
Heavy	398	320	-	55	-
Medium	1,471	1,127	-	-	-
Light	769	595	-	587	-
	2,638	2,042	-	642	-

(3)	<u>Heavy</u>	<u>Medium</u>	<u>Light</u>
British	142	928	576
American	15	-	54
Total	<u>157</u>	<u>928</u>	<u>630</u>

The deficiency (against I.E. and I.R.) of bomber aircraft in Metropolitan units, including Coastal Command⁽¹⁾ was as follows at 1800 hours on 15 August 1941:-

	<u>Heavy</u>	<u>Medium</u>	<u>Light</u>
Squadrons	- 114	- 39	+ 13
O.T.U.s.	- 4	- 159	- 90
	<u>- 118</u>	<u>- 198</u>	<u>- 77</u>

To meet requirements it was estimated that 500 heavy, 1600 medium and 1200 light bombers would have to be produced whereas the forecast, including American production up to the end of 1941 was 474, 1180, and 1171 respectively. As can be seen since attainment always fell short of programme the prospects were very bad. To keep pace with the expansion programme a hundred heavy and medium bomber squadrons were due to be formed by the end of 1941 and the latest production programme of 3 July 1941 represented a severe setback on the earlier forecasts, and moreover actual production consistently fell short of even this new programme. The general prospect for 1942 was not reassuring. The general inadequacy of bomber production both in Britain and in the United States was such that there was virtually no hope of expansion being achieved unless production could be greatly increased.

So there was the situation as revealed in the instance quoted, operational bomber aircraft of all types only lasted on an average 11.5 sorties against a forecast of twice that time. Production fell short by at least 25% on British production alone, and much more on American programmes. The O.T.U.s. were short of aircraft and the expansion programme was falling more and more behind on the vital element of bomber expansion. At the same time the number of personnel trained to basic standard were piling up in even increasing quantities.

/Against

(1) Established with Liberator, Wellington, Whitley and Blenheim aircraft.

Against this it was estimated that by the end of 1941 the German Air Force was likely to possess a 30% advantage in striking power⁽¹⁾. Even on best assumptions about home and United States production there were bound to be serious deficiencies in meeting the 4,000 first-line bomber programme. The Prime Minister considered that the position was grave and that it was essential to have a 30% expansion upon the latest programme. He therefore directed the Lord President to convene a Committee of Ministers to make a plan for Cabinet approval to achieve a great renewed expansion of air production and to assess the sacrifices in other directions⁽²⁾.

It was considered that, in order to achieve the target in bombers, the requirements from July 1941 to July 1943 were 22,000 bombers. Of these, the latest forecast provided for 11,000 from home production assuming 85% realisation of target, and that 5,500 might be available from U.S.A. The gap of some 5,500 could only be secured from new production.

The Prime Minister, therefore, directed that the M.A.P. should prepare a plan for the production in the United Kingdom of 14,500 medium and heavy bombers in the period between the end of July 1941 and the end of July 1943. He also directed the Air Ministry to readjust the R.A.F. expansion programme on the assumption that between these dates 14,500 bombers would be produced in the United Kingdom and that 5,500 would be received from the U.S.A. making a total of

/20,000

(1) S. of S. Folder 10A.

(2) Cabinet Paper "Outline of Events since July 1941" dated October 1941. M/878/1 P.M. to Lord President.

20,000 bombers in the period.

It was found that there were actually 1,276 bombers available for service, of which 82 were heavies. There were 792 bombers in the O.T.U.s. of which nearly 600 were medium bombers and only 7 were heavy bombers. In addition to this, there were nearly 800 medium light bombers in various stages of preparation in A.F.U.s. As regards deliveries of bombers, there was a steady rise in home production and a most disappointing delivery of U.S. bombers. By August the monthly delivery was 387 bombers from the U.K. of which 50 were heavies and 153 from the United States and Canada, of which only 2 were heavies.

By the middle of October the Lord President's Committee reported that 14,500 bombers could be obtained by the end of 1943 if the programme were realised 100%. If not, by June 1944 if only 85% were realised. He asked for authority to express the target force in terms of production, as steady expansion was preferable for R.A.F. He also assumed that the Prime Minister's requirement for a two to one preponderance could be met by bomb tonnage as opposed to mere numbers. The Prime Minister agreed to these proposals. By the end of October the issue now was so to reinforce the M.A.P. that they would be capable of realising 100% of their programme. This was a very difficult matter in view of the tremendous sacrifices involved.

Effect of Labour Shortage on bomber Production

By November 1941, fears concerning the achievement of the bomber programme received confirmation. At a Defence Committee meeting, the Minister of Aircraft Production explained that his latest production programme was going to fall short (chiefly because of the labour shortage) of the September programme⁽¹⁾.

This came as a serious blow to the Air Ministry who had planned to build up a really formidable bomber force on a programme

/of

(1) D.C.(5)41. 14th Meeting. 27 Nov. 1941.

10E

of 20,000 bombers over a two year period. As it was, bomber expansion was 48 $\frac{1}{2}$ squadrons in arrears. In addition, the original hopes of obtaining 5,500 heavy bombers from the U.S.A. had dwindled to some 2,100. It is not our concern to trace the causes of this state of affairs which was fundamentally due to the manpower situation, but the reader will be in little doubt as to the effect on a two year programme of training of these continual disappointments in aircraft production.

American Aircraft

By the end of November 1941, the imminence of war with Japan was evident and the Air Ministry were naturally apprehensive as to what would be the effect of America's entry into the war upon receipt of aircraft from them. (1) The strategic situation had changed since the Atlantic Conference in that Russia now looked far more likely to hold out in 1942, and the Government had hopes that the position in North Africa might be transformed.

So far as the American situation was concerned, they had always assured Britain since the days of the collapse of France that she could always depend upon a large supply of their aircraft without which there could have been little hope of outbuilding the Axis in the decisive manner called for in her plans.

The first Lease-Lend appropriation was encouraging. Out of seven billion dollars, more than two billion were devoted to aircraft and their accessories. The allocation of aircraft was, moreover, governed at this stage by the Lessor Agreement.

In the Spring and early Summer of 1941, therefore, the anxieties of the Air Ministry and of the Ministry

/of

(1) S. of S. Folder 10B.

of Aircraft Production were devoted less to the overall number of American aircraft than to the distribution of flow class by class, in particular, because the heaviest types occupied a relatively unimportant place in this flow. This point was discussed with General Arnold during his visit to London in April, 1941, and as a result a substantial reorientation of American aircraft industry was embarked upon in which the highest priority was given to heavy bombers. This programme, as revised, provided for a peak output of 500 heavy bombers a month by mid-1943. Even this output was a serious disappointment as it was much below the numbers needed, and far below the scale on which America was capable of producing, given the bill to do so.

It was not only in aircraft that the U.S. Defence Programme was inadequate. Deficiencies were arising over the whole range of British Defence needs, and it became clear that only by drastic expansion of her Munitions Programme, with a corresponding cut in her civilian consumption, could America hope to compete with the demands placed upon her. To this end, the so-called 'Stimson Consolidated Statement' was prepared with the object of impressing upon the President the need for far greater production. Although this document did make considerable impression, the vital decision to turn over to production on a wartime basis still remained to be taken.

In the meantime, two events had greatly intensified the difficulty of the problem. America assumed great responsibilities towards Russia, and at the same time, in the face of growing tension with Japan, greatly accelerated the tempo of her own defence preparations. The whole of the British Expansion Programme was in jeopardy. Britain looked to the United States to send her roughly 9,000 bombers. It became clear that only a small fraction of this number was yet in sight. The second Lease-Lend appropriation was a serious disappointment. Only half a

/billion

LOG

billion dollars out of a total of five billion concerned aircraft.

Finally, the War Department appropriation submitted to Congress in late 1941, which amounted to nearly seven billion dollars, contained no provision for the creation of new aircraft capacity, the view being that their Ordnance Programme was a long way behind the Aircraft Programme, and the gap had first to be filled. Reference to the proposed third Lend-Lease appropriation did little to reassure the Air Ministry. This was not due for submission to Congress until February, 1942, and it was clear that the funds it provided could not bring new capacity into play until a very advanced stage and, further, it only included provision for 2,000 heavy bombers. There were great difficulties in persuading the American Chiefs of Staff to turn their eyes away from the Pacific and face the realities of the situation in the West at a critical time.

BRINY 10690
CAESAR 970

So far as the British programme was concerned, by the 15 December, 1941 it was decided that the M.A.P. were to embark on their maximum programme in an effort to compensate for the deteriorating supply situation. Further, a tentative layout of Bomber Command was issued on 25 December. It included numerous sites still under consideration, and gaps where sites had yet to be found; but though re-shuffling would be inevitable the organisation was to be adhered to as rigidly as possible. No work of any kind not in line with this organisation was to be planned, *put in hand.*

put in hand or allowed to continue without prior reference to D.D.O.P.

Ibid.
App.A.

The lay-out will be found in full at Appendix "D". Briefly, it comprised the existing Nos. 1, 2, 3, 4 and 5 Groups, all expanded territorially in the areas they already occupied, and superimposed upon them:- No. 8 Group, in the area round Huntingdon; "A" Group carved out of No. 5's area; "B" Group, extending from No. 3 Group southwards into Essex; and "D" Group in East Anglia.

BC/S.25224/
Org. 19 Dec.

S.67148
Min.61 &
IM.1009/
D.G.O. 6 Jan
& 29 Dec.

Bomber Command meanwhile put forward a plan to save five aerodromes, reducing the number required from 194 to 189. This concentration was found practicable in the case of light squadrons and was approved in principle, but no amendments to the detailed plan were made, pending the settlement of three outstanding problems. These were:- (i) the precise implications in terms of aerodromes of the new organisation of Flying Training Command; (ii) the Bomber O.T.U. aerodrome requirement; and (iii) the commitment of aerodromes scheduled for use by this time by U.S.A. air forces -- including presumably those already scheduled under No. 8 Group, which had been earmarked for this same purpose.

S.67148
OP3b.
26 Dec.

BC/S.26163
24 Jan.

As will be seen later, by the end of January, 1942, the expansion of operational squadrons and training units was still far behind the original Target Force A, which was to have been achieved by the end of 1941. Bomber Command claimed that the disparity had led to considerable difficulties over personnel and accommodation, and suggested that an immediate and more practical target should be set. Instead of 4,000 heavy bombers by spring of 1943 the C-in-C (temporarily A/V/M Baldwin) suggested figures of 1,792 by the end of 1942, 2,682 by the end of 1943 and an ultimate figure of 3,200, subject to production being adequate. The rate of expansion suggested would be 52 squadrons @ 16 I.E.

/during

during 1942, and 56 in 1943. This, he claimed, would permit consolidation of the training organisation at 100% of first-line strength and would produce a higher standard of aircrews.

CS.9944
7 Feb.

No decision on this proposal was taken, pending a review of future production and what was believed to be the imminent arrival of American bomber squadrons.

(v) Two Squadrons per Airfield.

S.67148
Min.32
11 Feb.

At this time, too, the whole policy needed review once more in the light of still further increased airfield commitments. There were two principal new factors -- greatly increased requirements for advanced training, especially the new A.F.U's., and allocations to the U.S. air forces which were to be sent. The question at issue immediately was: Could Bomber Command accommodate more than 24 + 3 aircraft per airfield -- the number hitherto agreed upon?

A conference was held on 10 February 1942, between D.C.A.S., D.G.O., D.B.Ops., S.A.S.O. and A.O.A. Bomber Command, and representatives of all the Air Ministry departments concerned. The operational, maintenance and administrative factors involved were discussed, and a closer concentration of the force was decided in principle, as follows:-

The squadron to revert to 16 + 2, instead of 24 + 3.
Two squadrons per airfield-36 a/c instead of one at 27 a/c.
Stations to consist still of one parent and two satellites, giving 108 aircraft instead of 81.

The effect of this would be to release for other purposes about one-third of the number of airfields formerly required for the same sized bomber force.

Bomber Command representatives agreed that, on aerodromes with new runways, equipped with all improved navigational and landing aids coming forward, it should be possible to operate this increased number of aircraft without appreciable restriction of their operational effort. Many months would elapse before Bomber Command expansion and the

/arrival

arrival of American forces compelled the general adoption of this degree of concentration, but it was meanwhile intended to build up some of the heavy bomber squadrons to 24 I.E., as an interim step by which experience could be gained of the operational and administrative problems requiring solution.

Ibid.
Min 33.
13 Feb.

Approval was given by V.C.A.S. on 13 February, on the understanding that the solution was temporary only, that dispersal on the aerodromes itself was no less than had been previously authorised, and that even greater efforts were made to obtain extra aerodromes, so that the policy of accommodation 27 aircraft per airfield could be restored in, say, 18 months.

3. STAGES OF EXPANSION AND RE-EQUIPMENT.

(i) The Programme in Arrears.

As stated above, at the start of June 1941, expansion of Bomber Command was being pursued in terms of Target Force "C" (100 medium and heavy squadrons by mid-1942), with an intermediate Target Force "A" (75 medium and heavy squadrons and 10 light squadrons by the end of December 1941.) In fact, at the end of December 1941 there were 48 medium and heavy (i.e. 33 medium, 15 heavy) and 9 light bomber squadrons. The discrepancy was actually a little less, than these figures suggest, for six out of seven Hampden squadrons had by then been expanded to three flights (24 I.E. + 3 I.R.), as had one of the four Whitley squadrons and three of the 22 Wellingtons -- giving a paper total of ten extra flights, or five extra standard squadrons. The total of 53 heavy and medium squadrons represented by this force was, however, far short of the proposed expansion. None of the heavy squadrons had yet been expanded, though it was now envisaged that all squadrons would so increase, and even after the re-planning of February, which set the aim at two 16 + 2 squadrons per station, it was intended

to expand to this scale by means of adding a flight to each squadron and then combining them in a new squadron.

The principal steps towards expansion will be discussed later.

(ii) Causes of Delay.

In spite of the policy of conservation that had ruled the effort of Bomber Command during the winter 1940-1, and the fact that enemy night fighter defences did not at that time amount to a serious threat, by April 1941 Bomber Command was considerably in arrears in its progress towards Target Force C. This was due to drains on bomber resources through (i) sending two squadrons to the Middle East and additional crew reinforcements to create three further squadrons out there; (ii) provision of pilots and aircraft for three G.R. squadrons in Coastal Command; (iii) provision of pilots for the Atlantic ferrying organisation; and (iv) inadequate supply of pilots from O.T.U's.

It was to the latter aspect -- the others being virtually unavoidable -- that the efforts of Bomber Command had been turned during the spring. In April, courses at Wellington O.T.U's were ordered to be reduced to six weeks. This did, in fact, improve the crew position as regards quantities reaching operational squadrons, though eventually it filled the squadrons with half trained pilots and caused an increase in the rate of wastage on operational and training sorties.

It was to the failure of bomber production and deliveries to reach anything like the forecast programmes that the breakdown of expansion was due. Especially was this true of Manchesters. There were three squadrons (all non-operational) on 1 June, but in July all three had to be temporarily re-equipped with Hampdens.

(iii) Expansion of the Heavy Bombers.

It is perhaps convenient to examine side by side the

/forecast

Vol.II.

ERP 110
14 April

ERP 121
Note by
D/AMSO
31 July

forecast progress towards expansion and the expansion actually achieved, month by month during the period, first in heavy bomber types.

	<u>To the end of:-</u>	<u>Squadrons Planned.</u>	<u>Squadrons achieved.</u>	<u>Deficiency</u>
ERP 121	July 1941	12	8	- 4
ERP 26th	Aug "	18	10	- 8
ERP 135	Sep "	21	9	-12
ERP 141	Oct "	27	9 $\frac{1}{2}$	-17 $\frac{1}{2}$
ERP 144	Nov "	32	11	-21
ERP 151	Dec "	35	15	-20
ERP 160	Jan 1942	41	17	-24

No expansion was achieved during June or July 1941 owing to the falling off in supply of both medium and heavy bombers, and by the end of July the force was deficient of four heavy squadrons. The deficiency was of course greater in reality, since the Manchesters were non-operational. Six more squadrons were due to form in August, but all that could be planned in detail was to re-equip No. 10 Sqdn (Whitley Vs) with Halifax IIs at 16 - 2, and No. 150 Sqdn with Liberators.

The failure of this programme was due almost entirely to deficiencies in production, compared with the optimistic views held in spring 1941. Those heavy bombers that reached the squadrons still had difficult teething troubles to overcome and, in fact, up to the end of February 1942 the average serviceability of the heavy types, month by month, never exceeded 21 in the case of Stirlings, 31 Manchesters, 23 Halifaxes and 5 Fortresses, while the Liberators never did become operational.

AMWR
R.O.2.
Record.

REC/PDO/1.

The A.O.C.-in-C. emphasised this serious position in a note directed to the Secretary of State (Sir Archibald Sinclair) on 12 August 1941, expressing himself as very despondent about the future because the rising tide of production, and to a large extent, works expansion, so blithely promised and so badly needed if enthusiasms were to be maintained and effort increased, seemed to be ebbing.

/Sir

Sir Archibald Sinclair replied that the tide of production was still rising, but not fast enough. Estimates provided for planning in the Air Ministry had turned out to have little relation to reality. More recent and realistic estimates had proved to be depressingly low and he had refused to accept them. The Prime Minister, he continued, was determined that the production of heavy and medium bombers must be increased even if they had to pay a big price in the curtailment of other projects because we had reached the limit of our resources particularly in labour. Bomber Command, with its heavy demands, was the most important of all their customers. The Government was doing all it could to stimulate the flow of aircraft from the United States but high expectations of these deliveries were bound to be disappointed. Our chief hope must lie in going more for ourselves in this country, and if we wanted more labour employed in aircraft production there would be less for other things, including building bomber stations. Strong sustained pressure on the Ministry of Aircraft Production would be necessary.

The Prime Minister did in fact take up the cause of heavy bomber production, asking the other Services to make sacrifices so that M.A.P. could increase the bomber output. However, no expansion occurred until October 1941, when No. 10 Squadron re-armed with Halifaxes and No. 149 Squadron with Stirlings. The Liberator project failed completely, owing to lack of supply.

In December four medium squadrons re-armed with heavy types -- No. 102 from Witleys to Halifaxes, No. 83 from Hampdens to Manchesters, No. 218 from Wellingtons to Stirlings and No. 44 from Hampdens to Lancasters, though over two months elapsed before the Lancasters became operational. A second Lancaster Squadron began to re-arm (No. 97 from Manchesters) in January 1942, No. 78 transferred from Witleys

/to

WM(41)84th.
19 Aug &
WM(41)90th.
5 Sept.

ERP 141
16 Oct.

to Halifaxes, and No. 106 from Hampdens to Manchesters.

Meanwhile, in the same month, the Fortress squadron (No. 90), of which a detachment had been for some time in the Middle East, was reduced to a "number only" basis.

BC/S.
25303 6 Dec.
& CS 9119
24 Dec.

The Fortress I had been a failure, owing to the fact that it was called upon to operate at 32,000-ft. and even higher, and had been designed only for 20,000-ft. These deficiencies were fully known in the Command by September, 1941, when No. 90 Squadron and No. 2 Group both reported fully on the position. Briefly the main criticisms, as reported by S.A.S.O. Bomber Command (A/V/M Saundby) to A.C.A.S. (G) for the purpose of allaying American criticisms of our failure to use this splendid new aircraft, were as follows:- The Americans had had little experience themselves of flying the Fortress in operational conditions at heights near its ceiling; the Sperry bomb-sight was not fully automatic above 20,000-ft., and therefore bombing accuracy still depended on the human element; armament consisted of heavy, manually-operated machine-guns, and to operate the beam guns large blisters had to be opened, reducing the internal temperature of the aircraft to the order of -50°C .; armour was inadequate, but if augmented would lower the ceiling; its turbo-blown engines, though giving a higher ceiling than any other bomber, took it up to 35,000-ft., not to the stratosphere; it made great demands on the physiology and mentality of its crews at such heights -- and not even an American bomb-aiming expert had been able to place a single bomb in the town of Bremen; weather conditions limited its operational scope; it formed contrails, and would do so till it could exceed 40,000-ft.; its radius of action at 30,000-ft. was still only 500 miles; its engines developed defects in the rarified atmosphere near its ceiling; and its atmospheric oxygen supply needed to be replaced by a pressure cabin system.

The use of the Fortress by day was actually abandoned after 25 September 1941, after only 51 operational sorties, of which 24 were claimed effective, and less than 50 tons of bombs were dropped.

BC/S.25303
6 Dec. and
CS 9119
24 Dec.

On 6 December the A.O.C.-in-C. proposed that it should be tried on night operations, and this was agreed. The squadron was transferred to 8 Group, and, owing to lack of deliveries of the Fortress II, it was not given the new role, but was reduced to a "number only" basis.

At the end of February 1942 there were 17 heavy bomber squadrons. -- It should be noted, however, that four of these were Manchester squadrons, and the Manchesters were to fade from the operational scene at mid-summer 1942, though remaining in the Command as a useful means of converting medium bomber crews to Lancasters.

(iv) Expansion of the Medium Bombers.

The corresponding programme and achievement in the medium bomber sphere was as follows:--

	<u>To the end of:--</u>	<u>Squadrons planned.</u>	<u>Squadron Achieved.</u>	<u>Deficiency</u>
ERP 121	July 1941	46	40 $\frac{1}{2}$	- 5 $\frac{1}{2}$
ERP 26th.	Aug "	49	40	- 9
ERP 135	Sept "	54	41	- 13
ERP 141	Oct "	60	40 $\frac{1}{2}$	- 19 $\frac{1}{2}$
ERP 144	Nov "	68	40 $\frac{1}{2}$	- 27 $\frac{1}{2}$
ERP 151	Dec "	72	38	- 34
ERP 160	Jan 1942	77	37 $\frac{1}{2}$	- 39 $\frac{1}{2}$

One month later, at the end of the period under review, the standard squadron strength of the medium force had fallen to 35 $\frac{1}{2}$, of which two squadrons were earmarked for overseas, so that the net decline since 1 June 1941 was 2 $\frac{1}{2}$ standard squadrons (33 $\frac{1}{2}$ against 36.)

On the credit side of the medium bomber story, three new Hampden squadrons were formed (two R.C.A.F., Nos. 408 and 420, in June and Dec and one R.A.A.F., No. 455 in June). Four new Wellingtons squadrons also formed -- No. 458

and 460 (both R.A.A.F.), No. 419 (R.C.A.F.) and No. 215. Against this, two Wellington, three Hampden and three Whitley squadrons re-armed with heavies, and five Wellington squadrons either transferred, or were in process of transfer, overseas, the remnants of Nos. 40 and 104 being reconstituted into two new Squadrons, Nos. 156 and 158. The deficiency was partly offset by the existence of third flights, but it remained a serious deficiency, especially since all operational experience and the new expansion programme reflected how much more the Command needed, in terms of striking power.

The year 1942 actually opened with a serious decline in medium bombers -- the average available nightly in App.C. February being only 275, compared with 366 in June 1941.

One cause of the decline in Wellingtons was the need to divert operational types for specific training purposes, notably for gunnery training flights. The intention was to equip these flights with Whitleys, but few were forthcoming, and Wellingtons were supplied, to be replaced when practicable by Whitleys.

ERP 159
and 31st.
9 Jan.

(v) Re-equipment of the Light Bombers.

ERP
121-160

The planned expansion and re-equipment of the light bomber force is rather a different story. Throughout the period the force aimed at, under Target Force A, was 10 squadrons. Target Force E (Revised) substituted 20 squadrons on the assumption that Mosquitos would be diverted to bomber work, and would form 15 squadrons, but only slight progress was made towards this end in the conversion of No. 105 squadron to Mosquitos at 16 - 4. In fact, this squadron did not become operational until 31 May 1942.

But the Mosquito was a new departure. Up to April 1941 a different policy had been pursued. The Blenheim was incurring serious casualties in daylight

/operations

operations, but was being called upon for more and more of these sorties, not only against shipping in the Straits of Dover, Channel and southern North Sea, but also in attacking fringe targets, occasional surprise raids on ports like Bremen, Rotterdam or Brest, and some of the industrial targets in the Pas de Calais.

ERP 110
23 Apr.

In April 1941 the ERP Committee agreed that ultimately the light bomber squadrons should be reduced to a minimum.

That could not happen yet, because the forthcoming supply of pilots and American light bombers would produce a surplus which could only be dealt with by forming light bomber squadrons.

A.M.S.O's estimate was a compulsory formation of seven Boston III squadrons before the end of 1941, and the subsequent programme would depend on the extent to which we were compelled to use these American light bombers until sufficient heavies were available for light bombers to be dispensed with altogether.

ERP 117
17 May

There were, in May, two Blenheim squadrons of Bomber Command on loan to R.A.F. Northern Ireland - Nos. 226 and 88 Squadrons. Originally these were both to have rearmed with Boston IIs, for which purpose 50 of these aircraft had been earmarked. But wastage in Fighter Command Boston squadrons had reduced the number available, and it was decided not to use Boston IIs for the bomber squadrons, but to re-arm them with Boston IIIs, of which 780 were on order for the metropolitan forces, from the United States.

ERP 118
4 July.

By the beginning of June No. 226 Squadron had been brought back from Northern Ireland to rearm with the Boston IIIs, but these were not yet suitably converted for day

DBOps to
C-in-C
20 July.

bombing on this side of the Atlantic. The principal modifications needed were:- installation of T.R.9 and inter-communication, I.F.F. and approved compass; bonding of outer wing tanks and oxygen pipes; a bracket modification for front guns; and an increase in fuel capacity. Trial installations were, on 20 July, only just beginning, and in any case only 72

/aircraft

SECRET

aircraft had so far arrived in this country. Deliveries of modified aircraft to squadrons were not in prospect for some weeks.

There had been, meanwhile, some spirited bidding from the Commands for these Boston IIIs, and Fighter Command had already been given a claim on 80 of them for turbin-lite and intruder work, though I.I.A.P. now proposed to deliver the bomber version concurrently. During July No. 88 Squadron was brought back from Northern Ireland and was allotted eight unmodified aircraft for training and conversion purposes, while remaining operational on their Blenheims. Three more squadrons of No. 2 Group were to convert as Boston IIIs became available.

HQBC Admin
ORB Appx.
B.2.

DBOps to
C-in-C
20 July

ERP 128
Appx. A.

An allotment programme drawn up in August fore-shadowed the provision, between July 1941 and December 1942 of 1,650 light bombers for the metropolitan theatre, consisting of 750 Blenheims, 350 Mosquitos and 550 Boston IIIs, the latter commitment, however, including 500 for intruders and turbin-lite. This left 50 only for Bomber Command, and a virtual end to the large-scale conversion to this type of aircraft.

RECF/DO/6.
25 June.

As for the Mosquitos, as early as 25 June the C-in-C Bomber Command asked C.A.S. to secure the allotment of some of these aircraft, reviving a request made in February on the ground that they would earn a better dividend with Bomber Command than with Photographic Reconnaissance Units. C.A.S. replied that no Mosquitos had yet been delivered to the Service; three were expected in the following week, but it would take 21 days to convert them to carry bombs. The question was deferred until after P.R.U. experience had been gained. C.A.S. did, however, press for increased production of Mosquitos to enable Bomber Command to form and maintain three or four squadrons in addition to the night fighters and P.R.U.

/aircraft

aircraft commitment. He informed the C-in-C on 1 July that for the purpose of planning the first squadron, he could assume the first 20 aircraft would arrive in six weeks from 1 August 1941, though he probably would not actually receive them.

The Inspector-General of the Air Force had strongly advocated production of the Mosquito in large numbers, as the best thing of its kind in sight.

I.G./597
30 June.

By the end of July deliveries to the Service had started and of a total of 250 ordered, the first 10 were to go to P.R.U., the next 10 to Bomber Command, the next 180 as fighters, and the last 50 as bombers. The first 10 were expected in Bomber Command sometime in September or October, on the completion of modifications.

ERP 123
28 July.

The E.R.P. Committee in September asked that the Ministry of Aircraft Production should accelerate Mosquito production to a level of 200 airframes per month by December 1942.

ERP 21st
18 Sept.

Meanwhile preparations were made in Bomber Command to receive the first Mosquitos at Swanton Morley for training and maintenance experience, pending the return from Malta of the squadron selected (No. 105). The first two Mosquitos were delivered in November, and a few more by the end of the year.

HQBC ORB
Ops.
5 July.

HQBC ORB
Admin.
13 Nov.

When, in November 1941, No. 2 Group was relieved of its day bombing commitment, with the concurrence of the Cabinet, after severe casualties, it was envisaged that its squadrons might return to limited operations against shipping, alongside Coastal Command, when converted to Boston Mk IIIs., and full reversion was anticipated when it obtained Mosquitos. The primary role envisaged for the Mosquito was that of daylight harassing attacks on built-up areas in Germany to such depths of penetration as experience might prove to be feasible. Until it became available in increasing numbers, and until resources

S.46368/II.
136A.

/were

-23-

were sufficient to meet a reasonable scale of wastage, operations were to be limited to build up strength.

The story of the successor to the Blenheim, outlined above, gives the key to the development of the light bomber force during the period. As already shown, No. 2 Group possessed eight squadrons of Blenheim IV's on 1 June 1941, including No. 226, which was brought back from Northern Ireland to re-equip with Bostons, but remained on Blenheims for the rest of the summer; but excluding No. 88 Squadron (still in Northern Ireland), No. 98 Squadron (still in Iceland) and No. 114 Squadron (operating until August under Coastal Command at Leuchars.) No. 98 was soon reduced to a "number only" basis, but No. 88 returned, as stated above, in July, bringing the number of operational Blenheim squadrons up to ten.

Throughout the summer, however, these ten squadrons were depleted owing to the necessity of operating one squadron each month from Malta against shipping bound for North Africa -- a commitment that involved the absence of two squadrons from No. 2 Group, owing to the time taken to reach Malta and to return to this country.

Once the "Channel Stop" was set up, the whole-time effort of one squadron was diverted to this commitment, on a "fire brigade" basis.

By November No. 88 had received a few unmodified Boston IIIs, and No. 226 was still without any. Venturas and Mitchells were now in prospect as replacements for the Blenheim, though in January No. 107 also converted from Blenheims to Boston IIIs. Not until 12 February, when the German battle-cruisers made their escape from Brest, were the Bostons in action. On that occasion No. 226 Squadron operated 6 Bostons, and No. 88 Squadron 4. On 26 February the official return by No. 2 Group showed the following strengths:- 88 Sqdn 10

/Bostons

ERP 163
13 Jan.

2G/ORB
26 Feb.

Bostons; 107 Sqdn, 12 Bostons; 226 Sqdn, 12 Bostons.

Meanwhile the Blenheim squadrons were being depleted.

In October No. 18 Squadron's flying crews were detached to the Middle East; in January No. 21's crews went likewise; and in mid-February No. 139 Squadron was sent to the Far East and Nos. 82 and 110 to India. Nos. 88, 226 and 107 had converted to Bostons and No. 105 to Mosquitos, leaving only No. 114 operational on Blenheims, mainly on night intruder work. This type of sortie by Blenheims was continued until 17/18 August 1942 when Blenheims operated for the last time in Bomber Command.

4. - THE SUPPLY OF TRAINED AIR-CREWS.

It is not proposed, in this narrative, to deal with the problems in which Bomber Command was involved as a result of the need to expand the training organisation behind its first line -- except by way of passing reference. This subject is fully treated in the Air Historical Branch narrative on "Training", particularly in the chapters on "The Expansion of Air Crew Training, PP 165-191. 1934-42," which deal with Bomber O.T.U.s and Flying Training PP 143-165. Schools.

It is pointed out, in that volume, that by the summer of 1941 the shortage of pilots had disappeared, in spite of the delays and handicaps imposed during the previous year by the lack of advanced trainers. When, during the summer and autumn of 1941, the forecasts of large output of operational aircraft proved unjustified, and expansion was not attained, a large surplus of pilots began to appear. Before that time a deadlock had been reached for the simple reason that so many instructors and so many aircraft were needed for training that they could be supplied only from, or at the expense of, the first line they were needed to expand. In April 1941, when the demand for expansion was insistent, and the production outlook optimistic, the experiment of producing more crews by cutting down the amount

of O.T.U. training for pilots was tried. With minor modifications, which are dealt with in full, this policy remained in force during the summer, autumn and winter 1941 -- a period of much unfavourable flying weather -- but it was not a success and accentuated the problem. Though O.T.U.s were now intended to train pilots in six weeks to take their place in operational squadrons, they were in fact taking up to twelve weeks, or else were sending them out partially trained. Squadrons became diluted, during autumn 1941, with half-trained men, and became incapable of successful or sustained operations. This dilution greatly aggravated the rate of wastage in the first line, owing to the high crash-rate occurring on operational sorties. There were few bombers to replace this wastage, to expand the first line and to increase the O.T.U.s.

One temporary solution was the policy of conservation until spring 1942 which was impressed on the Command from the highest level, as had been shown in Part I. of this narrative; but avoidable accidents continued to occur even in weather conditions which favoured operations, and all the development of Flying Control and homing aids could not materially ease the position. By November squadrons could accept no more crews from O.T.U.s, and the flow of bomber crews through the training organisation was blocked.

Towards the end of the year new schemes, constituting a "New Deal" were evolved, for lengthening both pre-O.T.U. and O.T.U. flying training, while the over-dilution in the squadrons was eased by stopping, in November, the flow of experienced crews to the Middle East, these being drawn thereafter from O.T.U.s. This helped matters, though expansion of course was still hampered by the necessity of transferring whole squadrons, or detachments, for duty in the Middle East, India and the Far East -- commitments which increased after

/the

the Far East conflict began, in December.

The O.T.U. problem itself remained, and to this end the Inspector General recommended expansion of the O.T.U. syllabus to ensure full training. A new basis of 45 hours per pilot at O.T.U.s was approved, with a programme providing for a week's ground instruction plus a flying course of eight, ten or twelve weeks according to the season. This again threatened the programme of expansion, and the only way out was eventually taken -- the abandonment of the system of two pilots per aircraft. At one stroke it was possible to halve the amount of pilot training needed, and also the number of aircraft required, an unwelcome change but a necessary one. It was accepted at the end of February, 1942, by the new C-in-C., A/M Harris, subject to certain important stipulations, and at the same time he urged even higher standards of training than the New Deal envisaged.

5. - OPERATIONAL EFFORT OF THE COMMAND

A Peak in Sorties and Bomb-lift.

The inability of Bomber Command to expand materially during the period was reflected in its inability to maintain a high degree of operational effort in face of extreme difficulties. During June, July and August, 1941, the effort was certainly intensified considerably. In each of these three months the tonnage of bombs dropped was 50% higher than in the best month up to June. The figure reached was about 4,300 tons a month, compared with 2,800 tons in May 1941. For the first time, also, 4,000 sorties a month were made, compared with 3,000 a month in Summer 1940 and 1,700 a month in the winter of 1940-41. The increase in sorties was surpassed by the increase in bomb-lift for two reasons -- the increasing, though still slight, use of heavy aircraft and the greater bomb-lift achieved through restriction of range during the summer nights.

/Even

Even during the intensified period of bombing, from June to August, the number of medium plus heavy bombers available with crews for operations averaged only 400 a night, against an I.E. of nearly 700⁽¹⁾. This rather low average was due to four reasons. Firstly, the heavy squadrons were far below strength. Secondly, only 60% of crews in squadrons were fit for operations. Thirdly, serviceability stood normally at about 65%. Fourthly, it was impossible to absorb surplus crews in one squadron on to the surplus aircraft in another, so that total figures for the Command of aircraft and crews available gave an illusionary idea of the size of the force available. About 20% of effort was lost in this way. An attempt was made in No. 5 Group to prevent this by keeping the level of crews well above the number of aircraft, but this could only become widespread with substantially increased numbers of trained personnel. No. 5 Group persevered during the winter of 1941-2, but conditions never favoured a scientific analysis of the results achieved. The position in respect of crew strength did improve. Shorter O.T.U. courses increased the squadron population in late summer, but, against this, wastage was exceeding expectations. The training programme had been calculated on a wastage figure of $2\frac{1}{2}$ crews per squadron per month, and this was now proving an under-estimate.

Moreover, nearly 40% of squadrons' flying time was at this period absorbed by advanced training necessary to compensate for the shorter O.T.U. courses -- such as bringing forward freshmen to operational standard, training them in blind approach and air gunnery -- and to convert them to heavy bombers.

Finally, each month the pressing requirements of

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(1) The position is shown month by month at Appendix C.

the Middle East drained 30 medium crews and 30 light crews from the metropolitan striking force.

There was another, and over-riding factor which limited the operational effort -- the weather. At this time the C-in-C's aim was to strike a good balance between operational effort and the needs of expansion. This could be done in theory if each squadron operated one night in three, trained one night and rested one night. For the sake of a greater operational effort the training night was in abeyance during the moon period, however; and the aim was, given good weather, that 50% of the force would operate each night in the moon period and 33% in the dark period, with occasional 100% efforts in the moon period and from 75-100% in the dark period, when the weather was particularly promising.

In fact, during the summer of 1941 there was only one night in each month when the whole force operated, this being during the moon period. On roughly three nights in each month, two-thirds of the force went out. On seven to ten nights half the force operated. On four to seven nights one third operated. On the remaining nights, varying from nine to fifteen a month, there was a small, harassing scale of attack, or no operations at all. The cancellation of all operations occurred only when there appeared to be no chance of finding any targets in Germany or elsewhere, or when weather conditions were likely to result in aircraft being lost or crashing.

By later standards the meteorological information concerning weather prospects over the Continent was far from satisfactory. This was due to the lack of sufficient and reliable meteorological flights, and not to any failure on the part of the forecasters, who did extremely well when called on for forecasts of weather at home bases or on long overseas passages over which information was available.

During June and July 1941 the forecasts available to the

/C-in-C

C-in-C and his group commanders indicated good weather on only three moonlight nights and one dark night. On 28 nights they foretold "moderate or poor" weather over Germany; on 20 nights "bad"; and on nine nights they held out so little promise that no operations were undertaken.

CS/10488
21 Aug.

Ibid.
Min. 17.

The effort actually put out amounted to roughly five sorties a month for each I.E. aircraft, and about seven sorties a month for each serviceable aircraft. The C-in-C was easily able to convince the Air Staff that this was a reasonable figure, judged by the factors that limited it and in comparison with the G.A.F. effort; and in fact the conclusion arrived at was that it was even too high a figure to be maintained in view of the losses that were occurring. On the other hand, the Air Staff saw that continuity of effort was being attempted at perhaps too great a cost, since it resulted in inability to employ the maximum scale of effort on the few nights when weather was good. The C-in-C calculated that to sacrifice continuity in the hope of putting out more sorties on good nights would mean an overall reduction of 15% in sorties flown, and the Air Staff made it clear that such a reduction was acceptable if it meant that more accurate target-finding would result.

Ibid.
21a.
18 Sept.

C.A.S., in fact, recorded that he grudged the loss of valuable crews and aircraft on expeditions in such weather that they resulted only in bombing on E.T.A., whereas on some nights when the weather proved good only a handful of aircraft went out. He agreed that the paramount consideration was the weight of bombs dropped on good targets, rather than the number of sorties made. A reduction of effort could also be justified if it achieved a better standard of training, which would in turn reduce casualties and so accelerate expansion.

The C-in-C was asked to restrict his effort to harassing attacks on a small scale whenever weather forecasts

/indicated

indicated that large scale bombing would be for the most part indiscriminate, or that a high rate of wastage would be incurred.

This was the first definite pronouncement of a return to the policy of conservation which had been followed in the previous winter. In the autumn of 1941 the average effort fell from 4,000 sorties (4,300 tons) to 2,500 sorties (2,600 tons) a month, and in the winter to 1,500 sorties (1,500 tons). (For purposes of comparison Bomber Command's peak achievement during the war was 21,000 sorties (67,000 tons) in March 1945. The policy of conservation of the bomber force will be treated more fully in the following section.

6. - CONSERVATION -- AN OVER-RIDING POLICY

(i) Concern over Casualties.

It is now necessary to examine the causes of the policy of conservation which was re-imposed on the bomber force during the winter of 1941-1942, and which became the chief factor restricting the bombing of Germany. So much was admitted by the Secretary of State for Air, in a Memorandum prepared by C.A.S., on 7 February 1942 -- a document which quoted the other restricting factor as the diversion of nearly 40% of the limited effort available to the attack of the warships at Brest.

Previously, a moderate policy of conservation had been ordered in February 1941, when the War Cabinet made it clear, through the Prime Minister, that they did not wish bombing operations to be undertaken when weather conditions were unfavourable, as they had proved to be on 11/12 February 1941 through fog developing very quickly over this country.

By the summer of 1941 heavy losses were regarded as inevitably to be borne on occasions -- as, for instance, on 28/29 June and 29/30 June, and again in the first week of July. On the latter occasion the Prime Minister expressed, in the

/War

WM (41)
17th.
13 Feb.

WM (41)
64th.
30th June

WM (41)
68th
10 July

War Cabinet, the view that the pressure of our air attacks on the Western Front must be kept up, at any rate for the time, in spite of losses that might be sustained. However, he suggested it might be undesirable to attack continuously targets that had specially strong A.A. defences - a pronouncement which was followed by a decision of Air Staff to select smaller railway targets under the main bombing directive.⁽¹⁾

During the summer casualty figures rose. In May 1941 the total wastage figure for night operations had been 3.9% (missing and seriously damaged); in June it was 4.4%; in July 5.8% and in August 7.7%. Attention was drawn to these figures not only in the Air Ministry but by the Ministry of Aircraft Production. Sir Henry Tizard, of the latter Ministry, produced a paper on 12 August 1941, dealing with bomber production, wastage and effort, in which he pointed out the unwisdom of assuming we might incur in night operations less than 5% complete casualties to aircraft and less than 10% damaged but repairable. Comparable figures for Blenheims might be not less than 6.2% complete casualties and 20% for repair. It was clear how much the striking effort depended on keeping casualties as low as possible and how much depended on the efficiency of the repair organisation. With the estimate of 5% minimum casualties C.A.S. expressed agreement on 13 August, and foreshadowed steps to discuss the best organisation for economical application of the bomber effort.

(ii) Increasing Wastage

In this same month, August 1941, the higher scale of effort began to wear itself out. During that month 525 aircraft were struck off the strength of Bomber Command owing to battle casualties or training accidents. Bomber production of all types, except American, was only 331 in the same period. By early September, Bomber squadrons were deficient of 132 Wellingtons, 63 Hampdens and 24 Whitleys while gross wastage

(1) See page 79.

CS.10488
Min 17.

/from

from battle casualties, from accidents on return from operations, and from crashes during training - was still rising.

WM 84(41)
3. 19 Aug

The battle casualties were undoubtedly due in the main to the enemy's improving defences, and particularly the equipping of the belt of searchlights which was installed along a line roughly parallel to the Frisian, Dutch and Belgian coastline, covering the approach to Western Germany, and the increase of heavy guns at large towns. In July the figure for night bombing aircraft missing had risen to the highest level attained so far in 1941 (2.6%). This was due to the prevalence of light nights, particularly over Northern Germany, which were a big help to intercepting fighters. Nearly half the interceptions reported by crews who returned to tell the tale had been turned into attacks, and a quarter of the attacks resulted in damage to our bombers. By August the "missing" figure rose to 3.5%, and this increase was ascribed to the still increasing effectiveness of interception by night fighters.

WM 84(41)
3. 19 Aug.

On 19 August 1941 C.A.S. reported to the War Cabinet that the loss of 107 bombers since the month opened, mostly on German targets, had been partly due to treacherous weather, though there was no doubt enemy flak and searchlights had been strengthened. The Cabinet agreed with a view expressed by the Prime Minister that our attacks should not be pressed too hard if the weather was unfavourable, and consideration should be given to the attack of less heavily defended targets.

ORS/BC.
Report
No. 15.

In September the searchlight was recognised as an effective menace to our bombers, for nearly 70% of reported fighter attacks were occurring when our bombers were illuminated. The night fighter was becoming a force to be reckoned with, and, as an immediate counter-measure, Bomber Command began at the end of August to operate its own intruders - usually Hampdens which bombed aerodromes or searchlight concentrations along the bomber routes. These were operated

/consistently .

SECRET

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RECP/DO/6.
23 Sept.

consistently from the beginning of October.

The C-in-C, assuming that the enemy was using radar to control guns and searchlights, wanted to make experiments such as dropping metallic objects to confuse the enemy's system, but more evidence was needed that radar control was in force, and it was feared, by Sir Henry Tizard and the R.D.F. Policy Committee, that the experiments might help the enemy to beat our own defences.

All that could be done was to try to improve the concentration of the bomber force in time and space, so that a greater degree of saturation would limit the effectiveness of the enemy's guns, searchlights and fighters. Even so, the aim was far short of what was achieved much later, with the aid of navigational devices. Whereas in October 1944 over 600 night bombers could attack Duisburg in half-an-hour, in October 1942 the Command was aiming at only 100 per hour in the moon and 80 per hour in the non-moon period. But for various reasons -- notably the difficulty of obtaining precision in airmanship and tactical experience, in a force where the average experience of crews was about 300 hours' flying -- this degree of concentration was rarely attained.

RECP/DO/6.
16 Oct.CS/10488
4 Sept.

Casualties on return from night operations were heavy in August and September, (146 and 140 aircraft respectively) and a Committee of Enquiry into specific cases established that the main cause was fuel shortage. This in turn was often due to incorrect appreciation of the weather, and also to mishandling engine controls, errors in approach or landing in poor visibility, and damage from enemy action. However, the "safe ranges" for bomber aircraft with given amounts of fuel were reviewed, due allowance being made for the new factors, such as less experienced pilots and increased evasive action. In the case of Hampdens advanced bases in East Anglia were recognised as a necessity when making deep

BG/S.25328

/penetration

penetration and these were organised. Further instruction was given to pilots in squadrons on the proper ways of handling engine controls. Flying control organisation was pressed forward, and recommendations for modifications to the Hampden fuel system and to the Wellington windscreen were urged.

The most startling aspect of the wastage rate was the losses on operations, particularly on nights when weather troubles were experienced. The worst instances co-incided with the rare occasions when maximum scales of effort were employed. On 7/8 September, 303 aircraft were sent out, principally to Berlin and Kiel, and 20 were lost.

WM (41)111
11 Nov.

(iii) A. Climax Reached

There was an improvement during October, but the night operations of 7/8 November caused a recurrence of strong feeling in the Cabinet, and a stronger line was taken. Briefly, as the Cabinet were told on 11 November 1941, by C.A.S., 400 bombers had been despatched to Germany, of which 37 were lost. The main reason was weather conditions.

ORS/BC
194.
2 Dec.

The C-in-C's report on these operations, called for by Mr. Churchill, eventually showed that, on a night when the mass of convection cloud, with severe icing, reached a greater altitude than was expected over the North Sea, and extended further over the Continent than forecast, Whitleys sustained heavy losses on Berlin, and Wellingtons on Mannheim, owing to the shortage of fuel. Results reported from the squadrons showed the standard of long-range flying and engine manipulation to have been very variable, and the C-in-C contended that the conditions on that night, though safe for the majority of crews, defeated pilots whose knowledge of long-range flying was defective. He submitted proposals for the improvement in basic training of pilots to improve matters.

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Before this report was drawn up, however, the Prime Minister had discussed the results of the night 7/8 November

/directly

RECP/DO/6
10 Nov.

directly with the C.-in-C. at Chequers on the evening after the losses occurred. Writing demi-officially to C.A.S. on 10 November describing this interview, the C-in-C said the Prime Minister "as usual took the line that we must avoid these casualties, which we could not afford, and as usual I took the line that if one operated at all one was bound, every now and then, to get disproportionate results.....However, the P.M. became very insistent on my conserving and building up strength and said that he was giving me a definite direction on this, that I should use smaller forces and confine myself to shorter range targets."

(iv) Ruling by the Prime Minister.

WM (41)
111th.
11 Nov.

At the Cabinet meeting, the Prime Minister said instructions had several times been given that attacks should not be pressed too hard if the weather was unfavourable. In battle, many losses must be faced; but it was undesirable to expose our aircraft to extreme hazards in the course of routine operations. Clear instructions must be given to the Commanders-in-Chief that in planning operations they should take into account the need to build up our Air Force so as to have a stronger force available in the spring.

PM 1038/1.
11 Nov.

The Prime Minister also took up the matter with the Secretary of State for Air and C.A.S., dealing also with fighter losses by day over France. Two fighter sweeps a month, combined with continued attacks on shipping, should suffice, instead of four. He had deprecated forcing the night bombing of Germany without due regard to weather conditions. There was no particular point, at that time, in bombing Berlin^{*}. We could not afford losses on that scale in view of the failure of the American bomber programme. Losses which were acceptable in a battle or for

/some

* Berlin had been one of the targets on 7/8 November, after a lapse of nearly two months.

some decisive military objective ought not to be incurred purely as a matter of routine. There was no need to fight the weather and the enemy at the same time.

The Prime Minister finally declared:- "It is now the duty of both Fighter and Bomber Commands to regather their strength for the spring".

A.H.B.
ID/2/320
31A.

Sir Archibald Sinclair gave an assurance, in reply, that there had been no "forcing" of the night bombing of Germany without regard to weather. During the 100 nights up to 12/13 November the A.O.C.-in-C. had cancelled all bombing on 32 occasions and sent out fewer than 100 aircraft on 25 other occasions, thereby showing he was not trying to fight the very bad weather. The bombing of Germany was not regarded as a matter of routine, but, by both C-in-C and Air Staff, as a long-drawn out battle against the industry, transportation and morale of Germany, which they looked upon as decisive military objectives, although not yet of the kind that could be captured or destroyed in a single operation. Until the force was larger and could achieve a higher degree of concentrated damage on each operation, continuity was essential.

After discussing the unreliability of weather forecasting, Sir Archibald wrote:- I hope that your minute is not intended to put anything like a ban on the bombing of Berlin when weather conditions permit it."

CS/10488
13 Nov.

The instruction sent to the C-in-C on 13 November conveyed the sense of the War Cabinet's attitude, requesting that the necessity of building up a strong force to be available by the spring of next year should be borne in mind in planning operations. Whilst it was realised that in vital operations heavy losses must be faced, it was considered undesirable in present circumstances and in the course of normal operations, that attacks should be pressed unduly, especially if weather conditions were unfavourable or if our

/aircraft

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aircraft were likely to be exposed to extreme hazards.

The Prime Minister, when shown a copy of this instruction, underlined the words about conserving the force till spring, marked them "A" and wrote:- "The emphasis should be as at A."

He had previously called for a forecast of bombing for November, (1) and upon this he wrote, on 14 November 1941, "C.A.S.:- This programme should only be carried out subject to favourable weather conditions. The losses lately have been too heavy." An assurance to this effect was given, in reply.

(v) The Drain on Light Bombers.

As for day operations, the wastage was even greater than by night. Taking 1941 as a whole, the percentage of day bombers missing was 5.3% compared with 2.5% for night bombers. Blenheims suffered mostly from the intensified flak defences of their German shipping quarries, and the heavy bombers from interception by day fighters over the Continent, while the losses were swollen whenever a spectacular day-time raid by either heavies, mediums, light bombers, or mixed forces, was undertaken. The wastage of day bombers in 1941 was, in fact, the highest overall casualty rate incurred by the Command after 1939.

The drain on Blenheims was proving most serious, owing to the requirements of No. 2 Group and of the squadrons in the Middle East, precedence being given to the latter in view of the existing strategic situation, especially the desire to attack German shipping between Malta and the African coast. On 29 August 1941 Air Ministry instructed Bomber Command that home Blenheims should be conserved as far as possible, and two days later V.C.A.S. explained to the A.O.C.-in-C. that the Prime Minister had been concerned about the severity of the losses as exemplified by casualties in

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Cyph.Sig.
X.106.

(1) See page No. 139.

the spectacular low-level attack on Rotterdam in July 1941, when four out of 37 Blenheims were lost. On being reminded that the attack formed part of the plan to hit the Germans in the West and so relieve the Russian front, (which fulfilled the Prime Minister's criterion that a first-class strategic object must be served for pilots to be pressed hard,) Mr. Churchill had written:-
"The devotion and gallantry of the attacks on Rotterdam and other objectives are beyond all praise. The Charge of the Light Brigade at Balaclava is eclipsed in brightness by these almost daily deeds of fame."

(vi) Implications of the War with Japan.

A further factor contributing to the necessity for conserving aircraft arose early in December, 1941, when Japan and the United States entered the war. The broad implications of this new phase were sketched by C.A.S. in a note to Commanders-in-Chief on 12 December 1941. The Japanese war caused the U.S. to place an embargo on the export of munitions to the Allies, yet we were trying to fulfil our promise to Russia, to send reinforcements to the Far East, and to maintain at full strength the units in the forefront of battle in the Middle East. Not only were our liabilities heavier than before, but our expectations had been seriously upset. It was absolutely essential therefore that home Commands should make a supreme effort to help by avoiding all unnecessary losses.

Commanders-in-Chief were asked to give their personal attention every day to that vital need, by querying all casualties which might in any way be attributable to carelessness, taking undue weather risks, unnecessary flying, insufficient training, and so on. The crew position was satisfactory, so it was possible to take time over training; the enemy was not pressing on that front; and the weather risks could be reduced. Maintenance and repair personnel could contribute by making it a point of honour that no aircraft was sent away from the station that could be

/repaired

repaired there, and that all repairs were carried out at the greatest possible speed consistent with good workmanship. Senior officers on the staffs were to be taken into confidence but publicity was to be avoided.

(vii) Undesirable Publicity.

The reference to publicity raises a point in regard to current Press comments on the R.A.F. bombing effort against Germany proper, as it was affected by the weather at this period - comments which could not be answered frankly for fear of disclosing the current policy of conservation. Critical passages occurred in two journals -- first, the Sunday Express of 2 November 1941, and the Spectator dated 26 December 1941, and V.C.A.S. suggested that the Secretary of State might wish to make some comment. The reasons for the falling off in effort were, in V.C.A.S.'s opinion, apart from the weather, a fall in anticipated production here and in America, and preoccupation with still more important targets. Everyone seemed to think that the supply of aircraft was inexhaustible and that every one of them could bomb in two directions at once on the same night.

The Secretary of State commented, on 25 December:- "There are other things, especially production disappointment and naval weakness -- but it is mainly the weather." He would have liked a striking comparison to put over to the public. The C-in-C had described the weather as the worst for 68 years, but the meteorologists would not endorse this comment.

(viii) Results of the Policy.

The inevitable result of the instruction to conserve aircraft, coupled with the continuance of doubtful or bad weather, was to reduce considerably both the number of nights on which bombers went out, and the size of forces employed. Instead of the normal of about 25 operational nights per

month, the number fell in November to 15 (only 9 after the disaster of the 7/8) in December to 11, rising in January to 20, but falling again in February to 15, with a further decline in the total of sorties. The entire force was never out on one night. Only four times during the winter, after 7/8 November, did the scale of effort exceed 200 aircraft (7/8 December, 27/28 December, 28/29 December and 5/6 January), and the usual scale was something less than 100 aircraft, including minelaying sorties, freshmen bombing invasion ports, and leaflet raids by O.T.U.s.

Deep penetration was rarely made, so that during these four months of the year when the nights were longest, the bomber offensive was heavily retarded in the interests of its future well-being.

A.M.W.R.
Manual
of bomber
operations

Taking the nine months under review as a whole, Bomber Command flew 24,778 sorties, of which 15,951 were against German targets. The tonnage of bombs dropped was 25,813, of which 18,438 were reported fallen on Germany. Including the small daylight effort, this meant an average of only 59 sorties and 67 tons every 24-hours on Germany itself, and 32 sorties and 27 tons on other missions.

Up to 1 June 1941 Bomber Command had flown 34,030 sorties (8.7% of its war effort) and dropped 22,258 tons of bombs (2.3% of its war effort). After nine months of continual strain, these figures had risen by the end of February 1942 to 58,808 sorties (14.9%) and 48,071 tons (5%). The number of aircraft missing by 1 June 1941 was 718 (8.2% of the war total) and by 28 February 1942 1,533 (17.7%).

Not until February 1942 was there any prospect of a resumption of the offensive on any appreciable scale. With better weather in prospect, a new aid to navigation, better flying control over our own country, and a reduction of the defensive commitment, the way then seemed open for the big task to be resumed. First, however, several doubts in influential

places had to be resolved by stringent enquiry into the ability of the bomber force to make its mark on the enemy. This aspect belongs to the next phase of the narrative:- "Experiment and Expansion."

7. STANDARDS OF BOMBING ACCURACY

(i) Evidence of Night Photography.

If, as had been shown, only 67 tons of bombs fell on Germany during the average day and night, during the nine months from June 1941 to February 1942, occasions for devastation were, obviously, very few.

In fact, the accuracy of bombing was admitted by the C-in-C to be appallingly low; and the percentage of those 67 tons finding their target was only slight.

The first scientific analysis of night bombing accuracy was made by a member of the War cabinet staff at the close of the intensified bombing period. The method used was to study the photographs taken with bombing during the period 2 June to 25 July. This system was later developed to a very high degree and used constantly as a check on the accuracy of air crews; and also, pending fuller evidence from photographic reconnaissance in daylight, as an indication of the effectiveness of the attacks.

BC/S.24886/Nav.
13 Sept.

This first inquiry, covering photographs obtained from about 10% of the sorties on 100 separate raids (some 650 photographs) showed that only one sortie in five despatched arrived within five miles of its target. Since a much greater proportion (rarely fewer than 75%) claimed to have found their objective, it was obvious crews were being gravely misled and mistaken in their target identification. Only one in three who claimed to have attacked was within 5 miles. Over French ports two out of three were within 5 miles; over Germany generally only one out of four; and over the Ruhr

/alone

alone, one out of ten. In the full moon period two out of five claiming to have attacked could prove their claim; in the new moon only one out of fifteen. When there was no haze present, over one half were correct; when there was thick haze, only one out of fifteen.

During this period, haze had prevailed. Taking cloud and visibility generally into consideration, good nights had represented 6.6% of the total, moderate nights 46%, bad nights 32.4% and blank nights 15%.

It will be noted that the Ruhr, the seat and base of transportation in Western Germany was the area in which target location was most faulty.

Obviously the standard of target finding must be remedied, and until new and better methods were introduced this improvement could only come in the realms of DR navigation, astro and use of wireless aids. The C-in-C instructed Groups to kill any tendency to complacency which had grown up because of the known difficulties of night navigation. One of the disquieting features was the proportion of failures by crews who genuinely thought they had bombed their target. Either they had not been properly briefed, and did not know what to look for; or their navigation was at fault; or they had taken insufficient time to find their target. All these faults could be overcome, and Groups were instructed to investigate the errors disclosed by their night photographs.

HQBC
Admin.
ORB. 18
Sept.

The Operational Research Section established at Bomber Command during September 1941 turned its attention to the same grave problem, and found that during August to October only 15% of all sorties actually bombed within five miles, mainly owing to the fact that on about 45% of the nights when operations were possible weather conditions prevented positive identification of targets.

ORS Rept.No. 22.

Under the best weather conditions, with moonlight,

/good

good visibility and no cloud, 50% of sorties could be expected, (on the basis of current standards) to reach their target areas in German coastal towns, 45% in Prussia and on the Upper Rhine, and only 30% on the Ruhr. With haze or 5/10ths cloud and moonlight these expectations dropped to 30% on the coast, 20% in Germany, and 15% in the Ruhr. In the dark period under good conditions the best attainable was 30% on the coast and 15% elsewhere; under bad conditions 15% on the coast and 10% elsewhere.

This report, showing clearly the adverse effect of cloud and particularly of haze, was sent to Groups with a request to improve matters. By the end of December 1941

BC/S.
23739

the supply of night cameras reached 75% of I.E. aircraft, and groups were instructed to improve the number of successful attempts to photograph targets, the results up to that time varying between groups from 75% to 50% of aircraft equipped.

ORS.
S.
45.

There was, in fact, an improvement in target location during the period from December to February, due partly to the fact that snow often covered the ground and made identification less difficult. Taken all round, the average success on dark nights was now brought up to the level achieved on bright nights during the period June-November 1941; but still, only under the best (and rarest) weather conditions was useful concentration achieved. Up to 70% of aircraft claiming attack were now within 5 miles of their targets in good conditions, and 25% within one mile. Without the moon these percentages dropped to 50% and 20%; in moderate haze or cloud the success was only half the clear rate within 5 miles, and a few aircraft within one mile. In poor conditions, as before, not more than 10% were within 5 miles.

ORS/S.19.

The question why crews were so badly misled was also tackled, and inquiry elicited that rivers were a particularly

/unreliable

unreliable landmark at night and should not be depended on except in conjunction with other features. In a sample batch of interrogations, not one case of a river alone having given target identification was proved to be justified. Coastline was rather more reliable but could be deceptive also -- for example, the docks at Emden were wrongly identified by a pilot who was actually 61 miles away, over Bremerhaven; and the Pointe des Espagnols at Brest was mistaken for the Pointe de l'Amerique, 6 miles further east.

(ii) Causes of Failure.

The general opinion was that inability to master the problem of target-finding in conditions of poor visibility was due to lack of training. This in turn was due to the drive to produce crews in quantity rather than crews of quality, and to the fact that the new crews were called upon to fly aircraft that were larger and more difficult to control. The inadequacy of the standard of freshman crew arriving at the squadron might have been offset in part, given experienced personnel as flight commanders; but experienced personnel were lacking in the operational units. Most flight commanders were of pilot officer rank, and lacked the power to exercise sufficient supervision over reinforcement crews. The A.O.C. of No. 3 Group (A/V/M Baldwin) considered that the subsidiary causes of failure, after lack of training, were the inaccuracy of weather forecasts concerning conditions over the Continent; the effectiveness of defences; and the lack of adequate technical aids such as efficient illuminating flares and navigational beams.

The picture he drew of the almost nightly experience of his bomber crews was as follows:- Often, after contending with untrue forecasts of wind strength and direction, with no possibility of pin-pointing, excessive icing and cloud conditions, a crew would arrive at their destination on E.T.A. to find the area under 10/10ths. cover. It was impossible to check whether

/Their

JEAB/39/DO/
AIR 7 Dec.

their navigation was accurate or not, and all that remained was to return to base with their bomb-load, using such wireless aids as were available, with the faint hope that on the way back some suitable last resort target might be seen through a gap in the cloud cover. Alternatively, they could carry out a "nuisance raid", bombing on E.T.A.

If they did bomb on E.T.A., there was a danger that it might become a habit and they might fail to exercise sufficient perseverance to locate their objective.

The A.O.C. No. 5 Group, A/V/M Slessor, was equally concerned with the prevalence of the practice of bombing on E.T.A., and preferred to allot first and even second alternative targets which his crews should try to locate. If they then failed, he thought they should try, according to the amount of petrol and darkness left to them, to find some town, village or building -- something breakable in Germany -- and to hit it, coming down low if necessary, if their target was undefended. He thought crews were bombing from too great altitude, and there was little doubt in his mind that a good many more bombs had fallen into open fields than into towns, and that the actual objectives suffered very little damage.

Already he was coming to the conclusion, too, that only the better crews could find a target; the others needed to have it lit up for them. The better crews might be given more flares and sent out first, to light up the target for the others. Here was the essence of the pathfinding policy which eventually was adopted in summer 1942.

(iii) An early Radar Aid.

In a very modest and unspectacular way, soon to be overshadowed by the arrival of "Gee", an early navigational radar aid -- the Trinity beam -- was tried out in December 1941. It was really a fore-runner of Oboe, the successful

/target

JCS/DO/86/16
Air.2 July.

target-finder of the later war years, and it was tried out only against the battle-cruisers at Brest. It involved flying a beam, and experienced beam-investigation pilots from No. 109 (S.D.) squadron were borrowed to fly as second pilots in Stirlings of No. 3 Group, co-operating with the first pilot. A converted I.F.F. set - the 'broody hen' - produced a signal for the bomb-release. Judged by later standards it was a primitive device, and the best claimed for it was that one bomb fell between the target battle-cruiser and the quay.

8. - SUMMARY AND CONCLUSIONS.

During the period from June 1941 to February 1942 Bomber Command had to make shift with a force inadequate in numbers, equipment and technique to bring to bear on Germany any sustained, incisive attack. While wider horizons were being set as limits to the ultimate expansion, the force was falling seriously into arrears on its short-term expansion programme. This was due principally to the shortage of bombers arriving from British and American industrial plants, but also to the serious losses incurred both on operations and in training. The vicious circle in training, by which the operational groups had to denude themselves of experienced men in order to train their successors, had been broken by the decision to produce more crews in shorter courses; but it had closed afresh, and even more viciously, by providing semi-trained crews who were not able to surmount the difficulties confronting them. Bombing remained inaccurate; wastage remained high; expansion remained an unrealised ideal. After a spell of severe casualties, aggravated by the worst flying weather for many years, orders had to be given that the force must be nursed through the winter to rise in fresh strength in the spring.

Nevertheless, within the limits allowed, the Command kept up its harassing scale of attack on Germany and other

/targets

-47-

targets, sometimes scoring a point of real value and all the time presenting the Germans with the sure knowledge that more and more adequate defences were needed in the West. The Luftwaffe had to plan quickly and comprehensively for defence.

Morale in the Command remained high; and the knowledge that much of the effort previously devoted by science to our own defence was about to be turned to the purposes of attack was a source of great relief.

At the end of our period, there were imminent the preparations to "tram-line" Western Germany with "Gee," and so give direct aid to navigation; the decision to develop incendiary attacks on a large scale; the re-building of the training organisation on a sounder basis; the cutting down of pilot commitments by abolishing the second pilot as a regular crew-member; the arrival of the Lancaster and the improved effort of the other heavy bombers; and the sure prospect of better weather. All foretold a brighter future for the bomber force.

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PART II. THE NEW OFFENSIVE AND ITS OUTCOME.

1. THE OFFENSIVE AIM.

(i) The Claims of Defence.

Although in 1940, and again in January 1941, the strategic offensive against German oil resources gave to Bomber Command a nominal offensive task in line with its traditional function, many of the attacks on German soil during the year that followed Dunkirk were in reality defensive sorties. As an earlier stage of this narrative will have shown, the attempt to deal Germany a crippling blow through her oil supplies came to comparatively little owing to the tactical difficulties involved. In March 1941 the Chiefs of Staff agreed that the impact of events had altered the situation, and, as the Prime Minister had directed at the end of February that our efforts for the four following months should be devoted to defeating the U-boat and Focke-Wulf aircraft used in the attack on our shipping, they accepted the fact that oil objectives must take lower priority.

COS (41)
100th (7)
17 March

WM (41)
21st
27 Feb.

Directly or indirectly, the Battle of the Atlantic was the underlying cause of by far the great majority of operational sorties during these months, while those responsible for directing policy waited patiently for an improvement in the strategic situation.

(ii) Review of Future Strategy.

The opportunity to declare their offensive aims soon occurred. At the instance of the Prime Minister, the Future Operational Planning Section had undertaken, in March 1941, to draw up a long-term review of future strategy. Their labours resulted in the publication in June of a document which became known as the "Future Strategy Paper", and was regarded by the Chiefs of Staff as a valuable background for the whole planning and conduct of the war, including direction of the American war effort.

COS (41)
152.
11 March

JP (41)
444.
14 June

COS (41)
225th (4)
26 June.

JP (41) 444
14 June
para.17

This review examined the state of our own economy and the condition of the enemy. Invasion it considered unlikely until either Hitler considered our defences and morale had been sufficiently weakened to justify the attempt, or until Germany's situation had so deteriorated that he must rely upon a gambler's throw to win the war. If invasion were attempted we must use the whole bomber force to help repel the enemy, since final victory depended on the security of the United Kingdom.

Ibid.
para.199

(It is worth noting that this expression of opinion was published some eight days before the enemy turned to attack Russia, and at a time when it was evident some release of tension in that quarter was imminent).

Ibid.
para.199

Our chief national concern was declared to be the winning of the Battle of the Atlantic, and most of our bombing effort had been directed to that end. The acceptance of such a policy for the employment of the bomber force should be regarded only as a temporary measure to achieve immediate results, and we should endeavour to return to the offensive at the earliest opportunity. It was still recognised, however, that the defensive requirements of our vital areas and communications would absorb practically all our navy, army and shipping, and a large proportion of our air force for some time to come.

Ibid.
para.89

Ibid.
para.152

Important as would be the results on German economy if we were able to stop leaks through our blockade, no less effective might be, and more certainly within our powers were, the attacks the bomber force could make on the whole machinery of production and distribution within Germany. As the strength of the bomber force grew, its effect on economic targets was expected to prove the decisive factor in a German collapse.

Ibid.
para.153

(iii) The Prospective Force.

Ibid.
para.193

The future planners were careful to point out that

/the

the bombing offensive already in progress could not be held in leash, to be released in one shattering blow. It must be a continuous offensive of attrition, progressive and cumulative as our resources grew. It must therefore have proper priority, bearing always in mind the requirements of our own security, otherwise the offensive would never be sufficiently heavy to reduce Germany to a state which would again permit the employment of our land forces on the Continent.

Ibid.
para. 194.

By the end of 1941 it was hoped to deliver a weight of bombs against Germany comparable to what they could at that time (June 1941) deliver against us. By the spring of 1942 that scale should be exceeded, and thereafter predominance should increase progressively.

Ibid.
para. 196.

The aim was a numerical superiority of at least two to one, giving us a considerably higher superiority in total bomb lift. With such a force we should be able to sustain a devastating offensive, and yet meet inevitable defensive requirements. Instead of the already authorized target force of 1,648 heavy bombers and 1,056 medium bombers by spring 1942, a new expansion scheme would aim at a figure of 4,000 heavy bombers by spring 1943, and

Ibid.
para. 85.

Ibid.
para. 197

for this purpose a detailed investigation of the productive capacity of this country and the U.S.A. was in progress.

Ibid.
para. 198

(iv) War on Economy and Morale.

Ibid.
para. 7

The war (at that stage) appeared to the planners as a war of economy and morale -- a war on two fronts, for the attack on morale was as important as the attack on economy. In some ways they were interdependent, economic distress producing lowered morale, and loss of spirit increasing economic strain; in some ways independent, for men might lose the will to fight while the means still existed, or resources might come to an end while courage

was still high. To these two objectives the efforts of both sides must primarily be directed, and by their results in these spheres must military operations be judged.

(v) The Attack on Morale.

Ibid.
para. 175

On the British side reports on morale gave no cause at that time for anxiety. The immediate effect of heavy bombing might be to produce a numbed fatalistic attitude, but with customary resilience the British character soon reasserted itself. Both material and psychological results of heavy bombing were, however, cumulative in effect, and it would be fatally complacent if every possible step was not taken to strengthen British morale against even greater strain.

Ibid.
para. 181

The authors of the review regarded as significant that German civilian morale, despite the apparently favourable course of the war, showed signs of inherent weaknesses. The only examples quoted were dissatisfaction with the lack of clothing, shoes, soap and other goods, dissatisfaction at privileges accorded to Nazi party members, and fear of intensified R.A.F. bombing. It was thought the winter lull in most parts of Germany assuaged people's fears, but a recent burst of A.R.P. activity had "probably tended to stimulate this fear."

Ibid.
para. 182

Ibid.
para. 183

Ibid.
para. 183

The point was made that neutral observers believed that intensified and concentrated bombing might have very tangible effects on morale, but if the reality were no worse than the anticipation, morale might be at least temporarily strengthened. So the cardinal issue on morale was stated:-

"Bombing for moral effect must be severe. If it is inconclusive it defeats its own end."

Ibid.
para. 203

The planners made no extravagant claims for the attack on morale. The moral effect of bombing was, they confessed, an imponderable factor. It could be argued that concentrated attacks on chief centres of population would

not only have repercussions on the German armed forces and industrial population, but would soon produce internal disruption. But against that must be set not only the drastic measures which the Nazi regime had taken in anticipation of such attacks on morale, but also the huge bomber effort needed to attack enough towns with sufficient intensity to produce a breakdown. With our existing strength it was unlikely we could achieve results to justify selecting morale as the primary aim. The opportunities of combining a main focus of attack with a deliberate attempt to destroy industrial centres should, however, be exploited to the full on every possible occasion.

Ibid.
para. 204

Morale was to be borne in mind as a secondary target, which might prove profitable as a long-term objective for the expanded force and when German morale was less robust.

(vi) The Attack on Economy.

As far as tactical considerations allowed, the air offensive should, in the planners' view, be directed against targets which would do most to assist the pressure of our economic blockade. Oil and industries were discarded -- oil for reasons set out later, and industries because even in the heavy concentration to be found in the Ruhr the key points of each vital industry were numerous, widely separated, and difficult to identify and hit¹ while we were restricted to night bombing.

It was in transportation that the weakest links in the economic system were discerned, and the target whose destruction would do most damage to that system were the focal points on railways and canals. The best rail targets lay in Western Germany, within effective range of our bombers throughout the year; they were situated mainly adjacent to workers' dwellings and congested areas where the moral effect of air bombardment would be most marked;

1. see page 41.

they were large and comparatively easy to find on moonlight nights; and the opinion was expressed that the strength available would make the attacks profitable.

(vii) Summary of Future Strategy.

JP (41)
444.
para. 206

The Future Strategy review was, of course, only an elaborate aide-memoire, serving as a background of information and opinion for short and long term planning, but it clearly set out current faith in the bombing offensive as an essential preliminary to any action aimed at the final collapse of Germany; it asserted that the building up and rapid development of an adequate bomber force must not be prejudiced by the building up of other forces, the employment of which would be dependent on the success of bombing. On the other hand it uttered a warning that if the Germans developed such successful counters to our night bombing as shortly to weaken our principal offensive weapon, we should immediately use all our bombing resources while we could. Meanwhile transportation was to be the primary and morale the secondary target for the force; once expanded, and when morale showed signs of weakening, it should take morale as the primary target; and the defensive should only be undertaken when security at home was seriously threatened.

Thus a policy for immediate application had been hammered out, in the interests of Great Britain still fighting the lone battle against Germany and was ready to hand at the very moment in June 1941 when Germany turned to attack Russia. Now this cut-and-dried policy was seen to be well fitted to the very laudable desire to help the new ally by attacking the enemy on his first front - the Western Theatre - while he occupied himself with his second front - Russia. The night bombing policy could not have been better devised, with the means in hand, and it only remained to ascertain what additional effort could be employed by day to the same purpose.

In the following pages, the inauguration of the Transportation and Morale programme is more fully pursued.

2. ATTACK ON TRANSPORTATION AND MORALE.

(i) Scheme to Isolate the Ruhr.

A draft plan for an attack on transportation in Western Germany, which was intended to isolate the heavy industries of the Ruhr from the rest of Germany, was put forward by the Director of Bomber Operations in May 1941. The arguments advanced in its favour followed some of the lines adopted in the Future Strategy paper, though stress was laid particularly on the threat it would offer to the German economic and military machine.

It was accepted as a principle that the attack of a specific target at night could only be undertaken with success in clear moonlight, from which it followed that for three weeks in each month it was possible to obtain satisfactory results only by heavy, concentrated and continuous area attacks of large working class and industrial areas in carefully selected towns. Moreover, it was stipulated that they should lie on or near water if they were to be attacked except with the greatest difficulty.

It was intended to attack by moonlight nine main railway centres through which the great bulk of the heavy traffic on the Ruhr-Rhineland system had to pass. Weather conditions might frequently prevent the attack of these particular targets, and a number of other rail centres further afield but directly related to them were offered, these being suitable for area attack on dark, moonless nights. Road transport could best be attacked through the destruction of the two principal synthetic rubber plants at Schopau and Huls. Certain canal and river objectives were also advocated, and the entire plan is dealt with more fully later.

S.46368/II
Enc.90A

(ii) Morale as a Rival Aim.

The transportation plan was widely discussed by the Chiefs of Staff in the Air Ministry and at a conference with the A.O.C.-in-C., Bomber Command (Sir Richard Peirse), at the same time as a memorandum by Lord Trenchard urging that the attack of German morale should be undertaken at once and in force. This memorandum -- "on the present war situation mainly in so far as it relates to air" -- was submitted to the Chiefs of Staff at the Prime Minister's direction 28 May 1941, with a view to later consideration by the Defence Committee.

Lord Trenchard's thesis was based on the belief that morale was ingrained in the British, but was the Germans' weakest point. He found a different outlook among the enemy civil population -- neither allowed nor offering to take part in rescue or restoration, virtually imprisoned in their shelters or in the bombed area, passive and a prey to hysteria and panic. He believed not more than 1% of bombs hit the military targets at which they were aimed. When dropped in Norway, Holland, Belgium or France the 99% killed old allies and did Germany no harm; if dropped in Germany they helped to kill, damage, frighten or interfere with Germans, and were doing useful work.

Lord Trenchard asked for "absolute priority" for long-range bombers, backed by sufficient priority for supply, training and materials. On every night and most days some bombing of military targets in Germany must take place, even if only one aircraft was sent. There must be more day bombing, even though such a policy might necessitate fairly heavy casualties.

The Chiefs of Staff reactions were sympathetic with the general theme, but cautious as to its application.

The Chief of Air Staff, in his Commentary, qualified the priority due to the bomber force, stipulating that this should

COS (41)
86 (0)
19 May

COS (41)
195th (9)
30 May

COS (41)
94 (0)

be done only after providing the minimum force of fighters, general reconnaissance and Fleet Air Arm aircraft essential for security. In view of the relatively small bomber force, and the shortage of bombers suitable for daylight operations, a sustained attack on a limited number of objectives should be made.

COS (41)
95 (0)

The Chief of the Imperial General Staff (Sir John Dill) considered the force insufficient at that time to break down morale, and thought the Battle of the Atlantic should have an over-riding priority in operations. The defence of this country and essential areas overseas must be provided for before the building of the desired bomber force.

COS (41)
96 (0)

The First Sea Lord (Sir Dudley Pound) thought the paper a complete over-statement. Read literally it would seem unlikely we should get adequate air forces for the Battle of the Atlantic or that the Army would get any aircraft for co-operation. The principle needed intelligent interpretation. Priorities should be discussed as their need arose.

COS (41)
114 (0)
7 June

These views were accordingly collated into a reply, on 7 June 1941, to the Prime Minister. The Chiefs Staff jointly pointed out that the morale of the civil population could be affected by air attack in two ways -- by fear of death or mutilation, and indirectly by disturbance of the normal life of the community. To achieve decisive effect by the first was beyond present resources, but there was a sufficient force to affect very seriously the efficiency of the German railways on which the economic life, the heavy industry and military moves of the enemy largely depended. The proximity of workers' houses and industrial districts was also mentioned as introducing the risk of bodily injury.

(iii) Decision to Attack Transportation.

Ibid.
para. 5

The Chiefs of Staff recommended to the Prime Minister that, subject to the requirements of security (including the Battle of the Atlantic) bombing should be directed as follows:-

- (a) As a short-term policy against transportation targets, to achieve dislocation, coupled with the maximum direct effect on morale.
- (b) As a long-term policy, when the force was large enough, direct attack of the morale of the German people.

PM.D. 184/1
8 June

On receipt of these recommendations the Prime Minister next day, in a personal minute, asked whether (a) was to be interpreted as "concentrating upon the marshalling yards business, in contradistinction to oil, enemy warships, U-boat and aircraft factories and residential districts in large cities?" If so, it seemed to him a very bleak and restricted policy. He advocated drawing up a definite programme for each month and carrying it out as far as possible, rather than trying to formulate a policy expressed in terms of priority, and called for records of the bombing effort in March, April and May.

COs (41)
208th. (8)
11 June

The Chiefs of Staff, in reply, advocated that operations should be conducted in accordance with a strategic aim and not in a hand to mouth manner. The enemy's failure in that respect had been to our immense advantage, since there was ample experience to judge what would have been the effect had he maintained a consistent policy such as a concentration on our ports or on the aero-engine industry. They claimed that the record of attacks during the past three months on Battle of Atlantic targets proved it was practicable to maintain a definite aim. The morale and keenness of bomber crews would be sustained at a far higher pitch if they knew their operations were part of a comprehensive plan.

/The

The disruption of transportation on Western Germany, as a short term policy, was based on several main factors -- already quoted above¹ -- and they submitted it was not a restricted policy. The targets covered a wide area of Germany and allowed for all weather conditions. They pointed out, also, that the kind of attack on rail centres they were now contemplating bore no relation to the series of harassing attacks delivered earlier in the war on marshalling yards at Hamm and on German oil.

COS (41)
216th (2)
18 June Even before the recommendations went to the Defence Committee they evidently caused some misgivings at the Admiralty, for on 18th June, at the Chiefs of Staff meeting, Sir Dudley Pound referred his colleagues "to the bombing policy which we have now adopted" and expressed a fear that it might interfere with the priority hitherto allotted to Battle of the Atlantic targets. He was most anxious that there should be attacks on submarine building yards, since each submarine put into service might be regarded as equivalent to the loss of 100,000 tons of our shipping. He put forward a suggestion that a proportion -- say, one-third -- of the bomber effort might be earmarked for the Battle of the Atlantic, and could be switched from U-boat building targets to the naval units at Brest as circumstances dictated. The Chief of Air Staff contended, however, that the policy covered the Battle of the Atlantic, and that weather and moon conditions would ensure that a fair proportion would be so employed.

DO (41)
44th. (3b)
25 June The Defence Committee on 25 June 1941 received the Chiefs of Staff remarks on Lord Trenchard's memorandum, and approved the new bombing policy which had arisen from their discussion of this theme.

S.46368/II
Enc.90A The directive embodying this decision was officially sent to A.O.C.-in-C., Bomber Command on 9 July 1941,

by which time he had carried out several attacks in conformity with the plan. He was requested, "subject to essential diversions which might occur from time to time....to direct the main effort of the bomber force, until further instructions, towards dislocating the German transportation system, and to destroying the morale of the civil population as a whole, and of the industrial workers in particular." The diversions envisaged by the Air Staff were attacks on those objectives, the destruction of which was of immediate importance in the light of the current situation -- in particular, the naval units at Brest -- and the submarine building yards and bases were to be attacked periodically, especially when this could be done without missing good opportunities of bombing the primary targets, and when special opportunity offered or necessity might require.

(iv) Views of the A.O.C.-in-C.

The C.-in-C. had already taken an opportunity to express his views on the subject of this policy. This occurred at a meeting to discuss the plan, and to hear Lord Trenchard's views, at which the Chief of Air Staff presided on 2 June 1941. It was at that meeting that the Director of Plans was asked to draft the paper on which the Chiefs of Staff and the Defence Committee discussed the new policy.

The C.-in-C. expressed himself against that part of Lord Trenchard's case which rested on the sending out of "nuisance raids". In the C.-in-C's view, to achieve maximum moral effect material damage had to be done. Whether morale or the transportation system was regarded as the primary target the actual effect would be the same. Rail centres would be attacked as precise targets on the six or so nights a month when good visibility could be expected; on the other nights the bombs would simply drop into the area round the selected aiming point. The few rail centres not

SECRET

in populous areas should be dealt with by concentrated attack under conditions of good visibility.

S.46368/II
Enc. 90A

3. OPERATIONS AGAINST TRANSPORT AND MORALE.

(i) The Plan in Detail.

The Plan to attack Transportation and Morale, described in detail in an appendix to the directive of 9 June 1941, set forth, for attack on clear, moonlight nights only, nine specific rail targets as the primary objective, and listed their special qualifications, as follows:- Hamm (the most important and largest rail centre in Germany); Osnabruck (heavy traffic between the Ruhr and N.W. Germany, and also on the main line between N. Germany and Holland); Soest (heavy traffic between the Ruhr and Central Germany); Schwerte (heavy traffic between the Ruhr and Central and S.E. Germany); Cologne/Kalk Nord and Cologne/Gereon, Duisburg/Hochfeld Sud, and Dusseldorf/Derendorf (carrying a large proportion of the rail traffic between the Ruhr and the Low Countries, France, S.W. Germany and Italy) and Duisburg/Ruhrort (the largest internal rail-water transshipment port in Europe.)

It was considered that the stoppage of Hamm, Osnabruck, Soest and Schwerte would effectively prevent traffic movement between the Ruhr and North, Central and Eastern Germany; and that the stoppage of Cologne, Duisburg and Dusseldorf would effectively prevent traffic movement between the Ruhr, the Low Countries, France and Italy. The enemy's extended lines of communication reaching to E. and S.E. Europe and Russia, to Libya and Spain, would also be affected.

It was realised that stoppage at any one centre could be relieved by the diversion of traffic through another town in the same group of targets, as listed in

/the

the preceding paragraphs. The worst dislocation would result from the stoppage of all the centres in one group before the other group was dealt with, and attacks were to be carried out on that principle as far as tactical conditions allowed.

(ii) Areas for Attack in Darkness.

Of the nine targets mentioned above, the last five were situated on water, and were therefore regarded as suitable for concentrated and continuous area attack on moonless nights, though this fact did not reduce the importance of attacking the rail centres in the areas concerned on bright nights. Cologne was regarded as the most suitable, being an important centre of industry and rail and river communications, with a population of 940,000. Düsseldorf was included as an important centre of the west German steel and machine industry, and a rail centre, with 520,000 people. Duisburg was nominated as an important industrial area with a rail centre in the middle, its population of 450,000 including those in the Ruhrort industrial area which embraced the largest inland port in Europe and rail communications on a similar scale.

The Plan next scheduled the Dortmund-Ems and Ems-Weser Canals and the River Rhine as important to the scheme because they connected the whole area already described to N.W., Central and Southern Germany. The most suitable points for bombing attacks on the canals were the raised banks lying north of the Ruhr, where there was believed to be neither A.A. nor balloon barrage to prevent low approach. The element of surprise was so important for any attack of this kind, that it would be necessary to detail a force sufficiently large to complete the operation in one attack. The Rhine was to be sown with mines at a later date, the desired weapon being at this time incomplete.

S.46368/II
21 Nov.

This information was amplified in November, and specific locks and raised banks were offered for attack, while it was suggested the Rothensee ship-lifting plant constituted a complete bottleneck for heavy water-borne traffic from the Ruhr to East Germany and, it was thought, could be damaged for several months by a near miss with a 4,000-lb. or 1,000-lb. bomb.

S.46368/II
Enc. 94B.

Another water target offered for attack (on 22 July 1941 was the combined port of Emden and Delfzijl, through which the bulk of Swedish iron ore was said to pass to the Ruhr. Emden was already a "Battle of the Atlantic" target, but in this case it was felt an attack on the town would have an important psychological effect which would react on the port's efficiency. The direct attack of road transportation was not considered feasible, but the two rubber plants at Schopau and Huls were offered, as the early destruction of the Huls plant might have an "immediate influence on operations in the Russian theatre." To provide for occasions when weather conditions over the primary Ruhr and Rhineland targets were unsuitable, and to prevent too great concentration of A.A. and night fighter defences in that area, six main towns with important rail centres were chosen as secondary targets. These were:- Hamburg, Bremen, Hanover, Frankfurt, Mannheim and Stuttgart, of which Hamburg, Bremen, Mannheim and Stuttgart were already marked out as Battle of the Atlantic targets.

(iii) Weight of Attack.

In view of the remarks of the Chiefs of Staff on the weight of attack intended it is interesting to see that the Plan discussed the question of weight of attack necessary to affect the rail system, in the light of bombing experience in this country. It was estimated that 15 tons of 50-lb. bombs, dropped on the targets,¹ would lead to a
/complete

¹. In spring, 1944, most of the French and Belgian marshalling yards - many then small targets - were given between 400 and 2,000 tons of bombs each. - War Room Manual of B.C.Ops. 1939-45. pp. 85-106.

complete stoppage for at least a week at any of the nine main centres, and would cause widespread dislocation and delay to a degree which might extend to weeks or months. The use of about 10% delay action bombs was recommended, especially if these were set to explode at frequent intervals, so hampering fire-fighting, rail repair and traffic organisation.

(iv) Conflict of Evidence.

The plan to strike at precision targets in Western Germany when moonlight prevailed, and to attack area targets in the non-moon periods, was designed as an "all-weather" programme, but broke down owing to the limitations of the force, especially in face of the cloud and haze which persisted night after night over these very targets, and the weather at home bases, which imposed too great demands on inadequately-trained crews and sent the wastage figures soaring.

So adverse were the conditions in which the offensive was attempted that it might be thought the attack should have been called off completely until the difficulties were surmountable. There were two main reasons why this could not be done:- firstly, it was realised on all sides that the bomber force could only become proficient by constant effort, and that experience was necessary as well as more strength and better equipment, before the full offensive could be unleashed; secondly, the picture was never painted as gloomily at that time as it now appears in retrospect.

It must be remembered that until the spread of night cameras over a sufficient part of the force to give representative results, crews' reports of what they believed they had accomplished were treated as reliable. Proved cases of error, usually revealed by daylight photographic reconnaissance, came as a great shock, and at first threw doubt on the efficiency of the photographic interpretation rather than on the visual reports.

/Furthermore,

-65-

Furthermore, the crews' belief usually received a good measure of confirmation from the bulk of "intelligence reports" percolating through at a lapse of a week or two. These told often of heavy damage and lengthy disruption of transport and other facilities; or bolstered up current belief in the effect of that imponderable weapon the attack on morale, giving rise to an impression that whenever our Wellingtons, Hampdens and Whitleys flew by night the population of Western Germany took to its shelters, cowered under an incessant rain of high explosive, and plotted rebellion against the hated Nazi regime.

There could be no greater contrast imaginable than that between the enthusiastic reports received in bomber crew-rooms and the "travellers' tales" from Germany via Sweden or Switzerland on the one hand, and on the other hand the bleak pictures of scarcely-damaged towns brought back by P.R.U. Spitfires and the tell-tale night photographs of fields and open country. Rarely can there have been a campaign in which intelligence was so conflicting. Realists in the Service accepted the irrefutable "evidence in camera", and, under the cloak of complacent publicity which kept the British people happy, went to work on schemes to improve matters and build up a force that could do what the optimists imagined was already being done. Ultimately, under A/M Harris, the camera was accepted as the only reliable witness of the ultimate location of the bombfall.

(v) Rail Targets N.E. of the Ruhr.

The offensive against transportation began in the June full-moon period, and some of the precision targets N.E. of the Ruhr, which had been allotted in advance to individual Groups, were raised by forces of rather less than 100 medium bombers each. Marshalling

Appendix
H(i)

/yards

yards at Hamm, Osnabruck, Soest and Schwerte were attempted on 12/13 June, and Schwerte was repeated next night. All lay under such thick haze that neither the targets nor the towns themselves were damaged. No better success attended an attack on Hamm under the July full-moon, with haze, and the same conditions foiled three successive attempts on Osnabruck, and one of two raids on Bielefeld. The other on Bielefeld, by 29 Wellingtons on 5/6 July, aided by some Hampdens which apparently attacked this target in mistake for Osnabruck, caused considerable damage in the N.E. part of Bielefeld. Intelligence sources mentioned the Dürkopp works, formerly making sewing-machines, as severely hit and a military camp five miles away burnt out. Hamm was attempted once more in the August moon, without appreciable result.

These failures were partly off-set by a successful attack on main facilities at Munster in the July moon. The target was actually attacked on four successive nights, and on the 5/6 and 7/8 July, crews found excellent visibility. On both nights photography produced excellent, and hitherto unparalleled results, while daylight photos. taken on 7 July showed that the bombers (up to 89 Wellingtons and Whitleys on the first night and up to 34 Wellingtons on the second) had damaged an industrial area on the S.E. of the town, without damaging the town to any extent, had raised excellent fires over about 20 acres of the inland port, burnt out two trains to the north of the main station and damaged the tracks and signalling. Further photographs on 11 and 12 July, after the series of attacks was over, showed the damage to be heavy and widespread, by the standards of those days; involving demolition of buildings by two 4,000-lb. bombs, and gutting by fire in nine areas of the inland port.

Few aircraft were lost in these attacks, and the conclusion arrived at was that enemy fighters caused more

/casualties

P.I.S.I.R.
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Appx.D. 1707

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Int/Tac.
Reports.

Int/Tac.
19/42.

casualties than flak. By contrast, in the only other attack on Münster, in bad weather on 28/29 January 1942, five out of 84 Wellingtons and Hampdens were lost on a night when ice, snow and static were so bad that enemy night fighters were recalled. This attack was a failure.

These comparatively small attacks in summer 1941, some 16 in all, involved nearly 1,000 sorties, nearly 1,000 tons of bombs claimed successfully dropped, and a "missing" figure of 2.5% of sorties despatched. The encouraging damage at Münster and the lesser damage at Bielefeld were virtually the only concrete result. They stressed the virtual impossibility of hitting rail targets in conditions of haze and, possibly, industrial smoke, but, in the case of Münster, they showed the beginnings of a successful technique of area attack in force. Had there been a larger percentage of incendiary bombs than 14% the area of devastation would most likely have been greater. As it was, these attacks on the marshalling yards N.E. of the Ruhr did not prevent traffic movement from the Ruhr to North, Central and Eastern Germany, as was hoped.

(vi) Cologne.

Cologne was regarded as the most suitable area for attack in darkness, as well as containing two vital marshalling yards at Kalk/Nord and Gereon which were key points on the route from the Ruhr to the Low Countries, France and Italy. Results of the bombing of Cologne are well worth detailed study because German records are available (1) showing the damage caused in the raids of this period. Three months after the end of this phase A/M Harris was to mount his famous 1,000 bomber raid on this city, to show what could be done given a sufficient force. Meanwhile, in the nine months from 1 June 1941 Cologne was attacked as a primary target at night on 33 /occasions

(1) Records of Luftschutzort I. Ordnung, Köln, in the possession of the British Home Office at Kensington.

occasions, including two spells in which it was raided on five successive nights. In round figures, the aircraft claiming effective sorties reported dropping, in those raids as a whole, 6,600 H.E. bombs and 147,000 incendiary bombs. But the city was never entirely free from cloud or haze, and it is not surprising to find from the German A.R.P. record (1) that the bomb census registered only about 1,100 H.E. incidents and 12,000 incendiaries - roughly 16% and 18% respectively, of the total claimed to have been dropped on the city. (It is worth noting here that in the 1,000 bomber raid of May 1942 the German census reports 60% of the H.E. and 22% of the incendiary load claimed by our aircraft), (2). Only once, on 7/8 July 1941, was a raid really effective.

During the nine months as a whole, bombs fell, in Cologne, on 63 industrial concerns, 41 transportation targets, 10 military installations and caused damage to 947 residential buildings. There were 53 major fires, 44 medium fires and 368 small fires. In 109 incidents, traffic on rail, tramway or road had to be diverted. Ten large factories suffered loss of production in varying degrees (as shown in Appendix "H") as did 8 medium and 6 small factories. Some 459 buildings had to be evacuated, often only temporarily, and these involved displacement for varying periods of 13,116 persons. As for casualties, 138 persons were killed and 277 injured, of whom 10 killed and 10 injured belonged to the armed forces and 4 killed and 14 injured belonged to Civil Defence services.

In every respect but one these figures, covering the whole nine months from June 1941 to February 1942 were totally eclipsed by the results of the Thousand Bomber Raid in 1 hr. 48 minutes on 30/31 May 1942. The only exception was the number of houses damaged or destroyed.

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- (1) Records of Luftschutzort I. Ordnung, Köln, in the possession of the British Home Office at Kensington.
 - (2) An analysis of the British claims and German records for Cologne in the period under review, and for the 1,000 bomber raid, appears at Appendix J.

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By far the largest proportion of the results gained in the nine months' period occurred during the July attacks: for instance, 51 of the 53 large fires happened in that month, 34 of the 44 medium fires and 167 of the 368 small fires, these figures being reflected also in the highest proportion of building evacuated and persons displaced.

To achieve this fairly small proportion of damage compared with the 1,000 bomber raid, 55 aircraft were lost, compared with 42 missing on 30/31 May. Sorties flown amounted to 2,010, compared with 1,047 on the great occasion. On the other hand only 111 heavies flew in the raids over 9 months, compared with 338 on 30/31 May.

The uneconomical nature of the style of attack at this time is now undeniable, and was then fairly accurately guessed.

(vii) Düsseldorf.

High in the list of priority transport targets for both moonlight-precision and area attack, Düsseldorf was chosen as the target for 150 bombers on the night 2/3 June, and for 20-100 bombers on ten more nights in the same month. Once again, there was not a single night when vertical visibility and cloud conditions permitted a

PISIR
861,885,
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Int/Tac.
2/3 June

Int/Tac.
11/12 June

I.T.R. 38.

successful attack and photographic cover on 6 and 21 June and 12 July disclosed no damage. Düsseldorf was by then heavily defended by flak, which caused considerable damage and two or three casualties on 2/3 June; and on 11/12 June the effectiveness of the searchlight belt used by night fighters over Holland accounted for some of the six aircraft missing out of 98 despatched. Otherwise losses were slight. At this time "sources" were reporting "one house in fifteen" hit in Düsseldorf itself, Lisbon refugees confirmed these tales, and the Ministry of

/Economic

I.T.R. 40.

Economic Warfare thought it reasonable to suppose that the important Rheinmetall Borsig armament and engineering works had received some damage. A later report put the total damage to date at "one florist's shop!" However, even after two more rather costly attacks in August and one each in October,

D.A.K. 1305.

November and December -- none of them in favourable weather -- the damage can have been only negligible. No photographic interpretation could be made until April, when the sum total of discoverable damage to date (there were no attacks in the early months of 1942) was 12 houses in the whole town and suburbs, and one factory.

(viii) Duisburg.

There is evidence that the early June attacks on Duisburg at least came near to reaching valuable objectives, though the weight of attack was obviously too small to be effective. After four such raids (none in conditions favourable to target identification) in which 180 tons of bombs were dropped, minor damage to buildings was photographed on 21 June, at all three marshalling yards -- Duisburg/Hochfeld, Hochfeld/Sud and Ruhrort. The Ministry of Economic Warfare considered that the mechanised yard at Ruhrort (the Western counterpart of Hamm) was working far below normal capacity. Reduced activity was also discerned in the docks of the inland port and this was ascribed to lack of coal, and this, in turn, to probable slackening in production or interference with transport facilities -- all very problematical.

I.T.R. 26

There were six more small attacks in July and August, including one on 18/19 August in which pin-points were claimed to have been located, but on 31 Aug. no new major damage

P.I. S.I.R. 1096 appeared from daylight cover. In a raid on 28/29 August, of 118 medium and heavy bombers sent to Duisburg, six failed to return and the flak in the Ruhr caused damage to a number of others. The target was attempted only once more, in October, and was then ignored till July 1942.

-71-

(ix) Dortmund.

PISIR 980 A few 4 Group Whitleys and Wellingtons were spared once during each of the summer full moon periods to attack Dortmund, and on 6/7 July one of these brought back a bombing photograph showing the marshalling yards at Suderich, but apart from this there was little evidence of success, and in April 1942, after a 200-ton raid, only a few incidents covering some damage to factories and warehouses could be discovered.

(x) Munchen Gladbach and Krefeld.

PISIR 1011 Of the rail communications on the west of the Ruhr, there is little to record, as raids were few and small on such towns as Munchen Gladbach and Krefeld. It is noteworthy that two Hampdens, on 7/8 July, taking the latter as an alternative target to the former, appeared not only to have hit the railway yards at Rheydt, but to have caused some serious incidents in the town itself.

(xi) Aachen.

ITR 27 One of the few successful area attacks of this period was achieved on the night of the July full-moon (9/10th) at Aachen. In spite of some haze, and small amounts of cloud, 70 medium bombers, comprising Whitleys and Wellingtons of No. 4 Group and Hampdens of No. 5 Group, produced results which were described by the Ministry of Economic Warfare as phenomenal by comparison with the results of earlier raids on other towns and the results achieved by the Luftwaffe over this country. The extent of the damage by fire appeared to be considerably greater than had hitherto been achieved, yet only 15 tons of incendiaries were dropped, with 75 tons of H.E. Most of the bombs fell in the centre of the city, causing severe destruction, with minor points of damage in all districts.

Ibid and PISIR 1003

/The

The damaged areas were estimated to amount to about 30% of the town proper, and in each area about 60-70% of the buildings were destroyed, and almost all the rest damaged. Probably water mains suffered heavily from bombing, for on 12 July the Aachener Anzeiger appealed for conservation of water. Gas mains were also seriously affected.

In the railway goods station, warehouses and other buildings were damaged, again by fire, over an area of about 13 acres -- a second example, coming soon after the successful raid on Münster -- of the value of attack by incendiaries.

Another small attack on Aachen on 5/6 August was said, by an intelligence source, to have resulted in the destruction of rubber stocks at the Englebert rubber works in Aachen, and the removal of remaining stocks to Liege.

The only other raid on Aachen, on 7/8 December, was reported to have resulted in the blocking of transport routes to Liege for 24 hours, but since this attack was made in conditions of 10/10ths cloud, and the next cover, in March 1942, revealed little trace of new damage in the town, there is no reason to suppose the December attempt was outstanding.

(xii) Hannover.

On the rail routes leading eastwards from the Ruhr to Berlin several towns were attacked during the summer 1941, among them Hannover, which the enemy was attempting to camouflage in May. He was seen to be altering the appearance of the large artificial lake, the main rail station, the Weser-Elbe canal branch and the Gummiwerke rubber factory. In June only a few sorties were attempted. On 14/15 July a force of medium and heavy bombers overcame the haze sufficiently to drop their bombs at isolated points in the target area, judging by night photographs they brought back; and on 12/13 and 14/15 August nearly 200 mediums claimed to have attacked Hannover with 230 tons of bombs, in moderate conditions of

/visibility.

ITR. 36.

ITR. 38.

PISIR
849

visibility. Cover on 20 August showed one long factory building in the town centre destroyed, some workers' dwellings demolished, but no major items of damage. After a small raid on 26/27 January the German Press announced the names of 21 persons killed, but Hannover's turn for heavy damage did not arrive until 1943 and 1944.

AHB ITH/84
P.49

(xiii) Brunswick and Magdeburg.

A little further to the east, Brunswick was attacked once, on 14/15 August, by 42 Hampdens of No. 5 Group, in cloudy conditions. When cover was eventually obtained on 2 October no damage was visible, nor did night photography suggest the town was located.

D.A.K. 1168

On the same railway lines from the Ruhr to Berlin, Dresden and the Russian Front, Magdeburg was the objective for three small forces during July and August, without any known result.

Int/Tac.
14/15 Aug.

On one occasion, 14/15 August, Hannover, Brunswick and Magdeburg were attacked simultaneously, with a total loss of 14 out of 286 bombers -- these casualties being symptomatic of the success the enemy was gaining when penetration east of 7°E. was attempted. His twin-engined night fighters met with considerable success over the area N.W. of the Ruhr and over the North Sea, and fighters and flak were each blamed for about half the losses.

(xiv) Kassel.

One of the few night bombing successes of the autumn was scored in a single raid against Kassel by less than 100 Wellingtons, Whitleys and Hampdens with only 80 tons of bombs on 8/9 September in moonlight, when the town had only slight protection from cloud and very little haze. The town was not heavily defended by flak, and night fighters met with no success at all, the bomber force returning intact.

The targets were the Henschel railway locomotive works and the Mittelfeld rail junction. Most of the bombers attacked from only 10-12,000 ft., and brought back 13 photographs showing fires burning in the centre of the town, and 22 other photographs showing that the area had been correctly located. When daylight prints were obtained on 21 Sept., it was seen that the main railway station had been hit on the south side, the roof being destroyed over a length of 120 yards, other railway buildings damaged and many other points of damage caused in the town, mainly just to the east of the station. As at Aachen and Münster, it appeared as if the A.R.P. services had been denuded of personnel and equipment transferred to towns that had been continually attacked. Once again fire played the biggest part in the destruction, though only 17 tons of incendiaries were dropped. To what extent rail and other transport services were disrupted there is no firm evidence. Censorship sources later reported that serious damage was inflicted, and that rail passengers had to use motor transport to by-pass some of the small stations on the east of Kassel. What befell goods traffic is not revealed.

(xv) Frankfurt and Mainz.

In the Upper Rhine and Main rail complex, Frankfurt was a well-favoured target. It was given four small-scale raids in July (one by a few heavies only in clear weather), four in August and one in the September full moon, so that up to 7 September, when the town was photographed, 457 aircraft had claimed to have attacked it with 448 tons of bombs. It now appeared that in the Osthafen at Frankfurt sheds, warehouses, roads, railway quays and a military workshop had been badly damaged. However, if any damage of a vital nature had been caused, it had been quickly repaired, for activity was seen to be normal. One more raid, of 130 medium bombers,

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PISIR
1125

DAK. 1153

ITR. 32

ITR. 33

ITR. 31

-75-

DA.K. 1129

was made on 12/13 September but only two night photographs suggested any possible measure of success. These Upper Rhine and Main targets were proving fairly costly, but weather causes played no small part.

DA.K. 1161

At this period Mainz was not taken as a primary target, but bombs occasionally fell there when crews could not find their main objectives. On 12/13 September at least three aircraft reported bombing Mainz, and twelve days later the main railway station was seen to be severely damaged and already under process of reconstruction.

(xvi) Mannheim - Ludwigshafen.

ITR. 31
and
PISIR 1107

Further up the Rhine from Mainz, the extensive communications targets at Mannheim and Ludwigshafen received a number of unsuccessful raids in July and August, amounting to nine in all, by nearly 600 sorties, and 520 tons of bombs were dropped in the attempts. As at Frankfurt, the damage revealed on 7 Sept. was not vital, though cover showed a small weight of bombs had fallen on the main station and marshalling yard. Weather conditions never favoured a successful attack, and losses were usually of the order of 3%, weather, fighters and flak contributing. In October and November there were two small raids, and a small amount of damage was done -- for instance, a celluloid factory previously damaged was now seen to be demolished. Throughout the period, intelligence contacts reported disturbance on the rail complex serving Ludwigshafen and Mannheim, affecting the trans-shipment of goods from the Rhine to the railway for passage to Italy, but no substantial confirmation was announced.

(xvii) Karlsruhe, Stuttgart and Nürnberg.

Consistent with results at other lightly-defended towns when the weather made target detail visible was the

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effect of a raid on Karlsruhe, capital of Baden, on 5/6 August 1941. There was actually no heavy flak in action, either on this night or on the next, when weather was bad. Good night photographic results were obtained on 5/6 August, and again in a third raid on 25/26 August. Daylight cover on 28 August showed that the main railway station had been substantially damaged, with some of the tracks, particularly those of the elevated section of the line half a mile west of the station. The railway repair organisation fitted temporary sections to the tracks while the foundations were being restored. The same prints tended to confirm reports of the main A.R.P. shelter having caved in, with considerable loss of life.

Two more raids, in mid-September, were at least partially successful, judging from night camera results; and photographs by day during the 24-hour interval between the raids showed half-a-dozen important works apparently inactive, though there was no conclusive evidence whether or not they had had their production interrupted.

Another attack on Karlsruhe was attempted on 1/2 October, but foiled by thick cloud and haze.

On the same night a small attack on Stuttgart came to nothing for the same reason, and, after the October moon was past, an attempt was made to hit Nurnberg. Over 150 medium and heavy bombers took part, in an effort to find the railway station, marshalling yard and Siemens Schuckert electrical works. The weather was clear, but, possibly owing to the action of a decoy, the weight of attack fell on a residential town, Schwabach, some 8 - 9 miles south of Nurnberg itself. The usual coloured reports from intelligence sources quoting direct hits on aluminium and electrical works were not borne out by daylight cover much later. Considering the favourable weather of this particular night,

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PISIR
1043 & 1083

PISIR
1089

ITR. 30

DA.K. 1139
and 1144

DA.K. 1173

-77-

the failure was something of a shock, and an attempt was made to retrieve the position two nights later, only to meet cloud, severe icing and poor visibility, so that only half the force of 80 bombers claimed to have found any target at all.

(xviii) Hüls.

A cardinal point in the policy of attacking transportation targets had been that road transport could be hit only through damage or destruction to synthetic rubber works and rubber stocks, especially after the opening of the Russian campaign. A few night bombers tried in vain to find the Hüls factory, in the north of the Ruhr, during the June moon. During July, the Ministry of Economic Warfare decided that the Schkoppau works at Leipzig, the only other known synthetic rubber works of any size and importance, was not yet in a stage of construction sufficiently advanced to warrant attack. The target value of Hüls was considered to be enhanced, and on 28th August the M.E.W. urged that damage there during the coming moon would do more than anything else to help the Russian forces. Accordingly 86 medium bombers attempted to find this target on 6/7 September, and were favoured with good weather; but the factory had been cleverly sited among the wooded parts of the North Ruhr and daylight reconnaissance afterwards discovered only one very doubtful point of damage.

In the October moon a fresh effort was made, again unsuccessfully, for on this occasion there was 10/10ths cloud, and daylight cover disclosed only six craters near by.

On 28/29 December, 65 Hampdens of No. 5 Group claimed to have found the target, assisted by clear weather and snow on the ground, and their contention was supported by the night photographic evidence. Moreover, photographs taken much later showed the removal of five cisterns or

/gas

TIC.
42nd.

TIC.
46th.

PISIR
1119 &
1122

ITR.40

gas holders, which it was thought might have been connected with an explosion observed during the raid. Evidence was, however, inconclusive.

(xix) Emden.

The port of Emden, coupled with the Dutch port of Delfziyl across the river, assumed greatly enhanced importance during summer 1941 for various reasons. In June iron ore shipments from Narvik and coal from Spitzbergen re-commenced, Emden being the port principally used, though Rotterdam and Bremen shared this traffic. In the same month it was discovered that submarines were being built at Emden. At the end of June, too, both ports were reported as busier than hitherto, probably owing to the opening of the campaign against Russia. It was, however, decided not to attack Delfziyl in view of the risks to the Dutch, but to use Emden during the autumn as a useful target when weather was unfavourable for deep penetration. Emden had received many attacks by a very few aircraft, including a successful early sortie in daylight by one Fortress on 26 July. However, only one raid of any size (47 medium bombers) was made during the summer (24/25 July), in which it appeared some buildings in the dock area were damaged. Up to 30 bombers attacked on various occasions in September, October and November, and again on 30 November/1 December a smallish effort dropped some bombs successfully on buildings in the Nordsee Werke, the Binnen Hafen, the Eisenkai, the engine round-house near the railway dock, and harbour workers' dwellings, the latter being severely damaged.

Emden became, indeed, a useful target at a time when the hazarding of bombers on difficult targets was out of favour. There were seven more small scale raids in January and two in February, in most of which craters proved that direct hits had been obtained on railway lines near the Verbindungs Kanal and the Industrie Hafen, while items of

/industrial

TIC.
38th

TIC.
47th

PISIR
1077

DA.K.
1207 &
1241

DA.K.1262
& 1276

industrial damaged occurred in the Nesserland district, but no evidence of effective interruption of rail services was supplied.

KS.6

At the end of the period an assessment of damage during 1941 rated the damage to shipbuilding, harbour dwellings and dockside activity as small, the industrial damage unlikely to have caused appreciable fall in production from any one factory; and little interruption probable on railways and other communications. Moreover, even the short trip to Emden involved our aircraft in considerable losses, amounting in January to 15 aircraft out of 250 despatched. In most cases night fighters, and the flak at Emden itself, were believed to have been the cause.

Int/Tac.
Reports

AHB/Ems/
99b

The only German record available contains a record of the duration of air raid alerts in the Emden Harbour area, and an estimate of the extent of loss of production, calculated in hours and minutes. This shows that between 1 June, 1941 and 28 February, 1942, alerts totalled 209, lasting $192\frac{3}{4}$ hours, and loss of production amounted to 63 hours 36 mins. i.e. alerts averaged 42 mins. per day and loss of production 14 mins.

(xx) Extension of Policy to Small Towns.

Although, in the discussions preceding the decision to adopt the Transportation and Morale plan, no support had been forthcoming for the suggestion that aircraft widely dispersed over small towns could assist in breaking down morale, and although authoritative opinion was that attacks must be heavy to achieve moral effect, this question was again raised, and in a remarkably short time. As has been seen in Part I, bomber casualties during the intensified period of attack during June, July and August caused a good deal of concern (1)
/and

(1) See pages 31-32

D.B.Ops.
Archive.
Enc. 60A

and following a War Cabinet decision on 19 August 1941 the Chief of Air Staff on 20 August instructed the Deputy Chief of Air Staff to consider whether part of the effort should not be distributed over towns less heavily defended than those that were then being attacked.

The Director of Bomber Operations, after a visit to Command, reported that the C.-in-C. was reluctant, at that early stage in the implementing of the new policy, to depart from the main aim. An extension of operations under the directive, against small towns on main railway routes was, however, discussed, and with this programme the Air Staff concurred on 30 August 1941

S.46368/II
Enc. 105A

It was now hoped, by attacking a number of towns on the same route on the same night, so to dislocate traffic as to cause a serious, though temporary, breakdown in communications; as well as to spread to small towns the attack on morale. Another advantage might be to force the enemy to disperse his defences more widely.

Eight routes leading from Western Germany towards Russia were considered -- namely, A. Hamm-Hannover-Berlin; B. Soest-Kreiensen-Halberstadt- (i) Magdeburg-Berlin, or (ii) Aschersleben-Leipzig; C. Soest-Northeim-Nordhausen-Leipzig; D. Koblenz-Giessen-Kassel-Nordhausen-Leipzig; E. Frankfurt-Hanau-Bebra-Erfurt-Leipzig; F. Frankfurt-Hanau-Aschaffenburg-Würzburg-Nürnberg-Vienna; G. Karlsruhe-Heilbronn-Nürnberg-Eger; H. Karlsruhe, Stuttgart-Ulm-Münich-Salzburg.

An attempt was made to assess their relative importance and 21 towns, chosen for the nature of their transportation facilities, were offered for attack. These were:- Löhne, Minden, Lehrte, Stendal, Paderborn, Altenbeken, Kreiensen, Northeim, Nordhausen, Wetzlar, Giessen, Hanau, Bebra, Esienach, Aschaffenburg, Würzburg, Fürth, Heilbronn, Crailsheim, Mühlacker and Ulm.

/At

At this stage of the war, however, no attack on these smaller and more distant targets was attempted, their destruction being reserved for a much later phase, with the aid of precision devices. In some cases no target material existed at the period under review, and it was impossible, at that stage, to ensure concentration.

S.46368/II
Enc.108A

A further example of the elasticity of the transportation and morale plan was offered when on 11 September 1941, Schweinfurt was included in the list of targets -- not by virtue of its place at the junction of two railway lines from Frankfurt and Stuttgart to Leipzig, but because it was believed to produce 70% of the ball bearings required for the manufacture of mechanical transport, aircraft and armoured fighting vehicles.

(xxi) Summary.

It could not be denied that the attack on Transportation and Morale was in fact a harassing campaign with just sufficient effectiveness under the very best conditions of weather and enemy reaction to impress upon the enemy that night bombing would have to be strenuously opposed. The development of the Nachtjagdgeschwader, and the gradual conversion of the searchlight belt extending NE-SW. behind the Dutch and Belgian coasts to G.C.I. radar control took place during this period and accounted for the mounting losses during the autumn and winter.

Under good conditions, the bomber force had, with less than 150 tons of bombs per raid, caused extensive fire damage in Aachen, Kassel and Munster -- all comparatively lightly defended targets -- and rail targets had been successfully located, but not heavily enough bombed, at Cologne, Duisburg, Frankfurt, Mainz, Mannheim and Karlsruhe. Obviously this combined result

in no way fulfilled the aim of the offensive, and the bomber force badly needed the stimulus of the Renault raid (3/4 March), the Lübeck fire-devastating (28/29 March) and the 1,000 bomber raid on Cologne (30/31 May).

4. FURTHER CONFLICTS OVER MORALE.

(i) Nuisance Raids.

The idea of the "nuisance raid" for moral effect by night still persisted.

C.A.S. returned to the theme on 28 September, suggesting a careful reconsideration of the present directive on account of the "unpleasant fact" that, pending introduction of improved methods of target-finding, 75% of bomb-lift would not hit the intended area targets. There was a large and growing body of opinion to the effect that by keeping as many Germans as possible out of bed for as long as possible every night we should achieve far greater moral effect and not much less material effect than by attempting to concentrate attacks with the primary object of material destruction. On any night when bombing had to be "on E.T.A." (on estimated time of arrival) it would be better to bomb 20 or 30 widely scattered towns all over Germany than one or two. Wide dispersal was one of the original plans for night bombing and C.A.S. did not think it had ever been tried. He suggested that the longer nights allowing widespread diversion over Germany might be used as an experimental interlude, while not ruling out heavy concentrations when the weather forecast was considered exceptionally favourable.

The Director of Bomber Ops. answered this, in a minute to D.C.A.S., pointing out that only two months had elapsed since the directive was issued, and they had never been able to allow a directive to run long enough to obtain any cumulative estimate of its value or of Bomber Command's

/ability

D.B.Ops.
Archive.
Enc. 61A.

Ibid.
Encl. 62A

-83-

ability to achieve its aim. The introduction of the directive had coincided with the worst spell of late summer weather for many years. He preferred that the C.-in-C. consider a policy of making these widespread attacks when the forecasted weather gave good conditions at base but suggested no area in Germany was good enough for a concentration.

Ibid 63A.

D.C.A.S. supported this view and expressed the view that to be effective the nuisance attacks must be associated with intermediate heavy attacks, so that the latter would need to be extended from the Ruhr and Rhine deeper into Germany, thereby departing from the set plan. He favoured attacking morale only by way of a modification of the old plan W.A.8.

Ibid 64A.

V.C.A.S. also opposed the nuisance raid on the grounds that attack on morale needed to be backed up by damage, or it would tend merely to condition the population. He found it difficult to believe that the Germans and British were so basically dissimilar that, whereas maximum concentration of attack was needed to affect British morale, maximum dilution would be effective against German morale. The spare effort on bad nights could be better employed in training, and in good weather the force should work at maximum strength, even if it meant pilots flying on two or three successive nights.

JCS/DO
2 Oct.

Lord Trenchard also maintained pressure to secure attacks on morale, and on 2 October, 1941, a sample "Order to Bomber Command", embodying his views, was drawn up on Lord Trenchard's behalf by the A.O.C. No. 5 (Bomber) Group and sent demi-officially to the Director of Bomber Operations.

There is an interesting sidelight on the

question of dispersal of the bomber force over Germany for moral effect in a report from a branch of Air Intelligence to D.D.I.3. During a night attack, in conditions of 7-8/10ths cloud, with ground haze, German police messages, intercepted and decoded, showed that British aircraft were reported over a huge area extending from Chemnitz to Pilsen, Nurnberg, Bayreuth and virtually along the length of the Rhine in Germany, the average duration of the alarms being one hour, and the total time 6 hours. In sending this to D. of I. (0), D.D.I.3, suggested it constituted an answer to those who advocated dispersal over a greater number of towns.

(ii) Main Policy Reaffirmed.

Although, as will be seen later, there were various diversions from the main task, they were mainly those foreshadowed when the policy was discussed, and also the unforeseen effect of bad weather and growing casualties.

The bombing policy was reaffirmed, largely for the information of the United States Chiefs of Staff and those associated closely with the President, in a review which carried further the forecast of strategy contained in JP (41) 444 ("Future Strategy") and gave the Americans an impression of the means by which we hoped finally to win the war. Although this matter belongs properly to the narrative on "Anglo-American Air Co-operation," it should be mentioned here.

The Joint Planning Section suggested on 8 July that they should extend the scope of the previous paper for the information of the Americans, showing, on the assumption that the USA became belligerent, what they thought would be necessary to make certain the defeat of Germany and an outline of the joint military requirements of the associated Powers. They produced a short paper on 17 July 1941, stating that the air offensive should be limited only by aerodrome

JP (41)
527 8 July

JP (41)
549.
17 July.

capacity, and that where, at that time, 100 tons of bombs were being dropped, the aim must be 3,000 tons. Foreseeing no need for a vast army of infantry, they said the heavy bomber must have a very high degree of priority, and 7,000 of them would be needed in the area of British responsibility alone.

COS (41)
155 (O)
31 July

Finally, the Chiefs of Staff agreed upon a fresh statement of general strategy which was submitted to the Prime Minister during his voyage in H.M.S. Prince of Wales to confer with President Roosevelt, and Mr. Churchill then directed that it should be given to the American chiefs of Staff at the conferences, and to the Joint Staff Mission in Washington.

Ibid
para. 29.

This review stated that it was in bombing, on a scale undreamt of in the last war, that they found the new weapon on which they must principally depend for the destruction of German economic life and morale. To achieve its object within a reasonable time, the bombing offensive must be on the heaviest scale, and "we set no limits to the size of the force required, save those imposed by operational difficulties in the United Kingdom. After meeting the needs of our own security, we give to the heavy bomber first priority in production, for only the heavy bomber can produce the conditions under which other offensive forces can be employed.

Ibid
para. 30.

"Our policy at present is to concentrate upon targets which affect both the German transportation system and civilian morale, thus exploiting weaknesses already created by the blockade. Since the targets selected lie within highly industrial and thickly populated areas the effect upon German morale is considerable. As our forces increase, we intend to pass to a planned attack on civilian morale with the intensity and continuity which are

/essential

essential if a final breakdown is to be produced. There is increasing evidence of the effect which even our present limited scale of attack is causing to German life. We have every reason to be confident that if we can expand our forces in accordance with our present programme, and if possible beyond it, that effect will be shattering.

"We believe that if these methods are applied on a vast scale, the whole structure upon which the German forces are based, the economic system, the machinery for production and distribution, the morale of the nation, will be destroyed, and that, whatever their present strength, the armed forces of Germany would suffer such a radical decline in fighting value and mobility that a direct attack would once more become possible. When that time will come no one can with accuracy predict. It will depend largely on how well we are able with American assistance to keep to our programme of Air Force expansion and to obtain the necessary shipping. It may be that the methods described above will by themselves be enough to make Germany sue for peace and that the role of a British Army on the Continent will be limited to that of an army of occupation. We must, however, be prepared to accelerate victory by landing forces on the Continent to destroy any elements that still resist, and strike into Germany itself... United States intervention would not only make victory certain, but might also make it swift."

(iii) American Criticism and the Reply.

This document, having been discussed at the Atlantic Conference, and later in Washington, brought eventually a reply by the American Chiefs of Staff, dated 13 Oct. 1941. The Joint Board (i.e. of American Service Chiefs) felt that military operations to be effective should be directed against specific and concrete objectives, and that it was not enough to set forth the destruction of morale as a military

/objective....

-87-

objective..... The Board was unable to accept the view of the Chiefs of Staff that bombing offensives should be directed against general civilian morale. They should be directed against specific military objectives which had an immediate relation to German military power; in the end, success in that field should be more destructive of German morale than air offensives against civil populations.

The American Joint Board found it difficult to reconcile the Chiefs of Staff strategic conclusion on morale with Britain's "valorous experience with German bombardment."

COS (41)
505.2b.

Ibid
para. 2b

The Chiefs of Staff examined this reply in November 1941 and expressed serious concern at the "failure of the American Chiefs of Staff to appreciate the importance of the bomber offensive." The bomber force, they pointed out was our primary weapon for striking direct at Germany and producing such a radical decline as would permit of our land forces returning to the Continent of Europe. It must be explained to the Americans that our heavy bomber was being used against objectives directly related to German military power. It was appreciated that civilian morale throughout Germany could not be broken by bombing alone with the present force; but they planned such a vast increase in the size of the force as would, together with other measures, enable them to achieve decisive results. Even with that force, the bombing objectives would be most carefully chosen in the light of intelligence and experience. It was essential that we should have the fullest American support for our expansion.

The difference of outlook having been stated, the recounting of further steps in Anglo-American

/collaboration

collaboration will now be left to the appropriate narrative.

The Americans were not the only realists, however.

P.M.
M.970/1

The Prime Minister, commenting on 7 Oct. 1941 on an arithmetical estimate of the force needed to break the enemy's morale, wrote as follows:- "We all hope that the air offensive against Germany will realise the expectations of the Air Staff. Everything is being done to create the bombing force desired on the largest possible scale, and there is no intention of changing this policy. I deprecate, however, placing unbounded confidence in this means of attack, and still more expressing that confidence in terms of arithmetic. It is the most potent method of impairing the enemy's morale we can use at the present time. If the United States enters the war, it would have to be supplemented in 1943 by simultaneous attacks by armoured forces in many of the conquered countries which were ripe for revolt. Only in this way could a decision certainly be achieved. Even if all the towns of Germany were rendered largely uninhabitable, it does not follow that the military control would be weakened or even that industry could not be carried on

"It may well be that German morale will crack, and that our bombing will play a very important part in bringing that result about. But all things are always on the move simultaneously and it is quite possible that the Nazi war-making power in 1943 will be so widely spread throughout Europe as to be to a large extent independent of the actual buildings in the homeland.

"A different picture would be presented if the enemy's Air Force were so far reduced as to enable heavy accurate daylight bombing of factories to take place. This however, cannot be done outside the radius of fighter protection, according to what I am at present told. One has to do the best one can, but he is an unwise man who

/thinks

SECRET

thinks there is any certain method of winning the war, or indeed any other war between equals in strength. The only plan is to persevere."

5. ATTEMPTS TO REVIVE THE ATTACK ON OIL.

(i) Reasons for the Cessation of the Oil Campaign.

AN earlier chapter of this Narrative will have shown the stress that was laid on the campaign to prevent oil from reaching Germany up to and including January 1941, when the attack on this commodity was selected as the primary task for the bomber force for the following six months. In March 1941 the Chiefs of Staff agreed that oil must take a lower priority than the defensive struggle against U-boats and Focke-Wulf aircraft which were taking toll of our shipping, but even without that diversion of effort it appears unlikely that the campaign would have been very vigorously fought, for tactical reasons. These were summed up consisely in the Joint Planning Staff's Review of Future Strategy in June.

"Hitherto oil refineries and stocks in Germany," they reported, "have always been accepted as the ideal economic target. It now appears that a greater degree of damage must be done to oil targets than was at first envisaged before any definite results can be achieved. But even if their selection were theoretically sound, it must be recognised that so long as we are restricted to night bombing our present chances of doing real damage to oil stocks and production are small. With the force which we shall have at our disposal during the next 12 months, and with the difficulties imposed by bad or indifferent weather, enemy defences, and the extreme accuracy necessary to achieve results, the occasions will be rare on which we can hope to deliver really effective attacks on oil targets."

COS (41)
100th (7)
17 March

JP (41)
444.14 June
Para. 205

For these reasons the Chiefs of Staff discarded oil as the primary future objective.

(ii) A Final Raid on Leuna.

This was the situation when, on the eve of the German attack on Russia, the Defence Committee, on 16 June 1941 considered the latest report by Mr. Geoffrey Lloyd to Lord Hankey's Committee on Preventing Oil from Reaching Enemy Powers. Lord Hankey urged the Defence Committee not to give up the bombing of oil and, on the Chiefs of Staff stating their objections, the Prime Minister suggested, and it was agreed, that one heavy attack should be delivered on oil in Germany, and that preparations for bombing the oil wells at Baku should be completed. The latter project would not, of course, have involved the heavy bomber force in this country, and neither this project nor the proposals to send a heavy bomber force to South Russia as an aid to the Soviet forces will be further discussed in this narrative. ¹.

The decision of 16 June to deliver one more attack was not taken to involve necessarily yet another attack on the two synthetic oil plants at Gelsenkirchen (Scholven-Buer or Nordstern), as to the serviceability of which photographic evidence was by no means definite, but in any event the attack had to wait until the following full moon (due on 9 July 1941), and though on 6 July 1941, Air Ministry requested a single attack at heavy scale on the two plants at the first suitable opportunity, the next day the A.O.C.-in-C. was informed he might substitute the more distant Leuna oil works, at Merseburg, provided the attack could be made during the next seven days, before the moon was lost.

Accordingly, on 8th July, in the moon period, No. 4 Group was instructed to detail 12 Halifaxes for this long range operation. Thirteen Halifaxes and a Stirling

/took

1. There is documentary evidence that support was given to such a proposal by Sir Stafford Cripps in Moscow and by No. 30 Mission.

DO (41)
41st. (1)

D.B.Ops.
1935/DO.

S.43293

Cyph Sig.
X.18

S.43293

HQ BC.
ORB.
Appx.B1478

Ibid.
A.131

PISIR 998
RECP/DO/16

took off and, in spite of heavy defences and difficulties of pin-pointing the target, ten Halifax crews claimed to have bombed the oil works from about 10,000 ft, the total bomb-load alleged to have fallen on the target being 24½ tons (24 x 1,000-lb. and 62 x 500-lb.). In spite of P.R.U. cover, however, no damage could be proved, and the C.-in-C. after himself interviewing the crews, said he concluded the small margin of time available on such a short night had prevented adequate search for the objective. One more night attack - on a plant at Dortmund on 4/5 July, ended in the loss of the two Hampdens detailed.

(iii) Proposed Oil War on Two Fronts.

COS (41)
244th (2)
14 July

POG (41) 9
and
WP(41)162

At the same time Lord Hankey's Committee, in its 8th Report, recommended that the Russians and ourselves should make concerted and sustained attacks against enemy oil supplies, and the Prime Minister on 13 July attached to the Report a minute expressing a wish that the Chiefs of Staff should hear Lord Hankey, with Mr. Geoffrey Lloyd, Lord Cherwell and a representative of the Foreign Office.

COS (41)
245th (3)
14 July

At this meeting Lord Hankey pointed out that the policy decided upon and approved by the Defence Committee in January 1941 had not been followed consistently. Air attacks on synthetic oil plants had been a few spasmodic and light scale raids in February and March, and then nothing until the recent relatively small and unsuccessful raid on Leuna.

Now for the first time there was an opportunity of subjecting German oil resources to an attack on two fronts. There were reports that Russian attacks on Ploesti and Constanza had been fairly successful. His Committee strongly recommended an approach to the U.S.S.R. on the highest level, urging a concerted effort on both

/fronts,

fronts, and pressing the Russians to supplement their air attacks by naval bombardment on Roumanian and Bulgarian oil ports and on enemy tankers.

The Chiefs of Air Staff in reply said experience had shown it was useless to attack pin-point targets such as oil plants except on clear moonlight nights, of which there were on an average only four per month. Leuna and Gelsenkirchen were difficult to find, and the refineries troublesome targets on which to lay a bomb sight. Moreover, as these refineries were not in thickly populated areas bombs which missed the target were wasted. Our relatively light efforts in 1940 against German oil targets had only reduced output, it was believed, by some 5%. He was prepared to carry out a heavy-scale attack on a suitable oil target during the August moon period.

Accordingly the Chiefs of Staff recommended the Defence Committee to adhere to its present short-term policy, but suggesting the promised attack, in Western Germany, during the August moon. Their reasons were not only those raised by tactical difficulties. They reasoned that if the Germans overran the Russians within a few weeks they would gain control of Russian oil and maintain their hold on Roumanian oil before concerted action by the Russians and ourselves could take effect. On the other hand, if the Germans were held up in Russia, then their oil situation would become serious, whether we attacked oil or not. We could then take advantage of longer autumn nights in which to intensify such attacks. They thought the present policy both of carrying out daylight raids and heavy night bombing would do more good -- a view in which they were supported by the Foreign Office.

Lord Hankey made one more final appeal, which was circulated by the Prime Minister's order, embodying the

/views

COS (41)
136 (0)
14 July

COS (41)
144 (0)
20 July

views he had already expressed to the Chiefs of Staff. He asked for attacks on oil using the same methods as against other main targets -- attacks that would be heavy and persistent. There was no reason to be depressed by past failure. As for morale, he believed it was as important to strike at the morale of the High Command.

DO. (41)
52nd. (1)

Lord Hankey finally appeared before the Defence Committee on 21 July 1941, expressing his desire for more than the one promised attack. He wanted oil included in the category of decisive targets.

The C.A.S. and C.N.S. were supported in their opposition to this scheme by the Foreign Secretary. Mr. Attlee said he was attracted by the idea but wished to know what would be the effect of a week's concentrated bombing of Leuna, to which the C.A.S. quoted the low average of nights per month on which attacks could be expected to succeed. Finally the Prime Minister declared himself against the bombing of oil. If the Germans gained control of the oilfields in Russia, all our efforts on oil would have been wasted. The best way of helping Russia, in his view, was to bring down the heaviest possible scale of attack on German cities. If communications were interrupted, so much the better. He also mentioned that he deplored that the first Liberators recently received from America had been allowed to go to Coastal Command. Now was the time for every heavy bomber to concentrate on Germany.

To this C.A.S. replied that the Liberators had been allotted three months before, when the Battle of the Atlantic was causing anxiety.

The Defence Committee agreed that policy should remain unchanged, but one more heavy attack during the August moon should be made.

/This

HQ BC ORB
Ops. Appx.
A.166.

This attack did not, in fact, take place, though no firm reason for this can be found in documents available.

On 7/8 August, two Halifaxes did attempt to bomb, as secondary target, the Nordstern plant at Gelsenkirchen with 4,000-lb. and other bombs (5³/₄ tons) without apparent result.

WM (41)
89.
4 Sept.

Just before the following full moon, on 4 September 1941, the question arose at a meeting of the War Cabinet, and C.A.S. reported that the bombing of oil targets had been suspended pending further consideration.

S.549

Apart from a suggestion by the Secretary of State for Air to C.A.S. on 4 November 1941, that the matter should be reconsidered, now that the Atlantic Conference was over, the oil plan was not resurrected during the period under review. As will be seen later, Bomber Command entered a phase in which operations against area targets themselves were sustained only at great cost,¹ and in fact had to be confined to occasions when weather was almost certain to be of assistance, or at least to constitute no danger to our bombers. In such circumstances it would have been impossible, even if advisable, to switch over to a campaign against oil.

6. THREATS TO GERMAN CAPITAL AND OTHER TOWNS.

(i) Berlin as a Target.

It is unnecessary here to enumerate the reasons why the bomber force should make Berlin a special target, as was done on many occasions after the first raid on 25/26 August 1940. Any doubts that occurred were as to the tactical wisdom of making small attacks on the German capital, since the 34 raids during 1940 involved losses of 11% in aircraft missing, whereas each aircraft claiming to have reached Berlin dropped on an average only half a ton of bombs. This average, and the casualty rate, improved greatly in 1941, but in May of that year V.C.A.S. tried unsuccessfully

A.M.W.R.
Man. of
B.C. Ops.
1939-45
P. 55.

¹. See pages 31 and 54.

to persuade C.A.S. to put an end to what he described as the "utter wastefulness and dissipation of our resources" which these attempts to bomb Berlin must involve. C.A.S. replied, however, that he did not feel inclined to interfere with the C.-in-C. on this question. His own view was that it was well worth while losing say, 10 tons of bombs from another target to get 4,000,000 people out of bed and into the shelters every night.

HQ BC.
O.R.B.

In the next six attacks, up to 25/26 July, of 55 aircraft despatched, 24 attacked, with 76 tons of bombs (heavy aircraft were used) and nine were missing.

CAS./Misc.
44.

The question of bombing Berlin was discussed with the C.-in-C. on 29 July 1941. C.A.S. then said it was essential to put the maximum possible scale of attack on to Berlin at the earliest possible date. Precautions were agreed upon, in the hope of reducing casualties:- no attack was to take place unless a reasonable number of aircraft could be sent; under normal conditions of darkness the attack should be concentrated as much as possible in time, to confuse the defences, (one suggestion was that all aircraft in each squadron should be timed to arrive together over the target - a notable departure in tactics in those days - and the attack should be from a maximum height.)

In view of the fact that the A.R.P. official record kept by Oberbürgermeister Steeg at the Berlin Rathaus is now available, it is proposed to deal in some detail with the results of the eight raids on the German capital by Bomber Command during the period of five months from 2/3 June to 7/8 November 1941. (Following the abnormal losses of 7/8 November, there came an end to attacks on the capital, with one exception until 1943.

/In

In spite of the short nights, attempts were made during the summer to reach Berlin with the few new heavy bombers available, and a few Wellington II's. (1)

BCNO &
BCSO-94.

On 2/3 June, four Stirlings and one Wellington II of No. 3 Group claimed to have located their aiming point in the capital, in spite of haze and searchlight dazzle; and to have dropped 1 x 4,000-lb., 20 x 1,000-lb., and 18 x 500-lb. bombs, and 720 incendiaries. The crews believed their bombs fell in the city centre and about the Schlesischer railway station, causing five large fires, while the 4,000-lb. bomb was thought to have fallen in the western half of Berlin.

AHB/EMS/12a.

No photographic evidence was obtained. The German record shows that 15 H.E. and 80 incendiary bombs were counted, and that they caused damage to a military flak position at Priesterweg, to a hospital and to twelve houses. Casualties were 14 killed, 28 injured and 76 homeless, these figures including five military personnel killed and two injured. Bomber Command lost one Stirling in this raid, the aircraft being heard of on the homeward route between Magdeburg and Brunswick. The Berlin defences consisted of exceptionally accurate heavy flak, particularly on the approach from the south-east, and some of the searchlights, with flak co-operating, harried the bombers for 15 miles. No evidence from the German side bears on the loss of this Stirling.

Int/Tac.
2/3 June.

BCNO &
BCSO 153.

In darkness, after moon-set on 25/26 July, three Stirlings and one Halifax reported dropping 1 x 4,000-lb., 15 x 1,000 lb. and 24 x 500-lb. bombs and 480 incendiaries, the Halifax crew claimed that the 4,000-lb. bomb fell between the Tiergarten and Tempelhof areas. The civic record, however, shows that ten H.E. bombs, and one more which did not explode, fell in the city, causing no casualties and very light damage.

AHB/EMS/12a.

/The

-97-

BCNO &
BCSO 161.PISIR. 1038
AHB/EMS/12a.

The next attack, on 2/3 August, was intended to be heavier, and 8 Halifaxes, 4 Stirlings and 24 Wellingtons claimed to have bombed on or near their targets, which were the Air Ministry, the Friedrichstrasse Stations and an area aiming point. The total of H.E. bombs dropped was 234, including 4 x 4,000-lb. and many incendiaries, including 25-lbers. There was, however, considerable ground haze, visibility was poor, and searchlights and flak were very active. Night photographs did not lead the Command to expect much in the way of damage. In fact there were recorded by the A.R.P., incidents from one aerial mine, 24 H.E. bombs, (with two more not exploding), and 150 incendiaries. Six of the H.E. bombs fell on a flak unit's barracks at Heiligensee, causing severe damage; four factory buildings were damaged (the only one specified was a honey-works); a pumping station of the city water works was hit; some public administrative offices (Reichs-Monopol) were damaged together with an un-named public building; an air raid shelter was blasted; and one chapel and 40 houses were also affected. Casualties were 24 killed, 17 injured and 167 homeless. The shooting down of one British bomber near Berlin, which was announced by a night fighter control and witnessed by a returning bomber, was confirmed. In all, four aircraft failed to return.

AHB/EMS/12a

It is worth noting here that before the next raid by the R.A.F. occurred on 12/13 August, Russian aircraft also attacked the capital by night. According to the German record, on 7/8 August (when no British bomber claimed to have been over or near Berlin) the Russians dropped 24 H.E. bombs, three of them falling on the Stettiner station, and others damaging a margarine factory. Six people were killed, 18 injured and 330 made homeless, apparently from the bombing of 16 houses. On three nights just afterwards,

/when

when no British bombers attacked, aircraft presumed to be Russian attempted to reach Berlin but failed. Moscow radio was claiming that in one raid (presumably that of 7/8 August), 1,000 tons of bombs were dropped. The Germans said the figure was 1 ton, and the civic record certainly shows only 24 H.E. bombs counted.

ITR. 29.

BCNO &
BCSO 172.

Bomber Command returned to the attack in good weather conditions on 12/13 August, and claimed to have dropped 80 tons on the capital. Apart from one aerial mine, the German A.R.P. reported only 2 H.E. incidents, both being delay-action bombs which exploded eight hours later. However, the number of incendiaries rose to 200, the damage including an Army bakery on the Tempelhof, 80 houses, 37 bungalows, with five persons killed, 13 injured and 50 homeless. Of 70 bombers despatched on this night against Berlin alone, nine failed to return and four crashed, both fighters and flak being active. The German record did not, as one might expect, allude to an incident reported by secret sources, in which broken glass from windows in an exhibition hall in Charlottenburg became mixed with the grain stored there, thus making it unfit for consumption.

Int/Tac.

AHB/EMS/12a.

An account of a raid on 14/15 August, contained in the German record, in which 7 H.E. bombs fell on Berlin, may refer to another Russian effort to reach Berlin, but the propaganda and the civic record claimed there had been an attempt by the British to reach Berlin. Most probably this impression was gained by the fact that our aircraft were trying to find Magdeburg. One aircraft seems to have done some residential damage at Grunewald/Wilmersdorf.

PISIR. 1108

Another small raid on 2/3 September, by 35 medium and heavy bombers, caused a good deal more damage. Six bombers returned with night photographs of the capital and a neutral source justifiably described it as the "hottest

ITR. 31.

/night

AHB/EMS/12a

night yet" in Berlin. The reason was that cloud varied greatly during the attack, at times giving as little as 2/10ths cover. The German broadcast version, stating that only a few aircraft reached Berlin and that thanks to the flak no military installations were hit hardly did justice to a raid in which, according to the German civic record, 53 H.E., 600 incendiaries and three flares fell on the town. In fact, these figures represent just one-third of the bombs reported by our crews to have been dropped on Berlin, but even so they did quite extensive damage; classified as follows:- military installation, 1; transport and communications, 2; public buildings 4; church, 1; houses, 100; bungalows, 14; public utilities 11; factories, 2. The incidents included incendiary damage to the roof of the Stettiner station; destruction of the overhead tramway system on the Schiff-bauer-damm, and closing of the Friedrich Karl Ufer to traffic; incendiaries on the goods station at Spree-Ufer and on a Ministry of Health branch at Wilmersdorf; a direct hit on an office, piercing a water main and causing an emergency water call; damage to wooden buildings at Tempelhof airfield; and an H.E. on the runway; two H.E.'s on the Muggelsee (Köpenick) waterworks, putting out of action three filters but causing no loss of efficiency; damage to the police headquarters by a piece of iron 6 ft. long (!); destruction of a power station (probably a transformer near Friedrich-Karl-Ufer; damage to a publisher's works and an American Church. 39 people were killed, 69 injured and 573 homeless, of whom 265 were in the Tempelhof area.

The next raid, on 7/8 September, was a much heavier effort, and a rather costly one to the bomber force. It secured many more incidents, much more wide-

/spread

spread than before, but on the whole relatively unimportant damage. In spite of a plan to concentrate the force, 130 bombers took well over two hours to complete their attack and 17 were lost. A total of 161 tons of bombs was dropped, consisting of 236 H.E. of various weight and 4,200 incendiaries. The evidence of night photography that a good proportion of these fell in the city is borne out by the German count of 199 H.E. (including six delay action) and 2,000 incendiaries. The casualty figures rose to 41 killed, 207 injured and 3,381 homeless, though this last includes 1,408 who actually were enabled to return home by the end of a week.

There were only a few incidents of general interest, including incendiaries on an electrical station; the Reichsbahn garage and repair sheds, in which 20 lorries and 30 trailers were destroyed; the Treskow bridge was damaged by an H.E. bomb and tramway wires torn down.

Photographic interpretation, following cover on 16 September, claimed that up to that time there were 24 areas of damage, involving three industrial plants, 2 railway properties, 2 public utilities, several miscellaneous buildings, and the Opera House. This was certainly not an overstatement.

On 19/20 September, a few aircraft, bombing Stettin, flew near Berlin, according to the civic record, but no bombs were dropped. Some damage was done by unexploded flak shells.

The following night, 20/21 September, a force of 77 bombers was sent to Berlin, but was recalled owing to fog developing at home bases. However, 18 aircraft continued to Berlin, and claimed to have dropped 16 tons of bombs (59 H.E. bombs and 1,400 incendiaries). Conditions of visibility were good, but the German archives state that only 17 H.E. and 100 incendiaries were counted, causing one death, injury to three

/people

people and rendering 60 homeless. There was some damage to tramway installations, a hospital and a church, while a flak shell hit the Turkish Embassy, causing the death of a Turkish member of the staff.

Finally, on 7/8 November, as part of the largest-scale operations yet undertaken, 169 bombers were despatched to Berlin (Mannheim, Cologne and Essen were also attacked), only to find 10/10ths cloud and very severe icing in cloud on route. Only 73 aircraft claimed to have reached Berlin, and 21 were missing. In these conditions it is remarkable that 35 H.E. bombs and nearly 200 incendiaries did in fact fall on Berlin, causing nine deaths, injuries to 32 and loss of home to 398. The only H.E. damage recorded was to a barracks of the "staff construction organisation" at Müggulheim, and to a prisoner of war camp at Grünau, near the Teltow canal, where several barracks were destroyed. Fortunately only one man was injured. Flak shells pierced a gasometer and set it on fire, and another shell exploded, damaging an oil transformer at a power station. 21 bombers on this raid alone were lost (i.e. 12.5%) and Berlin was not again raided during the winter.

To summarise, in the eight raids on Berlin, between 2/3 June and 7/8 November, 630 bombers took part, of which just over half claimed to have attacked, with a total of 533 tons of bombs. 62 bombers failed to return (nearly 10%). It was claimed that 1,086 H.E. bombs, plus a proportion of those on aircraft that were missing, had fallen on Berlin. The German A.R.P. record shows that about one-third of this number of H.E. bombs fell in the city, and that these, plus incendiaries and the considerable number of flak shell incidents, caused 133 deaths, 369 injuries and 4,705 people rendered homeless. No serious case of destruction was included in the incidents recorded,

/though

though damage, especially in September, became widespread and incidents numerous.

(ii) Stettin as an Alternative

During April 1941 Nürnberg and München had been treated as targets of special importance, mainly for political reasons, and the same procedure was now applied to Stettin. On 16 September 1941 D.C.A.S. forwarded to the C.-in-C., Bomber Command, an appreciation, drawn up by the War Office, which advocated large-scale bombing of the port of Stettin as the best chance of interrupting German supply traffic to the Russian Front. This was described as "our one hope of giving adequate help to Russia at that stage of the war."

The target was commended as being easy to find, with its miles of quays and areas of dock and railway. It was suggested therefore as a primary objective in preference to Berlin or any other requiring deep penetration, especially in the coming three weeks. Three attacks were, in fact, attempted in the latter half of September.

The first, by 52 medium and heavy bombers, was spoiled by cloud and haze; in the second and heaviest, on 29/30, 95 aircraft claimed to have attacked, and some points of damage were photographed next day; and the following night, although only 29 Wellingtons reached their target, photographs with bombing suggested further success. The daylight cover discovered no widespread damage after the second raid, but severe damage locally to a factory believed to be making mortars, a barracks, and an artillery laboratory in the west of the town. Much of the weight of attack had fallen about 4 miles north of the town centre. Both the last two raids were carried out in good weather, and pilots' reports were particularly confident. There was, however, no evidence of any disruption of supplies to the east, and this town was left, except for one raid in 1943, until the full scale of the

/bomber.....

S.46368/II
Enc112A.

MI/14c/3/54

DA.K.1167.

-1024-

bomber offensive was available in 1944. Regarding the first of the three attacks in September, the Berlin Oberbürgermeister's record offered gratuitously the information that only minor damage was done at Stettin.

AHB/EMS/12a.

(iii) - Essen.

Cyph.Sig.
X.574 .

PISIR 960
and D.A.K.
1154.

Vol. IV.

There was, throughout the period, no worthwhile evidence of any damage having been inflicted either on the town of Essen, or on the Krupps armament works. The Russian mission in this country had, by early August, asked that the Krupps works should be attacked, stressing the importance to them of damaging the heavy land armaments industry. Nine small-scale attacks were made during the period, but on every occasion either cloud or thick haze made the location of the target impossible. Daylight photographs on 6th July and 21st September revealed only a few minor points of bomb damage. The impossibility of reaching the Ruhr targets in such weather conditions was realized, and it is significant that with the arrival of Gee, Essen was the target chosen for the first attack.

7. - ATTACKS ON ITALY AND CZECHO-SLOVAKIA.(i) Italy.

Although Italian targets had been several times bombed from this country during 1940, it seems clear that, as far as Rome was concerned, the capital was always outside the general scope of bombing policy and remained in the purely political realm, owing to the presence of the Vatican and the considerations it aroused.

The C-in-C. Bomber Command had discretion, however, to propose attacks on industrial areas in North Italy when the weather was suitable, each proposal of this kind being referred to the C.A.S. for consideration in the light of the current strategical situation and the claims on bomber effort.

The "Future Strategy" paper of June 1941 had singled out attacks on Italian morale as likely to prove particularly profitable owing to the "mercurial temperament" of the inhabitants.

During the September moon (10/11) 13 Stirlings, 10 Halifaxes 53 Wellingtons were sent to bomb the royal arsenal, main railway station and marshalling yard. The first aircraft to arrive found no clouds, but haze, and later the task of target-finding was made more difficult by smoke. Finally, by the end of the attack, there was cloud down to 3,000 ft. Most of the crews claimed to have bombed the town, from between 10,000 and 16,000 ft. Their photographs, however, were plotted on two areas 8 - 10 miles south of Turin, on largely-residential areas, Vinovo and /La Loggia.....

DB.Ops.
Archive
67A.

JP (41)
444 14 June

BCNO & BCSO
200

DA.K.1127.

K.1135 La Loggia, though some damage to industrial buildings was also done at these places, and part of the main post office in Turin itself was apparently burnt out. M.E.W. graciously

ITR.35. commented that the destruction of the paying-out office of the savings bank would have a depressing effect on depositors!

The A.O.C.-in-C., writing to C.A.S. on the difficulty of getting concentration on long-range targets, quoted the Turin raid as an example of incendiary loaders starting fires in the wrong place and throwing the attack astray.

RECP/DO/6.
16 Oct.

On 26/27th September a force was despatched to Genoa, but had to be recalled owing to bad weather at home bases. Two nights later the attempt was repeated by 2 Stirlings and 39 Wellingtons, of which two brought back successful photographs within 5 miles of the target. The bombs fell mainly in the outskirts, and in Monte Moros, behind the town. The most optimistic "source", some neutral seamen who were rushed ashore into shelters, said no damage had been done in or near the port but morale was exposed as "painful".

There was an unfortunate result of these operations. Mr. Eden, the Foreign Secretary, informed the War Cabinet on 6 October 1941 that our relations with Switzerland threatened to deteriorate owing to our recent blockade measures and to the R.A.F. flights over the country. Was it necessary, he asked, to fly over Switzerland to bomb Genoa?

C.A.S. replied that he was taking measures which he hoped would minimise the latter cause of friction.

(ii) A Czech Occasion.

Early in October 1941 the question of a possible raid on the Skoda munition works at Pilsen, in Czechoslovakia, was raised; and discussion upon it took place between the C.A.S., A.O.C.-in-C., and the Deputy Director of Bomber Operations. In the course of the preliminaries President Benes asked whether a

/special..

Cyph.
Y. 3480.

special effort could be made to carry out operations over Czecho-slovakia on the nights 27/28 or 28/29 October 1941, these being national days in his country. The request was put forward to the C-in-C on 9 October 1944 as being of high political significance, and it was mentioned that appropriate leaflets were to be carried for distribution to the Czechs. The scale of attack suggested was up to five aircraft, including possibly the Czech Bomber Squadron (No. 341).

However, on 17 October, A.C.M.S.I. (Air Marshal Medhurst) was visited by the Inspector-General of the Czechoslovak Air Force, who represented to him that owing to reprisals being taken by the Germans against the Czech population Czech aircrews should not be used, or, if they were, no publicity should be given to the fact.

HQBC ORE
Ops. Appx
A. 238.

Ibid.
Appx D. 1981(U)

In spite of bad weather, which made very few operations possible, 10 Stirlings of No. 3 Group were sent to Pilsen on 28/29 October, 1941, but none claimed to have found their target, and most of the bombs fell in South Germany. Strangely, the leaflet, of which over 44,000 were carried and must have fallen mainly on German territory, as well as in the Pilsen area, stated specifically, in Czech, that it had been brought by British and Czechoslovak airmen!

8: DAYLIGHT OPERATIONS AGAINST FRENCH INDUSTRY

(i) Review of Past Situation.

During the early summer of 1941, the principal pre-occupation of the light day bomber force (still virtually No. 2 Group only, with eight squadrons of Blenheims) was with shipping making its way coastwise from port to port between Denmark, Germany, Holland, Belgium and France. A very few /heavy.....

heavy bombers had been used by day against specific targets, including the enemy naval units at Brest. In addition, the Blenheims, with fighter escort, had attempted to arouse opposition from German day fighters by flying "Circus" operations, on fairly rare occasion, over the fringe of French territory which was within fighter range. The main object of the Circuses was not so much to do damage to the targets that were attacked, but to hold off from the Balkan theatre of war, and our hard-pressed troops in Greece and Crete, any German short range fighters which the enemy might be induced to keep on the Western Front to repel our day intrusions.

At the outset there was no definite indication that this policy was having any marked effect, but it was an attempt, and the best that could be made by the forces at Bomber Command's disposal.

On the other hand, it was clearly intended that as and when the force took on the characteristics of a heavy bomber arm, daylight air attacks into the heart of Germany would be organised, and a definite assurance of this ambition was given by C.A.S. to the Prime Minister at a War Cabinet meeting on 21 June 1941.

WM (41)
60th.
21 June.

(ii) - The Aim to Relieve Russia.

The effect of the outbreak of war between Germany and Russia was to secure an attempt to intensify these daylight operations. The Joint Planning Staff on 23 June 1941 examined the action possible to assist the Russians. Rejecting the most obvious means -- that of landing an expedition on the Continent -- for reasons that need not be stated here, they expressed a belief that the concentration of our air attacks on transportation targets in Western Germany might indirectly give appreciable assistance to the Russians, and they looked to the Air Staff for an extension of that kind of operation.

JP (41)
478
23 June

/C.A.S.....

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COS (41)
221st. (1)
23 June.

C.A.S., at a meeting with the other Chiefs of Staff on the same day, declared that plans could be put into operation by Bomber, Fighter and Coastal Commands to turn the German preoccupation in Russia to our advantage. If we could continue to dominate the air over Northern France, we could use an increasing number of medium¹ bombers to draw the enemy fighters into the air to give battle with our superior fighter force. We might even be able to carry out daylight attacks over parts of North West Germany.

WM (41)
62nd.
23 June.

On the same day, again, C.A.S. drew the attention of the War Cabinet to a crucial factor in the situation -- the German fighters were likely to refuse action if our daylight bombing attacks over N. France were confined to targets such as airfields.

(iii) Industrial Targets in France.

Accordingly, Sir Charles Portal sought a ruling from the War Cabinet whether our day attacks might be extended to include factories in the big industrial towns of Northern France -- factories which were engaged on the manufacture of war material that would be used against us. This was a new departure in policy as regards the bombing of enemy occupied territory formerly belonging to our Allies, and he further asked whether the workers should be warned, by wireless and by leaflets, of our intentions, so that they might leave the factories. The War Cabinet approved the principle.

Some of the factories concerned were not new additions to the list of Bomber Command targets, but were on the previous "fringe targets" schedule. On 27 June 1941 a revised list was sent to the Command, giving four

S.46368/
II.87A.

1. The phrase "medium" bomber was still often used, as in this case, to denote the Blenheim, just as Whitleys were often called "heavies".

transportation targets and eight power stations, all in the Pas de Calais area. The new rail targets were described as of high strategical importance, serving the ports of Calais, Gravelines and Dunkirk, and also handling a considerable portion of the goods traffic emanating from the Lille industrial zone. The power stations covered about 47% of the total electric supply available in the Pas de Calais area. An additional list of industrial establishments working for the enemy was worked out in consultation with the Minister of Economic Warfare and sent to Bomber Command on 3 July 1941. It contained six objectives:- Compagnie Fives-Lille at Lille, described as the most important manufacturer of locomotives in France, Accumulator Tudor, at Lille, leading French manufacturer of submarine accumulators; Kuhlmann, Harnes, synthetic oil and methanol plant, with coke ovens alongside; Mines de Bèthune, at Bully, large coke oven batteries, synthetic nitrogen plant and small synthetic oil plants, together with the Bully and Mazingarbe power stations; Mines de Marles, at Chocques, coke oven batteries, with the Chocques power Station and chemical plant, producing glycol, alongside; and Rayon and Staple Fibre Plant, Pont de Leu, Calais, producing 25% of the total French output of rayon including parachute material for the G.A.F.

Ibid.
89A.

S.46368/II
88B.

The letter sent on 8 July 1941 to Bomber Command by D.C.A.S. with these directives included a review of the implications and the war with Russia as it affected the fighter situation on the Western Front, showed that a further aim of the extended daylight operations was to cause discontent among the French industrial workers, to the embarrassment of their German masters.

Although previously it had been the intention of operations over France by day to stir up enemy fighters and

/provide....

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provide an opportunity for our fighters to destroy them, the new strategical situation created by the attack on Russia had caused this to be modified; and the aim now was to be the destruction of important targets and, only incidentally, destruction of German fighter aircraft. It was the value of the target that was to be considered when making a selection.

In the same review of the situation, Air Staff pointed out the value of making heavy and effective attacks on the French Atlantic ports used by Germans for the attack of our trade routes, and particularly on the enemy capital ships at Brest. Arrangements were in hand, whereby Spitfires and Hurricanes were to be equipped with long-range tanks enabling them to afford a large measure of protection to bombers attacking Brest.

(iv) - Circus and Ramrod Operations.

BC/S.23767
14 Apr. 1942.

During the period from July to October 1941 Bomber Command flew 550 "Ramrod and Circus" sorties -- an average effort of 4.5 sorties daily, the average being well exceeded in July and August, after which the effort fell off considerably. Before dealing with the tangible bomb damage results accruing from these sorties, it may be said that the G.A.F. were compelled to keep most of their FW.190's on the Western Front in an attempt to deal with this threat, and to support their own aggressive intentions in the West; that over the whole period the G.A.F. fighter force was actually strengthened in the Western and Mediterranean theatres combined, at the expense of the Russian front; but that it was nevertheless able to make good its losses on all fronts, at the expense of stores

Ibid.

/reserves....

reserves and R.T.U.'s. It was calculated at the time, however, that if we could inflict losses amounting to 200 a month on the Western front the force would begin to decline.

Ibid.

ITR.32.
T.I.C.52nd.

ITR 27 &
32

T.I.C.41st.

On 24 June the principal base-load electricity station of the Lille area (and the largest in France), situated at Comines, was attacked by 15 Blenheims with fighter escort, and hits were made on the boiler house, pump house and feed water system, while near misses were considered certain to have damaged the turbine house. The station was, for the expenditure of less than 8 tons of H.E., put out of action till the end of the autumn. Its counterpart, at Pont-a-Vendin, near Lens, consisting actually of two power stations close together, was also put out of action completely until the autumn by 11 Blenheims dropping 6 tons of H.E. on 30 June. The bombs hit the turbine house, boiler houses, switch house and offices, and this station too was out of action. These successes enhanced the value to the enemy of the station at Sequedin. An attempt to bomb it on 2 July failed owing to thick haze, and on 8 July 3 Stirlings just failed to drop their bombs on the plant, though hits were scored on the chemical works near by. Four more attempts during July and August failed on account of cloud and, in one case, failure to contact the fighter escort.

The Bully power station near Bethune was attacked by 3 Stirlings on 8 July with 13.4 tons of H.E., which burst on the coke ovens and gas-holders, near the power station, without hitting the station. One gas-holder was demolished by the explosion of a bomb, and another by fire.

/Yet.....

SECRET

-111-

ITR 26 &
32.

Yet another power station, with associated industrial works, was attacked several times, this being the complex at Chocques. While severe damage was done to the chemical plants, the power station escaped except for damage due to near misses, which was repaired by the beginning of October.

ITR.33.

With 18 of these power stations to be tackled, it was obviously impossible to bring the whole system to a standstill with the forces available, and considering the small size of some of the targets. By mid-November most of the outstanding damage was repaired but the offensive was allowed to die out.

TIC 52nd.

The principal successes against industrial targets other than power stations and the targets adjoining them were the Potez aircraft factory at Meaulte, the shipbuilding yards at Le Trait, and the steel and accumulator works at Lille itself. The Potez works was known to be overhauling Me 109s and 110s., though whether it was still producing aircraft such as bomber-trainers for the G.A.F. was not ascertainable. In an accurate attack by 4 Stirlings with 18 tons of bombs on 7

ITR 27

July bursts were seen, and photographed, on machine shops, stores, assembly shops and hangars and the offices. Following

ITR 31

the receipt of information confirming the gravity of the damage the target was suspended until November, when intelligence reported that the factory was being repaired.

TIC 50th
and
52nd.

The shipyard at Le Trait, on the Seine, near Rouen, was attacked twice by Stirlings in July, and three times by Blenheims in July and August. The yards were building torpedo-boats, destroyers and even submarines -- on eight slips, of which four were capable of producing vessels up to 9,000 tons each. The Stirlings, missed their target on both occasions, but the Blenheims, at their first attempt, hit the sheds and

ITR 27

/slipways.....

slipways. Two bombs burst very close to a large merchant vessel under construction, five bombs close to submarines, and others on dock and rail facilities. Comparable results were

ITR 28.

obtained in the next attack, on 12 August, and again on 31

ITR 30.

August. Work at the shipyards was believed to be brought to

ITR 31.

ITR 35.

a standstill and the target was suspended.

TIC 47th.

During the attacks on Lille industrial plants, the Fives-Lille locomotive and steel works were extensively

ITR 27.

damaged by Stirlings on 5 and 6 July and by Blenheims on

18 August, causing dislocation, and also interruption of

traffic through hits on marshalling yards, to such an extent

that the target was considered sufficiently heavily damaged,

and was suspended in September until mid-November.

TIC
47th &
52nd.

The most successful raid on a transportation target occurred in one of many attacks on the small but important marshalling yard at Hazebrouck which carried much of the traffic to and from the port at Calais. Stirlings which were unable to attack a target at Lille on 11 July bombed this yard and hit a train, believed to be carrying pioneers.

ITR 27.

(v) Other Targets beyond Fighter Cover.

For a time casualties were not unduly high in these daylight operations over France; and it was intended, after 22 July 1941, to extend the scope of daylight operations over France to targets beyond fighter cover -- e.g.

to Paris. A list of suitable targets was sent to Bomber Command on 22 July. They included the Renault, Gnome and Rhone, and Hispano-Suiza works, and the Soc. Nat. de Construction de Moteurs -- all near Paris, and generally extended widely over France and Belgium. These were to take priority over all "fringe targets" already given.

S.46368/
II.94A.

The whole question of daylight operations was, however, thrown into the melting pot by heavy casualties /which....

HQBC ORB
Ops p.
502-3 and
App.A.151

which overtook a bomber force detailed to attack Scharnhorst at La Pallice and Gneisenau and Prinz Eugen at Brest, on 24 July 1941. Of 115 heavy and medium bombers despatched, 16 failed to return. The view of the C-in-C., Bomber Command, on this reverse, as expressed at a conference at the Air Ministry to review day bombing policy, was that the flak was effective in breaking up bomber formations, and that fighters delivered telling attacks only after the bombers broke formation -- one cause of this lack of cohesion being that bombers were apt to dive for home after their bombing run. Daylight bomber operations were clearly going to be costly unless surprise could be achieved, or the targets had little or no fighter defences, or could be reached with fighter escort. Owing to the highly organised system of defence in N.W. Germany, daylight operations there would obviously be very difficult to sustain.

(vi) Day Bombing Policy Reviewed.

The occasion of this conference was a calling together, by C.A.S., of the A.O.'s C-in-C. Bomber and Fighter Commands, with one or two of their Group Commanders most directly concerned with day bombing and the escorts required. The task before them was to decide whether the operational policy as conceived and expressed in the memorandum of 8 July 1941⁽¹⁾ was best calculated to achieve the object of causing enemy fighter forces to be withdrawn from the Russian Front, and whether the method of execution of those operations was sound.

Considerable doubt as to the effectiveness of the policy was at once raised by A.O.C.-in-C. Fighter Command, who claimed that the number of fighters in the area from the Pas de Calais to Brest had been underestimated, while his A.O.C. 11 Group claimed that in the past ten days reinforcements of good quality had arrived and were now coming up to

..... (1.) See page 108.

/fight....

fight, even before they knew whether bombers were taking part in the sweep.

A.O.C.-in-C. Bomber Command took the view that the underlying strategical conception was unsound. When the policy had been decided he had hoped that, by drawing the majority of German fighters into the Pas de Calais a back door would be opened into Germany. This expectation, he was now convinced, was over-optimistic, and we could not develop heavy daylight bombing with our present forces without very heavy casualties. The enemy had left an adequate force of t/e and s/e fighters in N.W. Germany to neutralise any large scale or sustained operations. He intended to do his best to bomb Germany by daylight, making full use of surprise, but he did not think the scale of attack he could achieve with his present force would have any effect whatsoever on the disposition of the German forces on the Eastern Front. He was convinced that greater effect on those dispositions would be obtained by the activities of Fighter Command in the Pas de Calais, where the Germans were highly sensitive and could not afford to lose air superiority. The best contribution the bombers could make to Russian aid was to cause the utmost material and moral damage possible in Germany, in the most economical manner, both by day and night bombing.

A.O.C.-in-C. Fighter Command, however, said in general his fighters were unable to bring the Germans to battle unless bombers accompanied them. With this C.A.S. agreed and said he was sure the bombing of important targets would cause German fighters to react. Apart from that, the Germans were relatively unconcerned by our activities, and had not the slightest fear that we could effect a landing. The best hope in his view was for the Blenheims to continue hitting in the Pas de Calais area to prevent the withdrawal of fighter forces from that area.

/If.....

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If the heavies could then attack thickly populated areas in Germany, the demand for fighter protection might force the Germans to bring something back from the East.

Such attacks need not be on a large scale. The effect might be achieved by a small number of aircraft attacking two or three times a week. The effect on the Russians would be excellent, particularly if really deep penetration could be achieved by the Fortresses as more experience was gained with them.

The general policy was therefore confirmed as being in the terms of the declaration of 8 July 1941, and in the light of the discussion. Blenheims with strong fighter cover were to continue attacking targets in N.W. France, supplemented if possible by a few Stirlings. The Blenheims in the "Channel Stop"^(1.) squadrons could attack land targets if no shipping presented itself. Fortresses, and any other heavy types that could be made available, were to be used for attacking thickly populated areas in Germany in order to secure maximum effect on German morale. It was even envisaged that if the Fortresses were suitable, these attacks might be extended to such targets as the Fiat works at Turin. When convenient, certain precise and important targets away from thickly populated districts -- e.g., the Buna factory at Huls - which was difficult to attack at night, should be attempted by day.

(vii) Hampdens over France.

ITR 32.

During September 1942, Hampdens were used for daylight operations with fighter escort. On 20 September 6 Hampdens attacked the marshalling yard at Abbeville, on the route from Germany to the western Channel ports, and caused delay of some hours and inconvenience for some days.

ITR 33.
Ibid.

by direct hits on the tracks. On 27 September 11 Blenheims

/successfully..

..... (1.) See page 166.

successfully bombed one of the most important rail objectives in N. France -- the marshalling yard and running sheds at Amiens/Longueau. A round-house was destroyed and hits obtained on the turn-table, workshops and rolling stock.

9. DAYLIGHT PENETRATION TO GERMANY

(i) Tactical Limitations

S.46368/II
88B.

The Air Staff were never under any illusion that attacks on France were more than a second-best substitute for daylight attacks on Germany itself. Their view in June 1941 was that the best chance of persuading the enemy to withdraw appreciable fighter forces from the Russian Front would be to undertake more damaging attacks against key objectives in N.W. Germany and the Ruhr. Apart from the possibility of severe material damage, the effect on morale of the German industrial population would be serious, and the German High Command might well be forced to accede, against its better judgment, to a popular clamour for better protection.

On the other hand, any attempts at day attack in the Elbe Estuary or the Heligoland Bight were liable to stir up some hundred fighters, of the Me 110 type, according to this Air Staff note. There was little recent experience as to the capabilities of our heavy bomber formations in the face of such fighter forces. Largely due to concentration on individual night attacks, our heavy bomber crews had had little experience in formation flying or fire control, the standard of which must be high to withstand attacks by such a fighter force as had been envisaged.

If we were to harass the enemy sufficiently to cause an increase, it seemed that daylight attacks by our heavy bombers would have to be carried out in conditions affording

/a.....

-117-

a reasonable measure of security -- at a great height, or under conditions of cloud cover, or possibly by low flying with every possible element of surprise. Any such attempts would best be undertaken in conjunction with heavy attacks in the Pas de Calais and possibly in other coastal zones, to attempt dispersal of the enemy defences.

There was little prospect of withdrawal of fighters from Germany unless our attacks were heavy and sustained, and every effort to develop such attacks was to be made. However the scope of such operations was limited in the light of a further conclusion that, in using the medium and heavy bombers (except Fortresses) night operations should take priority over daylight, as being more likely to affect German morale.

The narrative of the attempts that were actually made is best recounted by taking in turn each type of aircraft that was used. There was only one joint operation, this being the attack on the Quadrath, Knapsack and Fortuna power stations at Cologne on 12 August, and since this was an exception, and was never repeated during this phase, it will be treated first.

(ii) Attack on Cologne Power Stations.

"Operation 77" -- an attack on the power stations at Cologne -- was designed as a means of hitting Germany at a vital point and furthering the current strategic policy of causing the withdrawal of short range fighters from the Eastern front in order to assist the Russians. It was ordered on 8 August and carried out four days later, with subsidiary operations designed to draw enemy fighters away from the main point of attack. A total of 72 bombers (mainly Blenheims) took part, with 314 fighters.

QBC Ops.
ORB Appx.
B. 1535.

Following night attacks on targets in the western part of the Ruhr, the main thrust was delivered by means of a low-level attack by the Blenheims. Their approach was /assisted.....

assisted by a Circus operation, in which 6 Hampdens, escorted by 84 fighters, attempted to bomb St. Omer aerodrome.

These succeeded in drawing up a large number of enemy fighters (estimated at 150 Me 109's) and bombed a railway line south of St. Omer instead of the airfield. Meanwhile one Fortress bombed De Kooy airfield with the object of attracting enemy fighters in that region. The Blenheims, escorted as far as Antwerp by Fighter Command Whirlwinds, penetrated through the mouth of the Scheldt and flew to Cologne, where, in good weather they located their targets and bombed from low levels. They met little fighter opposition, and at the same time a further distraction was offered in the form of a Fortress bombing the towns of Cologne and Eindhoven, from 35-37,000 ft. On the Blenheims' return they were met by a wing of Spitfires near Antwerp, and another wing near Flushing, each wing being navigated by a Blenheim. During the withdrawal, also, 144 fighters escorted 6 Hampdens in a successful attack on Gosnay Power Station.

From the whole operation 12 Blenheims were missing, and 8 fighters; while the enemy was believed to have lost 4 aircraft destroyed, 4 probably destroyed and had 9 damaged.

The raid was considered as the most important carried out, up to that time, on an industrial objective. The Knapsack and Quadrath generating stations were regarded as the principal base-load power stations of the Ruhr-Rhineland system, since they together supplied probably 20% of the power consumed in that huge industrial area. The Goldenberg (Knapsack) station also supplied an adjacent chemical plant. The hits scored on the centre of this plant, on a coal tippler and cooling towers undoubtedly caused some reduction of output; while the number of near-misses at both the Fortuna I and II stations at Quadrath was unfortunately high. However, parts of both plants were still inactive after nine days, and, bearing in mind that the total tonnage of bombs dropped was

/only...

BCNO
171.

ITR.30.

-119-

only 22 it was considered that the combined output of the stations was probably reduced by 10%.

The A.R.P. record for Cologne unfortunately contains no relevant material about this raid on the outlying power stations.

A.O.C. 2 Group considered that the reason why vital parts of the objectives were not hit was that the bombs released by pilots flying at chimney height flew over the roof of the objectives, hit the ground and ricocheted into the fields beyond. Following aircraft bombed from above the height at which blast effect would be experienced, probably more than 800-ft., and their bombs were released by observers. The results seemed to him to indicate that pilots should be trained to release their bombs, aiming by eye, from heights between 500 and 1,000-ft., and to ensure that the bombs hit the ground in front of the objective and ricocheted into or against the target. Instead of attacking in boxes of six, each aircraft should attack in turn.

(iii) Other Operations by Light Bombers.

To lose 12 out of 56 Blenheims in one daylight operation was a costly proceeding, and deep penetration into Germany was not again asked of the Blenheims. In fact, apart from sorties against ports in occupied territory, only two more daylight raids were attempted by these light bombers, against Bremerhaven and Heligoland, and both were unsuccessful. The last raid, against Heligoland, was intended as a diversion for a shipping sweep by other Blenheims along the Frisian coast, but it ended unfortunately. The formation apparently made

/an.....

an error in navigation, failed to find Heligoland and penetrated as far south as Scharhorn. Of the six aircraft taking part four failed to return.

In addition to the losses, the lack of success of Blenheim strikes against fringe ports was all-too apparent, the main reason being inability to depend on cloud cover. In six attempts against Bremerhaven for example, the target was never once reached.

However, on 2 June, although an attempt by six Blenheims to locate the liner Europa in Bremerhaven failed for this reason, a successful strike was made by nine Blenheims against shipping in the Kiel Canal. One aircraft claimed that 4 x 250-lb. S.A.P. bombs fell a few yards from a 6,000 ton merchant vessel east of Rendsburg, and the rear gunner raked the super-structure of the ship with machine-gun fire. Another saw a direct hit on a 1,200-ton vessel, which ran into the canal bank. A third fired at a 3,500-ton vessel in the canal. A number of other vessels were attacked but results could not be observed owing to the need for a quick withdrawal. It was reported that the Canal was still closed ten days later. On the same day, 21 Blenheims were despatched to bomb towns and villages in Germany, but without success. One bombed cargo boats in Terschelling harbour, one the aerodrome at Norderney, two were lost, and 17 abandoned their task owing to lack of cloud cover. The same cause frustrated a sweep over N.W. Germany by 25 Blenheims on 11 June.

For 28 June a surprise attack on Bremen was planned and 18 Blenheims set off to carry out a low-level raid.

Unfortunately, when flying just north of Wangeroog, they flew

B.C.N.O.
94.

HQBC.ORB.
App.D.1607.

BCNO.
102.

BCNO.
119.

over a convoy and the operation had to be abandoned since it was obvious that the secrecy of the approach had been compromised.

BCNO.
121.

Two days later, while Halifaxes were attacking Kiel, 15 Blenheims set out to make their attack on Bremen. This time they ran into thick fog, and the leader abandoned the mission. One Blenheim, however, reached its target, at low level, selected a large building in a timber yard in the Holzhafen area and attacked it from 50-ft, with 4 x 250-lb. bombs and 4 x 25-lb. incendiaries. The A.R.P. record of the harbour area of Bremen duly records that 1 H.E. bomb and 4 incendiaries caused two incidents in the Holzhafen, but only slight damage and no casualties. On the return flight this aircraft was attacked by three Me.109's., claimed strikes on them all, and finally belly-landed, badly shot up, at base. Four other Blenheims chose to attack a crowded marshalling yard near Oldenburg, and others bombed shipping and land targets in the Frisians.

AHB/EMS/1/
27.

BCNO 121.

BCNO 126.

The biggest success by No.2 Group was a daylight attack, also on Bremen, on 4 July. Twelve out of 15 Blenheims crossed the coast at Ouxhaven in conditions of fair visibility, little cloud and bright sun, passed below the level of the balloon barrage and bombed the city from chimney height -- as was proved by one aircraft bringing back telephone wires on its tail wheel -- and the leader actually flew beneath a high tension cable. 28 x 250-lb. bombs were dropped. Once again the A.R.P. record is

/available.....

available to show the results of this raid. There is one discrepancy, for the sunlight on which the crews reported so enthusiastically seems to have given way, in the observation of the A.R.P. recorder, to drizzle and rain!

AHB/EAS/1/
26.

There was no doubt about the result, however. According to the Germans, two H.E. bombs fell on the Weser Flug works, destroying a large quantity of newly-manufactured parts for aircraft. One of the Blenheims, hit by flak, crashed in flames near a warehouse in the Atlas works and set it on fire. Two bombs, still on the aircraft, exploded soon afterwards, and caused the deaths of four workmen. In the Atlas works, too, a mine-sweeper received a direct hit. In a near-by works other parts of the burning aircraft caused a traffic hold-up for a long period and caused some loss of production. The four deaths mentioned, and three injuries, were the only casualties in the harbour area.

RECF/DO/6.

For this exploit the leader, A/W/C H.I. Edwards, D.F.C., commanding No. 105 Squadron received the Victoria Cross, and five other immediate awards were made.

BCNO 158.

A further attempt on German targets on 30 July was abandoned owing to lack of cloud cover, and ships were attacked instead. The Cologne raid followed, on 12 August, and the casualties on this and the Heligoland diversion of 26 August put an end to these attempts at low-level penetration.

(iv) Operations by Stirlings.

The Stirling, which had first operated by night in February 1941, was tried out on occasional day operations beginning on 28 April 1941 with an attack on Emden, in which it dived through cloud to attack from 2,000-ft.

/Limited.....

Limited experience on three occasions in May suggested that cloud cover would not often be sufficient for this type of operation to succeed without abnormal risks of interception, and the same conditions spoiled attempts to hit Emden on 10 June, Cuxhaven on 1 July, and a series of towns -- Munster, Krefeld, Munchen-Gladbach (with Rheydt) and Aachen on 18 July, though on 2 July two out of three Stirlings were able to drop 32 x 500-lb. bombs on the sea-plane base at Borkum and claimed hits in the target area. Even this raid, however, did not succeed altogether as a surprise attack, for both these Stirlings were attacked by Me109's, of which they claimed one destroyed and one damaged.

JEAB/39/DO

Stirlings were still extremely scarce and were needed for night operations, particularly against more distant targets, and this type of daylight operation was abandoned from 18 July until 5 November, after the Fortresses, which had replaced them in this role, had been withdrawn as unsuitable.

Attempts on 5, 24 and 25 November and 9 December to reach the Ruhr or small towns between Osnabruck and Bremen came to nothing, as cloud cover failed on each occasion, and the daylight tasks were then handed over for a brief spell to Hampdens of No.5 Group.

(v) High Altitude Bombing by Fortresses.

The failure of the Fortress I to reach the height demanded of it as a stratosphere bomber, and the impossibility of managing its bomb-sight and armament effectively at its practical ceiling have been alluded to already.^(1.) Though, at 30,000-ft., it often presented a poor target to ground gunners, its habit of forming

(1.) See page 17.

condensation trails in most frequently-prevailing weather conditions, added to the lack of cloud cover, made it fairly easy to intercept, and its armament was not sufficiently powerful or manageable for small forces or single aircraft to fight it out successfully with enemy fighters.

HQBC ORB.
8 July.

The Fortresses first operated on 8 July, three being detailed to attack Wilhelmshaven. One turned back owing to a technical failure and bombed Norderney. The other two dropped their 6 x 1,100-lb. bombs from 28,000-ft. on the believed position of the naval base, and apparently achieved such surprise that no flak or fighters were met until the Frisians Isles were reached on the way home. Two Me 109's were then seen at the same height but after taking a quick look they disappeared.

HQBC Ops.
ORB Appx.
A. 154.

PISIR 931.

On 26 July, at their next outing, two Fortresses met with such severe icing, and thunderstorms, that they turned back, but one found clear weather over Emden and dropped 4 x 1,100-lb. bombs from 32,000-ft. The attack was accurate, and the bombs fell in the old town, causing the demolition of at least four buildings, according to photographic evidence. Again there was no opposition.

HQBC ORB
Ops. Appx.
A. 161.

AHB/EMS/5.

The Fortresses were now given the major bombing role by day over Germany. On 2 August one Fortress dropped four H.E. bombs on Kiel, where the German record shows it caused slight damage to private houses, killed one person, injured nine, and made seven homeless. One of the bombs was described by the Germans as a 500-lb. delay action bomb, instead of a 1,100-lb. bomb. A second Fortress failed to reach Bremen as cloud failed.

In support of the Cologne daylight operation of 12 August one Fortress bombed the believed position of Emden, from above cloud, presumably without result. On the

/next.....

next four occasions that Fortresses went out the target was Dusseldorf, but it was never reached owing to icing, contrails or engine trouble. Single aircraft between this date and 25 September failed on three occasions to reach Hamburg, Hannover once, Cologne twice, Duisburg once and Emden twice, owing to the same reasons. The only successful attacks were on Bremen on 31 August and 2 September and Emden on 20 September.

During September two Fortresses were lost on operations and two crashed, and it was decided to withdraw them from daylight operations. The reasons for this have been fully described⁽¹⁾.

(vi) Successful Attack by Halifaxes.

It has already been shown⁽²⁾ that the Halifaxes, first tried on night operations in March 1941, were not really satisfactory until midway through June 1941, when they resumed the night offensive in small numbers. On 30 June, while a Blenheim raid on Bremen was in progress, six Halifaxes were sent out, three to attack Kiel and three to attack Hamburg, making use of cloud cover. This protection was lacking in the Hamburg area, so five Halifaxes made for Kiel, where they were able to locate their aiming points, and dropped 15 x 1,000-lb. and 30 x 500-lb. bombs.

This was, in fact, a most satisfactory raid. The record of the Police-President of Kiel shows that there were 35 H.E. incidents (only 45 bombs were dropped), and that four of these were delayed action. Damage was "widespread." One bomb fell in the Adolf-Hitler Platz, damaging the town theatre; another on open ground just

/to.....

HQBC ORB
Appx A.121.

AHB/EMS/5.

(1) See Page 17
(2) See page 4

to the west; one demolished offices engaged on "food research" and another totally destroyed a building known as the War Material Research Institute. Two bombs, one of them d.a., also fell on a factory making electro-acoustic devices. There were many cases of disruption of the tramway system and water mains, and one crater, in a main street, was nearly 40-ft. wide. Seven people were killed, one missing, 22 injured and 200 homeless.

The Halifaxes were intercepted, however, just west of Kiel at 16,000-ft. and two of them had to dive to 5,000-ft. to escape three Me.110's and a Me.109. One of the bombers eventually reached cloud cover but the other was seen to go down and was not heard of again.

The same priority rule for night-bombing was applied to the Halifaxes after this as to the Stirlings; and the only other daylight operations undertaken were against the enemy naval units.^(1.)

(vii) Hampdens over Germany.

In the raid on the Cologne power stations, on 12 August, Hampdens had caused a diversion over France;⁽²⁾ during September those in No.408 Squadron were used on circuses over France; and in December, following a second barren spell of daylight penetrations by Stirlings, No.5 Group were asked to detail Hampdens for attacks in Northern and Western Germany, to cause alarm and industrial dislocation. They were unescorted, and were instructed to turn back if cloud cover failed. If it persisted, they would navigate to the supposed vicinity of a likely target and pop out of the cloud to bomb - a technique which might be regarded as the inverted counter-part of the "modus operandi" of the common or garden "mole" - and the operation became known as "Moling".

(1.) See pages 150 and 157.

(2.) See page 115.

A short campaign of this kind opened on 10 December with single Hampdens bombing Soesterburg and Gilze Rijen airfields with 4 x 500-lb and 2 x 250-lb bombs each, but attempts by three other Hampdens to bomb Emden, Wilhelmshaven and Aurich ended in last resorts being attacked. The only serious opposition was from heavy flak on board a German battleship of an old type. Operations of a similar kind were only partly successful on 11 December, when the docks at Emden were bombed with 4 x 500-lb. bombs, and a town in the Frisians and Leeuwarden airfield with a similar weight of bombs. On 12 December, while six Hampdens were trying to reach Brest, one more reported by wireless having attacked Gelsenkirchen, but failed to return to base, one bombed Emmerich, but the remaining four did not reach their targets. The Hampdens continued to try to bomb the naval units at Brest by day, and also carried out successful daylight mining operations, but on 21 and 24 December, and on 2 January 1942 single Hampdens, given roving commissions to break cloud cover and make such attacks as they could in Western Germany, had to abandon their tasks. One was missing on the first occasion.

From this time onwards, until 12 February, the importance of hitting the naval units at Brest became paramount, and no more daylight attacks were conducted over Germany until No.3 Group took over the "Moling" operations, in the middle of March, with Wellingtons.

Like the other bombers used temporarily for the day offensive, the Hampdens were not regarded as an economic proposition in this role. They had to be painted for day work, and therefore were not available

5G/26/1/Air

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by night on the many occasions when lack of cloud cover prevented their effective employment by day; and though the A.O.C. of 5 Group (A/V/M Slessor) much preferred their use over Germany to operations over France, the lack of suitable weather robbed this little offensive of the necessary sting.

10. COMBINED OPERATION -- VAAGSO.

Minute in comparison with later combined operations, the attack on Vaagso on 27 December 1941, can be regarded as a significant pointer to the effectiveness of such adventures given adequate naval and air support. This operation, called "Archery", was but one of a series planned at Combined Operations Headquarters, and undertaken to harass the enemy on his Western sea-board, which at that time, extended from the Bay of Biscay to the Arctic Ocean. Lightning attacks on this Western sea-board by land, sea and air, depending for success on perfect co-ordination, timing and the unawareness of the enemy, were to prove that Britain was not entirely content to maintain an attitude of passive defence but could strike effectively and efficiently.

The objects of the Vaagso expedition were two-fold;

- (1) the naval task was defined as the capture, if possible, and otherwise the destruction of merchant shipping found in Ulversund, off the port of Vaagso; (ii) the military task was defined as (a) the destruction and capture of enemy troops and equipment; (b) the destruction of an industrial plant, (c) the seizure of documents, codes and instruments; (d) the arrest of Quislings; (e) the withdrawal of Norwegian volunteers for the Free Force.

/Bomber.....

-129-

BCOO 137.

Bomber Command's part in "Operation Archery" consisted of low level attacks on gun positions and the dropping of smoke bombs to cover a landing party, low-level attacks on Herdla airfield and a diversion off Stavanger. Following a postponement by 24 hours, on account of bad weather, the operation was ordered for the morning of 27 December 1941, after rehearsals in Scapa Flow just before Christmas. Part of No. 50 Squadron, with 10 Hampdens, had moved to Wick in preparation for the operation. The action began at 0848 hrs. with the naval bombardment of the coastal defence battery on Maaloy Island. This bombardment lasted $9\frac{1}{4}$ mins. and in that time the Hampdens were circling above, spotting the point on which they were to drop their smoke bombs. As soon as the bombardment ceased, a shower of red Verey lights gave the Hampdens the signal to descend. They dived to 50-ft. and dropped their smoke bombs along the edge of the island, setting up a complete cover for the troops. One Hampden was hit, and, in attempting to fulfil its mission, went out of control and fell into the water, from which one of the crew was rescued. The smoke bomb fell on a landing craft and wounded 20 men. The Hampdens had first tried to silence the four-gun battery on the island of Rugsundo, but in the almost complete darkness the results could not be observed, and the battery continued to fire though the smoke from their bombs did much to mask it. Finally, the Hampdens attacked gun positions on Vaagso, with machine-gun fire and silenced them for a time at least. In these operations a second Hampden was lost, and the navigator of a third seriously wounded.

5G.ORB.
P.120.

The second part of Operation "Archery" consisted

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of an attack by Blenheims on Herdla airfield, where German fighters were expected to re-fuel and re-arm. This attack was timed for noon precisely, and 13 Blenheims of No. 114 Squadron, carrying 52 x 250-lb. bombs, made a most successful raid on the wooden runways at 1201 hrs at a time when a number of Me. 109's, with their engines running, were about to take off. The only one seen to move down the runway fell into a crater which suddenly appeared in front of it. The navigation of this formation of Blenheims from Lossiemouth to Herdla, in spite of the 300-mile sea journey and the difficulty of spotting the airfield which was covered with snow, was a brilliant piece of airmanship. Two of these 13 Blenheims were lost.

Finally, a diversion in the Stavanger area was carried out by No. 110 Squadron, also operating from Lossiemouth. Of six Blenheims despatched, four were seen to attack a convoy of ships off Obrestad, sinking one of them; but none of the four returned. A fifth secured near misses on a 1,500-ton vessel in the same area, and saw a column of black smoke rise from it. The sixth Blenheim could not attack as it was caught in the slip-stream of the fifth. A further diversion using Stirling aircraft had been planned but the immobilisation of these aircraft over Christmas to deal with German warships which might break out from Brest made this an impossibility.

An important aspect of these operations was the fact that, following a blizzard on the North Scottish airfields, four inches of hard-frozen snow formed on the wings of all the aircraft before take-off. Some aircraft took off thus laden; other crews managed to chip off the snow.

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11. THE BURNING OF CROPS AND FORESTS.(i) Enemy's Growing Food Crops Not Vulnerable.

A type of attack which came under consideration during the summer of 1941 was the burning of German crops and forests. To this subject a good deal of thought was given in the Air Ministry during June and July -- both in regard to the type of objective and the technique of destroying it. At a meeting of the Defence Committee on 21 July 1941 the Prime Minister asked what plans the Air Ministry was proposing to carry out, and the Secretary of State for Air replied that examination of the possibilities had proved the attack on crops to be ineffective, but they were anxious to bomb forests with a new form of incendiary.

DB Ops/1935.
DQ.20 June

DO/(41)
52nd.21
July

WP(41) 183
31 July.

The difficulties of destroying crops were explained in a Memorandum which Sir Archibald Sinclair prepared and which was published as a War Cabinet Paper on 31 July 1941. Certain weather conditions were essential -- namely, high wind following a prolonged dry spell. The burning must be by day to avoid the action of dew; but, on the other hand, daylight operations of that kind were ruled out owing to lack of fighter escort at the ranges involved. Only a small proportion of the 90 million acres of Germany under crop was within range, and it would not be possible to produce a marked effect on the food situation during the approaching winter of 1941-2. For these reasons crop-burning was not planned.

(iii) - The Case for Burning Forests.

As for forests, the most profitable objectives would be dense firwoods, which the enemy used to conceal military targets; and heath planted with firs, which he used for military training. They were to be found in the Thüringer Wald, the Harz Mountains and on Lüneburg Heath.

/During.....

During August it would be possible to attempt the burning of forests near Berlin and Leipzig, but the best time of year for this type of operation was between March and May, during which months, in 1941, the bomber effort could not be spared.

For such an attack 200 bombers would be needed on each area, to swamp local fire-fighting arrangements; and a high wind, following dry weather, was again essential. The conclusion reached was that the effort was justified provided weather was favourable and the bombers could be spared.

S.46344.
28 July.

Meanwhile a directive to this effect was sent to the C-in-C., Bomber Command, on 28 July, but it was pointed out it should not prejudice the main objective and should therefore not be put into effect on moonlight nights with good visibility.

S.46368/II.
113B.

Stocks of a new 50-lb incendiary bomb were provided for this type of attack; but the months of July and August brought no opportunity to develop this plan, and on 29 September 1941 the directive was placed in abeyance owing to the lateness of the season; and the incendiary bombs, which would become ^{un}serviceable unless consumed within three or four months from that time, were ordered to be used against area targets.

12. SUMMARY OF OFFENSIVE BOMBING.

Operations during the summer and autumn of 1941 resulted in a most satisfactory increase in the proportion of sorties and bombs despatched to Germany, compared with missions over occupied territory. From June 1940 to May 1941, this proportion had been maintained at about 60%, but in June and July 1941 it rose to 70%, in August to 78%, and it remained at

/about....

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about 70% until December. By this time it had become necessary to conserve the bomber force for the spring, and since the requirements of the Admiralty in respect of bombing as an aid to sea warfare increased rather than decreased, the proportion of sorties sent to Germany tailed away sadly to between 40% and 50% during the winter of 1941⁽¹⁾.

As for the rival claims of offensive and defensive bombing, the figures show to what extent inability to maintain a sustained offensive, coupled with the needs of the Battles of the Atlantic and North Sea, caused a reversion to the purely defensive role. One may take as offensive bombing the attacks on German and French industrial and rail centres, merchant shipping (since this was a vital part of Germany's transport system), and minelaying; and, as defensive sorties, the attack of shipyards and harbours in Germany, France and the Low Countries, enemy naval vessels and minelaying sorties directed solely against them. It may then be said that in the summer of 1941 the effort was 75% offensive, declining to 60% by November, 50% by December, and striking a new low level in February 1942 at 20%.

It was, of course, the effort required against Brest (to be discussed in the next chapter) that dominated the naval requirement in the winter of 1941-2. The two main categories of target attacked throughout the period were

(i) German transport and industry and (ii) French docks

/and.

(1) See Appendices F and G., which give the total sorties, and percentages of missions on various categories of target. For later periods, these were compiled by the Air Ministry War Room Statistics Section; but the present figures have been built up from the daily records of the same section for the purposes of this narrative.

and harbours, with the enemy naval units they sheltered. Together they amounted always to two-thirds or more of the total effort. As the one prospered, the other dwindled. In June and July 1941 the offensive against Germany took up roughly 2,500 sorties, the French docks 500; in August the offensive soared to nearly 2,900, the French docks only 230. In September and October the offensive was nearly halved, the effort on the French docks was doubled. November and December 1941 were months of greatly reduced effort, owing to bad weather and the policy of conservation. Though a fair balance was maintained in November, at 942 sorties on German transport and industry, and 286 on French docks, in December the figures were much more nearly level, at 713 and 623. By January the sorties against French docks rose to 1,010 compared with 884 on German transport and industry. Finally, in February, taking into account the 242 sorties against the escaping naval units (which were attacked at sea) the comparison was 439 on the vessels and French docks, against 294. The minelaying in the path of the enemy naval units accentuated this contrast.

In terms of percentages of the whole effort of Bomber Command, the attack on German transport and industry dwindled from 72% in August 1941 to 40% in January 1942; the attack on French docks and harbours rose from 6% to 45% in the same period. In February only 20% could be devoted to the offensive while, on account of the movement of the battle cruisers up Channel, 21% of the effort was made on minelaying, 17% on German shipyards and harbours, 13% on French shipyards and harbours, and 16% on the naval vessels themselves -- a total of 67% of the whole effort for the month.

/Thus.....

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Thus the offensive petered out owing to vastly overwhelming circumstances -- inability to expand, (with all its subsidiary causes), the requirements of naval support, the necessity of conserving the force; while, even when in full operation, it lacked that incisiveness which was necessary to bring about the disruption of transport, the crippling of industry and the softening of morale.

SECRET

PART III - BOMBER COMMAND IN THE WAR AT SEA

1. THE CASE FOR MORE DEFENSIVE BOMBING

(i) Admiralty's Request for Renewed Assistance

The rival claims of offensive bombing under the policy of July 1941 and of the Battle of Atlantic did not obtrude unduly, or give cause for high level reconsideration of the arrangements for reconciling them, until well into the autumn, by which time weather was reducing the total effort to some 3,000 sorties a month compared with well over 4,000 a month during the summer.

WM (41)
104th. 20 Oct

On 20th October 1941 the War Cabinet invited the Chiefs of Staff to consider whether the position in the Battle of the Atlantic called for a resumption of bombing attacks on ports used as submarine bases or for the manufacture of submarines.

COS (41)
239 (0)
21 Oct

The Admiralty's opinion, circulated in a Memorandum by the First Sea Lord next day, was clear on the subject. It gave an account of the current shipping losses, showed how the naval commitment was increased by the convoys to North Russia and demonstrated what might be the increased threat from U-boats if the Germans developed the use of supply ships, in which case "the maintenance of our whole war effort, including our bombing offensive, might well be jeopardised". Sir Dudley Pound asked for action to reduce the rate of growth of the U-boat fleet by bombing concentrations of U-boats in the shipyards where they were built, fitted out, and maintained, and also by bombing the adjacent areas in which the shipyard workers were housed.

Taking as an example of shipping paralysis the effect of the bombing of Plymouth in March 1941, the Admiralty estimated that comparable results could be obtained by five attacks each on Hamburg, Kiel, Bremen and

and Wilhelmshaven, provided the total sorties on each were 1,335, 667, 534 and 667 respectively, plus a percentage necessary to off-set the considerable areas of water at each port, amounting to two-thirds at Bremen and half at Hamburg and Wilhelmshaven.

The First Sea Lord's recommendation was that Bomber Command's directive be amended to permit of action against these ports on a higher priority, and also of action against operational bases, which included Brest, Lorient, St. Nazaire and Bordeaux.

The Air Ministry attitude, as evidenced by a loose minute from D. of Plans to C.A.S. (23 October 1941) was to resist any change which required the bombing of operational bases, but to agree to higher degree of priority for attacks on the yards, especially Hamburg and Kiel. They could ^{not} concede harassing attacks on the operating bases, without any guarantee of their effectiveness.

(ii) - Four Ports for Attack,

S.46368/II
125A.

This attitude was embodied in a draft directive to C.-in-C., Bomber Command, asking him to choose targets in the ports of Hamburg, Kiel, Bremen and Wilhelmshaven whenever the weather was such that he decided to attack North West Germany, and it was left to him to follow his present principle of repeating successful attacks as frequently as weather allowed, to achieve the effect of concentration.

COS (41)
367th.
25 Oct.
and Annex
II

This draft was approved by the Chiefs of Staff on 25 October, and, in deference to the wishes of the Admiralty, attention was drawn in the directive to the importance of Lorient (Brest was already undergoing heavy attack) but no diversion to these bases was ordered.

PM D
290/1

This decision was submitted to the Prime Minister, who, as in the case of the directive on bombing policy in June, ⁽¹⁾ took exception to the form in which the aim was set out. In a

(1) See page 58.

minute on 28 October he recalled that he had several times asked for a forecasted programme, or bill of fare, for the month. The danger about issuing directives of this kind was that the point mentioned might take too large a share of the available effort. All programmes must, of course, be subject to revision through weather or events. He asked to see Bomber Command's proposals for November, assuming normal weather conditions, and said the bombing programme could never be considered except as a whole.

A minute was returned to the Prime Minister showing that in October, with no emphasis on shipyard attacks, the weight of attack had been:- transportation and morale, 49.8%; industrial and morale, 22.4%; shipyards, 9%; aircraft factories, 7.5%; land armaments (e.g. Essen), 8.7%; power stations 2%; others .68%. Allowing for the increased emphasis on shipyards it was now proposed to operate in November, as follows:- transportation, 45%; industrial and morale (mainly at submarine ports) 30%; Battle of Atlantic targets (submarine shipyards and Brest naval units) 15%; others (Berlin, Essen, Italy, Brest, Cherbourg and mining):- 10%.

(iii) U-Boat Operational Bases.

The proposal to bomb the U-boat bases on the Bay of Biscay was, as is seen from the above, left virtually in abeyance. It was to come before the Air Staff and Bomber Command much more prominently in 1942-3, and it is worth noting here that the scheme had been put forward as a practical proposition in a letter written to C.I.S. by Air Marshal Joubert shortly after taking up his appointment as A.O.C.-in-C., Coastal Command, in June 1941.

CC/S.7010.
22 June.

Actually, during the summer of 1941, one attack had been made on Lorient in an effort to reduce the activity

/of...

of U-boats operating from that base. 47 aircraft attacked on the night of 4/5 July, and did considerable damage at points on the west side of the Port Militaire; but the bomb-load consisted entirely of H.E. and although the night photographs showed the target had been accurately located it was equally

PISIR 950

PISIR 1046

evident that a large proportion of the semi-armour piercing bombs used had fallen in water.

DA.K.1131.

A few Wellingtons attacked Lorient as a last resort target on 13/14 September, without visible result, and Hampdens and Manchesters were sent on 23/24 November, without achieving much damage.

St. Nazaire was attacked four times in January and February 1942, but on each occasion cloud or haze spoilt the attack.

2. - NIGHT ATTACKS ON GERMAN PORTS

(i) - Bremen.

Compared with results in the interior of Germany, raids on German ports, given good weather, were already producing better examples of concentration, judging by the evidence of night photography. It was estimated, by Operational Research Section, that in the best weather and moonlight 50% of sorties could be expected to reach German coastal targets, dropping to 30% with haze or 5/10ths cloud, while in the non-moon period this figure could be expected to fall to 30% in clear and 15% in hazy or cloudy conditions. The Chief of German A.R.P. in the S.W., or harbour, area of Bremen, recorded that up to the first three nights in January 1941 British bombers had attacked at random; but now "works and warehouses of importance to the war and its maintenance were hit with great success. The attackers must have been very well informed and trained; most likely they had been prepared by British information services".

AHB/EMS/1/17.

/This....

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This valuable record, however, shows no evidence of success from the night raids during June, July, August and September, and one can only conclude that the harbour area escaped, except for 1 H.E. bomb on 29/30 June, causing slight damage in the Holzhafen; a few incendiaries on 14/15 July; an H.E. incident in the Industriehafen on 29/30 September (this evidently a last-resort bombing by one aircraft); and two more on 20/21 October. Our own sources offered rather more evidence, because they covered the industrial parts of the town as well. A direct hit on the Atlas Werke was claimed by daylight cover of the 25th June, and a 4,000-lb. blast area, of 200 x 130 yards in the old town by 7 July; but by mid-August it was conceded that damage was of a minor character. There was evidence of a factory and grain warehouses being destroyed; with 26 casualties, on 21/22 January, but generally Bremen could not be claimed as more than slightly damaged in this period -- in spite of nearly 1,500 sorties, 950 of them claimed successful, a bomb-tonnage of 1,200 tons, and more than 50 bombers missing. None of the principal targets -- the Deschimag works, the Focke-Wulf factory, or the Vegesack ship-building yards - had received damage of major importance.

(ii) - Hamburg.

A very similar degree of effort was made during the period under review against Hamburg -- particularly against the Blohm and Voss and Havalts ship-building yards. There were five raids, amounting to 250 tons, during the summer; in the autumn five more, with 500 tons; and in the winter four raids with 450 tons. No German records are yet available for this part of the war, but our own reconnaissance showed some results in vital areas by the end of September. By this time the dock area south of the Elbe, (which was to be heavily devastated in summer 1943) was the scene

DA K 1162
and
ITR 32

/of.....

OOS (41)
239 (0)

DA K. 1209
and 1238.

of a considerable number of incidents, and the First Lord of the Admiralty, in a special report on the increasing submarine menace, stated in October that delay in producing submarines had certainly been noticeable, but that a greater effort was necessary. Three raids between 31 October and 30 November, however, failed to produce any really significant damage to the submarine yards, though on two occasions there was excellent weather over the target. A few vessels were destroyed in the harbour and woodstores were burnt out, during two raids in mid-January.

(iii) - Kiel.

At Kiel the main target was the Deutsche-Werke submarine and ship-building yards. The reports of the Police-President of the town, in his capacity of Chief of A.R.P., show a number of incidents to have occurred at this target, though they do not, of course, deal with the question what delay or dislocation in fitting out and repairing vessels may have been effected. Later the floating dock in which the Gneisenau was berthed after escaping from Brest became a vital objective.

The Bomber Command effort amounted to nine raids during the summer, with 650 tons; three in the autumn with 200 tons; and three in the winter with 200 tons of H.E. only, directed against the Gneisenau.

A raid on 20/21 June 1941, by 88 aircraft over 10/10ths. cloud, appears not to have hit Kiel at all.

On 23/24 June 21 heavies and mediums claimed to have attacked with 56 tons of bombs, and the German police record that one bomb of heaviest type, falling in the water, damaged buildings and 75 houses in a radius of $1\frac{1}{2}$ kilometers, in the central area known as Kleine Kiel. Casualties were one killed and eight injured. On this occasion there was only haze over the target.

There is no evidence of damage from a raid by 42 mediums on 24/25 June, when thin cloud and thick mist prevailed, and the following night 25/26 June, in haze, 41

/aircraft....

AHB/EMS/5.

aircraft, dropping 53 tons of bombs, caused 5 H.E. incidents, damaging private property. Seven civilians were hurt and 25 homeless.

The raid of 26/27 June is also ignored, (there was thick haze and cloud) but due mention of damage in a daylight attack on 30 June appears.

AHB/EMS/5.

A smaller raid on 24/25 July, with only slight haze, appears to have concentrated against the eastern side of the harbour. 49 Wellingtons and Hampdens claimed to have dropped 132 H.E. bombs on the Kiel area, and the Germans record 10 as having fallen. Three fell near the Deutsche Werke yards, but all were in the water. The others damaged some dwelling-houses, water mains and electric cables, and one dropped 200 metres from a radio station. The casualty list was only three hurt and four homeless.

On 2/3 August poor visibility marred an attack by 33 Hampdens, and only slight damage to private houses, making 7 people homeless, was recorded.

After another daylight raid, there was a 100-ton attack on 8/9 August, in which 82 Hampdens and Whitleys reported dropping about 520 H.E. bombs and some incendiaries. The German census shows 39 H.E. incidents and some 300 incendiaries, but these must have dropped to good effect, since it is admitted the whole of the electric power supply of Kiel failed at the start of a two-hours' raid, through a direct hit with H.E. on a main cable. However, the supply was restored, by means of relays from other areas, at the end of the raid. Meanwhile, tramway lines and wires water main and telephone cables were cut in many places. Six H.E. bombs damaged buildings, docks and railway lines in the naval wharves of the Kriegsmarine-Werft; while an employees'

/hostel....

AHB/EMS/5.

hostel was totally destroyed by incendiaries. 5 H.E. bombs fell on a foreign workers' camp, destroying a barrack block, killing eight Italians and injuring 14 more. Ten H.E.'s fell near a water tower, and the remainder caused extensive damage to civilian property.

A month later, on 7/8 September, a smaller raid in clear conditions seems to have resulted in most of the bombers crossing Kiel without attacking. 36 out of 51 reported successful bombing, with 140 H.E. and 6 tons of incendiaries. The German record shows that 16 H.E. incidents included two delay-action 250-lb. bombs, which exploded later, rendering 829 people homeless, these being the only casualties. 2 H.E.'s damaged the office of the Reichsbahn works, the loco sheds and one locomotive, while one of the delay action bombs caused the evacuation of the whole main "works" of the Post Office. An engine workshop in the Deutsche Werke was destroyed, and a floating repair contrivance was sunk; but of seven bombs in and near the Deutsche Werke, five fell in water. No private property was touched in this raid.

AHB/EMS/5.

The next attack on Kiel was by 51 Wellingtons on 11/12 September, and again many bombs fell into water, particularly at the Deutsche Werke. Two H.E. bombs hit the boiler-house of a factory making special oils for margarine, causing about eight days' loss of production. A few ships were hit by incendiaries, without loss, and some damage to houses, mains, three fatal casualties, five injuries, and loss of homes of 70 people was caused.

AHB/EMS/5.

On 23/24 October, when the Hipper and Lutzow were believed to be in Kiel, 93 aircraft claimed to have attacked. The bulk of a force of 114 bombers, operating as a first wave, found 10/10ths cloud, and 33 out of 70 claimed attack. The German record estimates that 23 out of 34 reached the target

/in....

in this phase. Later 36 out of 44 Manchesters and Hampdens found better weather, but the German estimate was 8 out of 11 successful. There were 19 H.E. incidents, and 100 incendiaries. Three H.E. caused extensive damage to the railway, disrupting main-line traffic, including that to and from Hamburg, and also goods traffic. Three more bombs damaged a precision workshop and another engaged on tank weapons at the Deutsche Werke; while an 84-ton motor schooner in a canal, laden with cement, was sunk.

AHB/EMS/5.

Two raids in November (1/2 and 15/16) were known to have been virtual failures, owing to cloud and icing, and the German record shows that a few aircraft, evidently those briefed for Hamburg, were actually over Kiel on the night 30 November/1 December, and dropped 6 H.E., with very slight damage and casualties.

AHB/EMS/5.

The last three raids were on successive nights at the end of February. On 25/26 February 36 aircraft claimed to have dropped 58 tons of H.E. The German census counted 28 incidents, including one "aerial mine". Again three H.E. bombs fell on the Deutsche Werke, damaging a crane and a building, and destroying a second building. At the Kriegsmarinewerft five bombs fell, one hitting a "house-boat" and others falling on the quay-wall. The Kriegsmarine pay office was damaged by fire, an Army barracks destroyed, and high tension cables torn down. 12 people were killed, 58 injured, 11 missing and 207 homeless. Damage to several clinics and the university was recorded.

The following night, 26/27 February, in another effort to hit the floating dock housing the Gneisenau, 26 bombers claimed to have attacked Kiel in good weather. The German figures show six bombers got through, and dropped 30 H.E., of which one "aerial mine" and 5 250-lb bombs were delay action. A foundry of the Krupps Germania Werft was

/destroyed....

destroyed, water mains were hit, 12 people killed, 12 injured and 117 homeless. Damage to houses was described as fairly extensive.

The third of the series of nightly raids, and the last of the period, on 27/28th February, was carried out over 10/10ths cloud and presumably no aircraft reached Kiel, for no attack is recorded.

From this record it would appear substantial damage was never done to Kiel at this period. No fresh light is thrown on the supposed damage to the Gneisenau. There is no record of the nature or size of the "house-boat" described as being hit on 25/26 February; but it is interesting to note that the incident was reconstructed from photographs at the time, and intelligence sources reported that the ship was then housing some of Gneisenau's crew.

(iv) - Lübeck, Rostock, Warnemünde

On no occasion during this period was Lübeck taken as a primary target, though at the end of March 1942 the extremely effective incendiary raid on this town opened up a new era of bomber attacks.

However, on 7/8 September 1941, one Stirling, detailed to attack Kiel, chose Lübeck as a last-resort target and reporting dropping 5 x 1,000-lb and 4 x 500-lb. with 480 incendiaries. A record found in the town after the end of the war records that on this night 30 bombers approached the area, and that the spearhead dropped 8 H.E.'s and 218 incendiaries. The incendiaries dropped on a prisoner of war camp, and were put out by the British housed there, one British major being severely injured. The H.E. did little damage. One aircraft also attacked on 11/12 September, but caused no damage of consequence.

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IDR.44.

AHB/EMS/4a.

-147-

BCIR. 1882.

The main targets on this night were Rostock, and Warnemunde, but there was no evidence of success or otherwise, except from an intelligence source which reported that the Heinkel Works at Warnemunde was seriously damaged, with heavy casualties, and the railway line cut. There was no photographic confirmation.

(v) - Wilhelmshaven.

DA.K.
1181 &
1239.

Night raids on Wilhelmshaven produced a number of minor incidents, damaging quays and dock buildings at the Deutsche Werke, Tirpitz Hafen and Scheer Hafen, but the scale of attack was small, amounting to only about 500 tons between July 1941 and February 1942, in a total of eight attacks.

3. DAYLIGHT ATTACKS ON PORTS AND THEIR SHIPPING.

During this period Blenheims, in addition to attacking merchant shipping off the coasts of Holland, Belgium and France, made several determined and spectacular raids on the ports in occupied territory used by these vessels. They had to make use of cloud cover for their low-level approaches to their targets, and their losses were surprisingly light.

Of these attacks the most spectacular were two raids on Rotterdam. It was of these that Mr. Churchill wrote:- "The charge of the Light Brigade at Balaclava is eclipsed in brightness by these almost daily deeds of fame".

BCNO 140.

The first raid was carried out at a time (16 July) when photographs had shown the port to be packed with shipping. The Blenheims went in at mast height, achieving complete surprise, and attacked in two waves of 18, in line abreast. No fewer than 17 ships, totalling nearly 100,000 tons, were claimed as destroyed, and five more, totalling over 40,000 tons damaged. The raid was seen to be greeted with enthusiasm /by....

by the population of Rotterdam. German fighters took off too late from the Waalhaven aerodrome, for the Blenheims made rendez-vous just after the attack with their fighter escort. Four Blenheims were destroyed by flak, which was of considerable intensity.

BCNO 188. Six weeks later, on 28 August, these low-level tactics were repeated, though on this occasion the Spitfire escort accompanied the Blenheims throughout, and drove off slight opposition from Me 109's on the homeward flight. The flak on this occasion was more deadly, and 7 Blenheims out of a small force failed to return. Besides a cargo liner of 9-10,000 tons which was sunk in the shallow waters of a quay near Wilton's yard, direct hits were scored on warehouses, engine shops, docks, quays, and other port facilities. At this time the importance of Rotterdam was continually being emphasised, and it was actually considered as being possibly of equal importance as Hamburg.

TIC 46th
49th and
54th.

DA.K.2470 Boulogne was three times bombed successfully by Blenheims by daylight, photographs on the last occasion showing direct hits on invasion barges at the Quai Chanzy, roads and goods yards near the tidal harbour, and on the harbour facilities.

PISIR 1030. The first of five attacks on Cherbourg, on 10 July, ended in a direct hit on an oil pumping station on the east quay of the Darse Transatlantique, and another on a quay close to a tanker. A raid by 34 Blenheims on 24 July, as a diversion to operation "Sunrise" against the naval units at Brest, caused hits on the Quai Napoleon, the adjoining Place de la République, and probably on the Town Hall. On 4 Sept 6 Blenheims put down

PISIR.1113. 2 tons of bombs in the area of the Bassin Napoleon III (some fell in the water), and in the same area on 20 September bursts were photographed on submarine shelters in the same basin.

DA K.1151.

/Four....

Four attacks on Le Havre brought less success. At Ostend, after a lull in these operations during the winter, 6 Blenheims on 28 February 1942 dropped bombs successfully on the concrete pens used by small surface craft, and on the platforms and tracks of the main passenger station.

4. - ENEMY WARSHIPS IN HARBOUR AND AT SEA

(i) - A Major Diversion.

While a new emphasis on certain North-West German ports was a factor that coincided well with Bomber Command's general offensive, it was otherwise with the attack on the enemy naval units, Scharnhorst, Gneisenau and Prinz Eugen when these powerful surface raiders took refuge in Brest. Their attack was always regarded as rather hopeless -- and therefore as an unwelcome diversion from other tasks -- a view that gave rise to considerable controversy. Even as early as April 1941 the C-in-C (Sir Richard Peirse) had argued the case with C.A.S., pointing to the large wastage of bombs inevitably falling into the waters of Brest Harbour; and Vol. II of this narrative will have shown that the priority allotted to this task was down-graded in May 1941, Bomber Command being instructed to put out an occasional harassing raid against Brest. But, before May ended, Prinz Eugen was temporarily loose in the Atlantic, following the loss of Bismarck, and further heavy attacks had to be made when she was located in dry-dock at Brest on 4 June 1941.

During the period of the June moon four night attacks were made on the naval units in dock, and about 430 tons of H.E. was claimed to have been dropped on Brest. The heaviest raid was by 110 bombers, mostly mediums, with a few Stirlings.

/On.....

RECP/DO/6
15 April

On each occasion a smoke-screen was reported as efficiently screening the vessels. As the July moon came to the full three raids of a similar scale (320 tons) were made by night, and again, even when weather conditions were perfect, smoke prevented adequate target location. In June there had been no bomber casualties; in the July raids 5 out of 247 were lost.

DBOps.
Arch. 1 1a.

The difficulties in the way of final success against these ships were adequately summed up by D.B.Ops, in a note to the P.S. to the Secretary of State:- "Heavily protected ships in dock will always be difficult to damage decisively. They cannot be sunk; the opportunities for under-water damage are absent; and full facilities for repair are always available. Despite these difficulties and the protection afforded by strong fighter and gun defences, it is clear from their prolonged stay that damage of a serious nature must have been done to all three ships by our bombing from time to time".

JCS/DO/16

Moreover, the A.O.C. No. 5 Group (A/V/M Slessor) in a characteristic note to the C-in-C towards the end of the June attempts, assessed the odds against hitting the ships as "The national debt to a tin-tack....our bombs either pitch into the water or into a French town, and the crews do get very browned off with it". He suggested setting aside one squadron as an anti-shipping unit, with the best equipment and picked crews, and letting them train continuously against moving targets. (Three years later his own Group under another A.O.C., was to provide a special squadron which finally disposed of Tirpitz in a Norwegian fiord). Meanwhile it was his alternative suggestion -- a daylight operation -- that was put into practice.

(ii) - A Costly Operation by Daylight.

No. 2 Group had endeavoured, on 12, 14 and 15 June, to send a few Blenheims to make surprise attacks on Brest; but on each

/occasion...

-151-

occasion cloud cover was lacking and the task was abandoned. Now a precision attack by day was planned, under the name of Operation Sunrise. By 18 July there were five squadrons of Spitfires available in Fighter Command with long-range tanks permitting them to operate effectively in the Brest area, as escort for our bombers.

B.C.O.O.
134.

It was estimated that the enemy had about 30 Me.109's and 9 Me.110's or Ju.88's as his fighter force within easy reach (say, 50 miles) of Brest, and a further 60 Me 109's dispersed between the Cherbourg peninsula and the Channel Islands. His advance warning system was expected to give him information of aircraft approaching at 100 miles' range if flying over 5,000 ft. It was therefore planned to send over first whatever Fortresses were available, at high altitude, to bring up the fighters, followed by escorted Hampdens. The enemy was expected to commit his fighters against these two forces, and the main force of Wellingtons, Stirlings and Halifaxes was to arrive 45 minutes later, when it was hoped these fighters would be either destroyed or re-fuelling, and before they could be reinforced from the Cherbourg-Channel Islands area. Meanwhile, Blenheims would make an attack on Cherbourg to attempt to hold these reinforcements even longer.

Before this attack could be made, Scharnhorst left Brest (on 22 July) for La Pallice, where, on the following day, three Stirlings, out of six detailed, made an attack, in which one H.E. bomb (2,000-lb. A.P.) secured a direct hit or a very near miss, which caused sufficient damage for her sortie into the Atlantic to be cancelled. During the night 23/24 July 25 Whitleys attacked her again at La Pallice, with 40 tons of H.E., but inconclusively,

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It became necessary to detach the 15 Halifaxes from operation Sunrise, when it took place in the afternoon of 24 July, and to send them against Scharnhorst at La Pallice, while the Stirlings were also withdrawn, thus diminishing the concentration in the main attack on Brest.

The attack took place in clear weather which gave the gun defences of Brest a great deal of assistance and to some extent broke up the bomber formations. Until this happened virtually no fighters attacked but immediately the bombers became dispersed -- some diving rapidly to clear the defended area, others holding on to their course and altitude -- numerous attacks by Me.109's developed. Bomber losses on Brest were 9 Wellingtons out of 78, and two Hampdens out of 18. The three Fortresses in the first wave escaped losses. From the attack on La Pallice, five Halifaxes out of 15 failed to return. The Blenheims completed their diversion against Cherbourg without loss, but the total casualties for the day were 16 bombers out of 150. This was a scale of wastage that could not be tolerated, and led to an Air Ministry conference at which the future of daylight operations was reviewed.^(1.)

The operation had fulfilled with a vengeance the incidental aim of causing German fighters to come up against our escorted bombers. German losses were claimed to be 21 destroyed, 8 probably destroyed and 8 damaged.

No direct hits were scored against the enemy ships, but the Fortresses brought back photographs showing bomb bursts on the Port Militaire, close by, and on points in the town of Brest itself. The enemy had not, on this occasion, used his smoke screen.

Twice in August two Fortresses attempted high-level bombing of the vessels, but again without conclusive results.

(1.) See page 113.

/The....

The three ships remained in dock until 16 December.

(iii) Harassing Scale of Operations.

Cyph. Sig
X.483

On the approach of the August moon, D.C.A.S. and C-in-C Bomber Command decided, on 5 August, that if weather conditions prohibited attacks under the transportation and morale plan, and conditions over Brest were suitable at least one night attack should be delivered on the battle cruisers. The C.-in-C. thought 100 tons would be the minimum necessary to secure a fair chance of a hit. The weather conditions did not prove propitious, and the attack by night was not resumed until 3/4 September, 1941. On that occasion, after 140 bombers had taken off, there was a sudden change in the weather, involving risk of fog at bases, and Nos. 1, 4 and 5 Groups were recalled. Some 56 Wellingtons and Stirlings of No.3 Group attacked, but once again their bombing was hindered by the use of smoke. The operation was repeated on 13/14 September, in conditions of intense darkness, and 120 aircraft carrying over 170 tons of H.E., were reported as having attacked. There was no evidence to suggest any marked success from this attack, and from then to 16/17 December a harassing scale of operations only was put out.

In this phase Brest was visited on 17 nights and was attempted by Hampdens unsuccessfully on two daylight missions. The average effort by night was some 15 aircraft (varying from 6 - 30), and the average weight of bombs dropped was 20 tons of H.E. Only one bomber was lost from these operations. It was hoped, by these means, to take the enemy by surprise and, by using a profusion of flares, to overcome the tactical disadvantage arising from the use of smoke.

/ (iv).....

(iv) - Attack on Highest Priority.

Immediately upon the attack by the Japanese at Pearl Harbour on 7 December 1941, and the declarations of war that followed, destruction or neutralisation of enemy

~~capital units~~ capital units became a matter of the utmost

S.46368/II
1421.

importance. The commitment of the naval units at Brest was again handed to Bomber Command, in a directive of 10 December 1941, which requested a maximum effort of up to 50 sorties, within the bounds of tactical conditions, for each night when the weather was sufficiently favourable, (It will be noted that this request was made after a firm policy of conservation in Bomber Command had been in force for just a month, and the scale laid down was therefore comparatively more exacting than if it had occurred in the summer).

The night scale of attack was stepped up, on 17/18 December, to over 100 sorties, dropping 140 tons of bombs; while on 16/17 December and several nights during the remainder of that month, Stirlings were included in the attack, using the "Trinity" beam as a bombing device.

DO(41)72nd
(7) 15 Dec.

The chief hope of success at this critical time, however -- the urgency being heightened by the fact that Prinz Eugen left her dock on 16 December -- lay in another daylight operation of some magnitude. Plans for "Operation Veracity" were laid before the Chiefs of Staff on 16 December by V.C.A.S., and the attack occurred on 18 December.

BCIR 2095

COS (41)
423rd.
16 Dec.

This was an operation by heavy bombers only, consisting of 18 Halifaxes, 18 Stirlings and 11 Manchesters. The operation was preceded by a Blenheim "Circus" in the Pas de Calais 15 minutes before zero hour at Brest, and the heavies were timed to attack in 24 minutes after zero hour. The heavy bomber crews trained for a few days in formation-flying, as it was intended to attack in sections of three.

BC00.
1388.

/The.....

The approach was made from the landward side of Brest which was the less heavily defended.

Naval and
Damage
Assessment
A.K.1.
23 Dec.

The operation was a success from the point of view of bomb-aiming. One bomb scored a direct hit on the stern of the Gneisenau, and another fell between the stern of Scharnhorst's stern and the wall of her dock. Other bombs fell between the starboard side (aft) of the Gneisenau and the dockside; the recess of the lock gate covering the Scharnhorst's dock; and between the starboard side of the Scharnhorst and the dock wall. The extent of the damage could not be gauged from the photographs, but subsequent events proved that neither vessel was permanently crippled. The attack, must, however, have increased the advisability, in the eyes of the German High Command, of getting these vessels to a home port before they were finally disposed of by our increasingly heavy offensive. In this daylight raid, five bombers and one fighter were lost, and three enemy aircraft were claimed as destroyed.

COS(41)
430th.
22 Dec.

On 22 December 1941 the Chiefs of Staff still gave the highest priority to attacks on these vessels, and over Christmas 200 heavy and medium bombers were immobilised from other operations in view of the imminent prospect of the vessels breaking out from Brest. The danger passed, however, and a considerable scale of effort was maintained on 27/28 December 1941, on fourteen nights in January and three in February. Nearly 1,000 sorties were flown, and 1,050 tons of bombs dropped. One more daylight attack, by 14 Halifaxes was also made on 30 December 1941, but without success, and three heavy bombers were lost.

(v).....

(v) The Escape.

DONC/Ops. 15
29 April 1941

Plans had long been formulated for an attack on Scharnhorst and Gneisenau in the event of their attempting what was regarded as the unlikely course of trying to pass the Straits of Dover by day. Such a course, it was thought, at the Air Ministry, would offer a unique opportunity to surface vessels and air striking force to engage the ships while in the Straits of Dover. It was not worth while holding air striking forces in readiness, however, until such time as Coastal Command reconnaissance reported the ships absent from Brest.

BCOO 133
1 May 1941

Bomber Command therefore drew up orders for "Operation Fuller" designed to ensure the attack of the vessels with limited forces between Cherbourg and Dunkirk by daylight and with the maximum possible striking force in the Straits of Dover by daylight. It was not intended to attack with aircraft at night. The general scheme of attack was to launch A.P. and S.A.P. bombs from high level, and also to lay mines along the track of the vessels.

Board of
Enquiry Rept
para. 2.

By 1 February 1942 all three ships were out of dock, and their seaworthiness was not believed to have been seriously affected by bombing. Tirpitz had sailed from Kiel to Trondheim, possibly to divert attention from Brest, where, in the previous few days, two destroyers, five torpedo boats and eight minesweepers had congregated, giving rise to the belief that the ships might attempt to leave Brest. On 2 February the Admiralty drew up an appreciation, stating that, although a break-out to the west or south could not be ruled out, the ships would most probably proceed up channel. These views were passed on to C.-in-C. Bomber Command through the Naval Staff Officer, and on 3 February Air Ministry made the signal "Executive Fuller" to all three operational Commands.

Ibid.
Appx. 1.

Ibid.
Para. 7.

/Coastal...

Ibid.
para. 12.

Ibid.
para. 13,
" 14

Coastal Command, on 8 February, issued to Bomber and Fighter Commands an appreciation expressing the view that the enemy were likely to break out up Channel, most probably from 10 February. Scharnhorst was seen again in dock on 8 and 9 February, but was out again on 11 February, as were the other two heavy units. There were six destroyers in harbour. On the other hand, the fact that torpedo booms were still in place protecting the ships, and the absence of signs of fighter concentrations did not suggest a move that night.

Ibid.
para. 10.

Meanwhile, between 3 and 9 February, Bomber Command had laid 98 magnetic mines in five specified areas off the Frisian Islands.

Ibid.
para. 96.

Undetected, the naval units on 11/12 February slipped through the night air reconnaissance patrols, in circumstances which, with the attendant consequences, were later the subject of investigation by a Board of Enquiry consisting of Mr. Justice Bucknill, A/C/M Sir E.R. Ludlow-Hewitt and Vice-Admiral Sir T. Hugh Binney. The vessels were first identified, following various R.D.F. plots, by Fighter Command aircraft, at 1042 hrs. on 12 February. Bomber Command received this information at 11.27 hrs.

Ibid. para
116

The degree of readiness at which Bomber Command had been standing had been left (rightly in the view of the Board of Enquiry) to the C.-in-C. On 4 February, when "Fuller" was put into operation, the bomber forces detailed for a possible attack were put at two hours' readiness - a state at which they could not be kept for long because it involved the standing-by of crews in the vicinity of their aircraft and meant that all their training and other operational work came to a

/standstill.....

standstill. About 6 February Bomber Command asked Air Ministry whether they could be released from "Fuller". The Air Ministry replied that before this could be done the Bomber Command should consult the Admiralty. This was done at once and the Admiralty replied that the degree of danger of the ships coming out had not in any way become less, but, if anything, was increasing as the tides became more favourable. The Bomber Force detailed for "Fuller" was placed at a state of four hours' readiness. This was subsequently modified, the arrangement being for 100 bombers to stand by on four hours' readiness, loaded up with A.P. bombs, and the rest of the force was stood down. The Board of Enquiry expressed the opinion that in the absence of any notice of the partial failure of the night patrols the degree of readiness in Bomber Command was reasonable, Bomber Command being entitled to expect that they would receive a reasonable notice of the approach of the ships and of the time of the attack. On the other hand Bomber Command should have informed the Admiralty of the reduction in readiness so that the matter could have been reviewed jointly by the Air Ministry and the Admiralty.

Ibid. para.
117

When the news was received at Bomber Command headquarters at 11.27 hours all operational Groups (Nos. 1 to 5) were immediately warned to prepare to attack and were asked to report when they would be ready for take off. There were then available some 310 operationally fit aircraft with crews, from which must be deducted 50 Witleys and some snow-bound Wellingtons; giving a final total of about 240 for the operation, including a number of aircraft which had operated during the previous night.

Ibid. para
67.

Ibid. para
68.

The weather in the Channel and the North Sea had been given as 8/10ths. to 10/10ths cloud, with the base never higher than 2,000 feet and down to 700 feet in showers.

Ibid. para
69.

/Visibility...

-159-

Visibility was expected to be about 1,000 to 2,000 yards. Moreover, it was known that as the warm front proceeded south the weather would inevitably get worse during the afternoon.

Ibid. para
70.

The C-in-C. realised that there was little chance of his Command being able to cripple the ships. With the cloud base at 2,000 feet or less, armour piercing bombs would have inadequate penetration. General purpose bombs could not achieve penetration but might cause some damage to the ships by blast. The C-in-C therefore decided that the main aim of his Command must be to distract the ships' attention while the torpedo bombers and surface craft were in action. Orders were given that General Purpose bombs were to be substituted for armour piercing bombs to the greatest extent possible, but that the departure of the first wave of bombers was not on this account to be held up. A certain number of armour piercing bombs were retained in the hope that possible breaks in the cloud might enable a high-altitude attack to be carried out.

Ibid para.
71.

After consultation with his Naval Staff Officer and with Coastal Command, the C-in-C decided to organise his attacks with all available aircraft into three waves (i) 1430-1500 hrs; (ii) 1600-1630 hrs; (iii) 1745-1810 hrs. He hoped that this arrangement would enable the bombers to distract the enemy ships while the main Naval and Coastal Command attacks were launched. It was realised, however, that, owing to the bad weather and the large number of squadrons and stations affected, it would be impossible to compress the attacks rigidly within the planned timings. Arrangements were made with Fighter Command to give high cover to the bombers in the first wave, but it was agreed that the second and third waves would reach the ships /beyond...

beyond the limits of short-range fighter effectiveness.

Ibid. para
72.
and HQBC ORB
12 Feb 1942

The first wave of 73 aircraft was airborne between 13.30 and 14.20 hrs. and were over the target in the waters off the Dutch Islands between 14.55 and 15.58 hrs; the second wave of 134 aircraft took off from 14.37 to 16.00 hrs and attacked

between 16.00 and 17.06 hrs; the final wave of 35 aircraft took off between 16.15 and 17.05 and attacked from 17.50 to 18.15

Ibid. para
73.

hrs. In the early afternoon visibility was less than 1,000 yards, with 10/10ths clouds at 500-1,000 feet; and visibility actually deteriorated later to a few hundred yards with rain.

A high proportion of the aircraft despatched reached the

vicinity of the German naval squadron, but were unable to

locate the ships owing to low cloud and failing visibility.

Some found the ships and made repeated attempts to gain enough

height to carry out an effective attack. Each time they did

so they found themselves in cloud and lost sight of the ships.

The one advantage of the weather was that it screened them from enemy fighters, and few reports of encounters were received.

On the other hand, as many aircraft were flying between the sea and low cloud in a failing light, some of the casualties may have resulted from aircraft flying into the sea.

Ibid. para
74.

Of the 242 bombers despatched, 39 attacked naval units, 188 failed to locate the ships or were unable to attack them owing to low cloud, and 15 failed to return.

About 20 were damaged by flak or fighters: one of these crashed on return and was destroyed. The forces despatched included 10 Bostons on their first operational sortie in Bomber Command.

HQBC ORB.
5th Feb.

The weather conditions prevented minelaying during the afternoon, but during the night, at the Admiralty's

request, 9 Manchesters and 11 Hampdens of No. 5 Group took

off to lay magnetic mines in selected positions at the mouth

of the Elbe. Seven aircraft succeeded, laying 13 mines in the

Ibid. para
75 and HQBC
ORB 12/13 Feb.

ordered positions and five others laid them in alternative positions..

Ibid, para
115

The Board of Inquiry found that, if the presence of the German ships had been detected before sunrise, the bombers would have been able to make their attacks under the better weather conditions which prevailed earlier in the day. The minelaying appeared to have been skilfully planned and laid. It was, in fact, learnt later, but not reported to the Board, that both Scharnhorst and Gneisenau struck mines during the later stages of their voyage to home ports and were damaged.

Ibid, para
123

HQBC. ORB Ops
Appx. D. 2318 &
2273.

Board of Enquiry
Report, para. 12.

By way of conclusions, the Board expressed the view that against fast, heavily armoured ships, the most effective air weapon available at the time was the torpedo bomber, particularly under conditions of low cloud cover and visibility which the Germans almost invariably chose when operating their big ships within range of air attack. Under these conditions high-altitude bombing was impracticable. The most numerous force employed on 12 February, Bomber Command, played a comparatively ineffective, if gallant, part in the battle. This was in the main due to the weather conditions, which made it difficult to find the enemy, and when found, the low cloud cover made high-level bombing impossible. The evidence indicated that the training of the greater part of Bomber Command was not designed for effective attack on fast-moving warships by day. The reasons were clear -- the expansion of the force, the need for reinforcements overseas and the necessity for replacing heavy casualties which had enforced concentration of their training on their major role of night bombing. Whether they should be trained in attacks on moving warships was a matter of high policy, but if they were to be expected to take a more important part in the control of sea communications, large

Ibid, para
129

/additions.....

additions to their training would appear to be necessary, and this could presumably only be effected at the expense of their operating capacity in what was at that time considered their primary, if not their only, role.

The epilogue to this phase of Bomber Command's work was written in a minute by the Prime Minister to the Secretary of State for Air and C.A.S., on 14 February, saying, "The Brest question has settled itself by the escape of the enemy. I am entirely in favour of the resumption of full bombing of Germany, subject always, of course, to our not ~~incurring~~ heavy losses owing to bad weather and enemy resistance combined. It is to be expected that better weather is at hand."

(vi) "Admiral Scheer" at Oslo.

The only other daylight attack on an enemy naval unit occurred in early September, when the German pocket battleship "Admiral Scheer" was reported to be in Oslo Harbour. Four Fortresses were detailed to attack on the morning of 6 September. The three which reached Oslo could not locate the battleship and bombed another ship alongside a berth, scoring hits on the dock side. Two days later another attack was attempted but over South Norway, at nearly 30,000 ft., they were intercepted by a strong patrol of Me.109s. which shot down two of the four Fortresses on the raid. A third was chased for 65 miles over the North Sea but in spite of damage made a successful crash-landing at base. The attack was abandoned.

(vii) "Tirpitz" at Trondheim.

Whatever the cause for the move of "Tirpitz" from Kiel to Trondheim in the third week of January 1942, it served to embarrass Coastal Command, in its watch on Brest.

/It.....

-163-

S. 50128
27 Jan.HQBC ORB
Appx A. 295a

It also demanded attention from Bomber Command. C.A.S.'s approval for an attack on the battleship was conveyed to the Command on 27 January 1942, the effort to be up to 30 aircraft on the night 29/30 January if the weather allowed. The attack was made by 9 Halifaxes and 7 Stirlings on that night, the bombers operating from Lossiemouth, but no direct result was observed and it was not believed that any damage resulted.

5. - ATTACKS ON OTHER SHIPPING AT SEA.

(i) - Role of the Blenheims.

Though the Blenheims were used during summer and autumn 1941 for the attack of land targets by day, their main role was delivery of low-level, mast-high, pilot-aimed attacks on enemy shipping, usually at sea, but sometimes while sheltering in ports. In the view of the Chief of Naval Staff, expressed in a letter to C.A.S. on 16 July, 1941, these attacks were "one of the outstanding achievements of 1941", as they had destroyed a very large tonnage of shipping. Figures quoted for the four months to the end of June 1941 were:- 373 ships attacked, 104 destroyed, 72 damaged, representing a loss in tonnage of over 400,000.

(ii) - Bomber and Coastal Interests.

However, all was not well with the direction of this effort and its relation to other anti-shipping work of the R.A.F., the chief point at stake being the inter-relationship of Bomber and Coastal Commands. To find a means of co-ordinating the operations of the two Commands, thus avoiding overlapping or neglect of certain areas, C.A.S. held a meeting on 15 July 1941 at which the views of Bomber, Coastal and Fighter Commands were amply expressed.

A.O.C.-in-C. Coastal Command (Sir Philip Joubert) wanted his Command to bear the primary responsibility for the bombing of ships at sea. Bomber squadrons were welcome as backers-up to Coastal, but their primary objective should be confined to land targets, including ports. This opinion he based on the closeness of the liaison between Coastal Command and the Admiralty, whose main concern was anti-shipping operations, and on the aim to secure greater economy and efficiency by placing under one Command all aircraft habitually operating over the sea. He admitted that Coastal Command organisation was not at that moment as efficient as it might be for taking advantage of the available information, and that No. 2 (Bomber) Group had been very successful in developing an anti-shipping technique, but he did not regard these as sufficient reasons for handing over to Bomber Command primary responsibility for the attack of shipping.

A.O.C.-in-C. Bomber Command took his stand on the theory that all bombing operations should be under the control of Bomber Command, leaving to Coastal the use of torpedoes and sea reconnaissance. His reasons were:-

(a) By conducting all bombing operations Bomber Command could concentrate on the best target available at any time, using the whole resources of the striking force if necessary;

(b) He was responsible for the development of bombing tactics and weapons, and had produced the system then in use for the supply of information on enemy shipping;

(c) Light bomber squadrons had to be retained in the Command because of the commitment to help the Army in the event of invasion; they could not reach far inland and were of use against shipping.

/((d).....

(d) Shipping and the ports were part of the enemy's communications system, which was then the primary objective of Bomber Command.

(e) In the event of invasion Bomber Command had a primary commitment to attack enemy surface vessels;

(f) There was no hard-and-fast line between the attack of ships in port and those at sea.

(iii) - Responsibility by Areas.

Because of the recognised inability of his Command to conduct all anti-shipping operations, Sir Richard Peirse proposed a division of responsibility by areas.

This was favoured by C.A.S., provided there was a pooling of resources by the two Commands when this was necessitated by the importance of a target in any particular area. This would make quite clear who was responsible for initiating operations in any given area.

A.O.C.-in-C. Fighter Command was concerned with the comparatively small area within 100 miles of Manston, in which fighter cover could be provided for offensive operations. In that area first information of enemy shipping often came from fighters on patrol. He found that the arrangements for providing a striking force quickly were inadequate, although better in Bomber than in Coastal Command. He suggested that all anti-shipping operations in that area should be conducted by a force under single control, kept at constant readiness to be operated immediately information was received. His experience therefore confirmed the value of regional division of responsibility, but prompted special arrangements in the Dover area.

It was decided therefore that a trial of these proposals should be made. Bomber Command would be primarily responsible for anti-shipping operations in the sea between

/Cherbourg.....

Cherbourg and Texel, and Coastal for operations over the rest of the sea round the British Isles. If targets were presented in one of the areas which required greater resources than were available, the Command responsible would borrow, and control operationally, aircraft from the other Command. The area system was also to apply to reconnaissance, though Coastal would carry out any special reconnaissance flights for the Admiralty.

(iv) - The "Channel Stop".

As regards the Dover area, C.A.S. suggested that to put a complete stop to the movement of enemy shipping through the straits No. 2 Group should have two squadrons standing by at an aerodrome near the S.E. coast, ready to take advantage of any report. The squadrons should take this duty in rotation, and would be reinforced if necessary.

This aim was agreed and the control of the "fire brigade" was to be under a controller of No. 2 Group located at Headquarters No. 16 (Coastal) Group. Fighter Command escorts were to give maximum tactical assistance to the Blenheims -- for example by strafing the decks of enemy ships just before the bombers attacked them.

The "Channel Stop" was set up within the next few days, the striking force being at Manston, with the Group effort "echeloned" behind it. There was some misunderstanding at the start about the amount and scope of fighter cover, but no vital principles were involved and the matter was cleared up in correspondence.

As a preliminary, the successful low-level attack on Rotterdam on 16 July in which 17 ships were claimed as destroyed, gave the anti-shipping campaign a vigorous fillip. On 18 July No. 21 Squadron, which was about to move to Manston,

/despatched....

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23 July.

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Air/Do.

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Ops.Appx.
A. 143.

despatched three Blenheims, with fighter escort, to attack an enemy tanker of between 6-8,000 tons which was trying to run through the Straits. The three Blenheims pressed home their attack in the face of intense flak, and scored direct hits, which caused the vessel to beach in a sinking condition near Gravelines, where she was photographed lying in-shore with bows submerged. All three Blenheims were shot down by flak, though one reached a point near the English coast where the crew were rescued. Enemy fighters were also active, and Fighter Command claimed 1-0-2 without loss.

Ibid.
A. 144

The squadron operated next day from Manston but failed to sink a tanker off Ostend. On 20 July one formation of Blenheims failed to locate a tanker off Ostend, but the fighters found and hit the ship with cannon and machine-gun fire, while another formation of six Blenheims attacked a second tanker off Berck-sur-Mer and caused her to beach. This operation was marked by fighter opposition, and two Blenheims failed to return.

Ibid.
A. 146

A merchant vessel of 2,000 tons eluded the "stop" and slipped into Dunkirk on 21 July, and on 23 July No. 21 Squadron also failed to hit a 4,000-ton tanker off Ostend, their bombs under-shooting. This vessel was escorted by flak ships and four of the six Blenheims were lost.

Ibid.
A. 147

Ibid.
A. 149.

DFS/DO/1.

During the next fortnight it was claimed that not a single merchant vessel of over 1,000 tons was detected passing through the Straits, though one of 1,000-tons ran into Calais from the east without being molested; and trawlers and mine-sweepers made the passage by hugging the French

/coast.....

coast. The supposition of convoys being rushed through under cover of night was carefully examined, but appeared to be unjustified, as there was no unusual accumulation of shipping in the ports to east and west of the Straits.

HQBC ORB.
Appx. A.160

No.107 Squadron took over the "Stop" and on 1 August set fire to and sunk a 1,500 ton ship off Ostend, but two of the three Blenheims did not return. On 10 August, when No.226 Squadron was on duty at Manston, one of three Blenheims operating with fighter escort attacked a merchant vessel of 1,500 tons protected by two flak ships and two E-boats north of Gravelines. The vessel was hit amidships, set on fire and left sinking, while the fighter escort also set the flak ships on fire. Two Blenheims were lost, one through an attack by four Me 109's and one by flak, but the fighter escort claimed 1-0-2 without loss.

Ibid.
A.169

Ibid.
A.176.

On 16 August three Blenheims of No.18 Squadron, at Manston, set off to attack a merchant vessel off Boulogne, but failed to make a rendez-vous with their escort and returned to base. The following day the squadron tried to attack a 6,000-ton vessel off Le Touquet after Beauforts of Coastal Command had attacked it. They came upon the vessel unexpectedly and turned to make a second run, but the escort was already involved in a dog fight and the attack was abandoned. Fighters claimed 3-1-2 for the loss of 2 Hurricanes.

Ibid.
A.178.

Ibid.
A.185.

On 25 August the Channel "stop" searched in vain off the Hook of Holland for a tanker which had passed through the Straits of Dover in fog and low visibility, but could not locate it; and on 30 August an attempt by three Blenheims of No.139 Squadron to locate shipping in the Channel failed through poor visibility at a first attempt,

Ibid.
A.190

/and....

-169-

and at a second attempt did not make contact with their high cover fighter escort.

Ibid.
A.193

The same squadron, however, destroyed a 4,000-ton vessel west of Zeebrugge on 2 September, losing one of three Blenheims engaged. On 8 September six Blenheims of No.88 Squadron at Manston joined in an attack on a convoy of barges near the Channel Islands, sinking several of the vessels with the aid of fire from the fighter escort. On 17 September, No.88 Squadron failed to find a 4-5,000-ton m/v off Gravelines, but next day three aircraft secured a direct hit on a 5,000-ton tanker north of Blankenberghe, escorted by no fewer than nine flak ships. The tanker was sunk, but in an attack by Me.109s immediately afterwards, two of the three Blenheims were shot down. An uneventful patrol from Manston on 28 September proved to be the last sortie operated from this advanced base, though attacks on shipping further north along the Dutch coast were continued from home bases in East Anglia.

Ibid.
A.207.

Ibid.
A.208.

Ibid.
A.215.

The duties had become more hazardous than ever for Blenheims, and A.O.C. 2 Group actually recorded later that two-thirds of a striking force was lost every time a ship was attacked in the Straits. On 29 November 1941 the Channel Stop was handed over to Hurricane bombers of Fighter Command.

The conversion of the Hurricane to a bomber role dated from June-July 1941, and immediately on its appearance in this function the C-in-C suggested to C.A.S. that he could, if given six of these aircraft, provide a very economical means of putting

RECEP/DO/6
24 July

/Bom..

down merchant shipping in the narrow waters. He begged C.A.S. not to give the operational responsibility to Fighter Command.

This request was not granted, on the ground that the Hurricanes were dependent on Fighter Command signals organisation and that to transfer them would mean duplicating this on bomber airfields. Once the Hurricanes dropped their bombs they became pure fighters and must be controlled and operated as such. He wanted to see their attacks directed primarily at the flakships escorting merchant vessels which were the targets for bombing Blenheims.

C.A.S. also made it clear at this time that there was little chance of building up a force of single-seater bombers to support the Army in the event of invasion. The small bomb-load carried by the Hurricane did not seem to make it different in vital character from the cannon-fighter or gun-fighter, which might also be given the role of diving to attack personnel, tanks or transport.

(v) - North Sea Convoys and Reporting Vessels.

Over and above the many attacks made by Blenheims of No. 2 Group on enemy shipping in ports such as Rotterdam, Boulogne, Le Havre and Cherbourg; in the Straits of Dover and in the Kiel Canal, a very large effort was made to destroy merchant vessels and tankers bound to and from Emden and Rotterdam, as well as those which, located in the waters near the Frisian Isles and off Holland, were attempting, or had successfully accomplished, the passage of the Straits of Dover. Before Bomber Command was given sole responsibility for attacks between the Frisian Isles and Cherbourg⁽¹⁾, this role also included patrols along the Norwegian coast, and Blenheims operating from Lossiemouth claimed several victories. On 2 June, for instance, though 7 out of 8 Blenheims were frustrated in an attempt to locate shipping (1.) See page 165

/off.....

Ibid.
A. 126.

off Lindisnes owing to the presence of fog and sea mist, the eighth aircraft found a 2,500-ton merchant vessel and claimed to have destroyed it. On 4 June two aircraft each claimed two direct hits on a 5,000-ton m/v in the same waters.

Ibid.
A. 128.

During June, also, there were no fewer than 10 strikes by Blenheims off the Frisians and Holland, including attacks on the small fishing vessels, of 50-100 tons which were seen to be equipped with W/T aeriels and were identified as reporting vessels - "squealers" as they became known - with which the enemy was trying to augment his advanced raid warning information. Further east, in the Heligoland area, a whole string of these was located on 6 July, and of the total of 15-20 vessels, five were claimed destroyed and two damaged in an attack by nine Blenheims, of which one was lost. Most of the strikes in June, however, were on individual merchant vessels, and at the end of the month No. 2 Group claimed to have destroyed 20 ships (45,200 tons) and damaged 4 (10,200 tons), bringing the total claims of No. 2 Group for all waters, to 265,200 tons destroyed between 12 March and 30 June, 1941 and 62,200 tons damaged.

2G ORB.
P. 626

It is not possible to produce comparable figures for later months, because claims were often difficult to assess in view of the difficulty of making accurate observations. Often, as opposition to the Blenheims from flak and fighters increased, the crew could only make a quick get-away without photographic record of their hits, and sometimes conscientious search revealed no trace of the survival of a ship that had been attacked. The victims tended more and more to move in small convoys of 6-8 vessels, escorted by 4-6 flak-ships, powerfully armed, which it was almost fatal to attack, as some

/Blenheim.....

Blenheim crews did, in error. These were left to the Fighter escort to deal with. Tactics varied from day to day and from squadron to squadron. Sometimes the Blenheims were able to make such an approach that the flak-ships could not fire without risk of hitting each other. Towards the end of the summer it became more and more common experience to find several Me.109's either circling the convoys or hovering in the offing in readiness for an attack.

Nevertheless the Blenheims pressed home their attacks on numerous occasions, sometimes being compelled literally to weave in and out among the vessels of the convoy and escort to find a gap through which they could make good an escape. On 19 July, for instance, of a convoy of seven vessels escorted by 4-6 flak ships, one tanker and three m/vs were claimed sunk, a total of 26,000 tons at one blow, by 8 Blenheims, all of which returned safely. On 7 July, off the Hague, six out of eight escorted vessels were reported sunk, a total of 19,000 tons, but three out of 11 Blenheims were lost. Convoys were also attacked with spectacular results off the Dutch and Frisian coast on 19 July, 5 August, 7 September and 12 October. On the latter occasion one Blenheim is recorded as having had its port engine hit by flak, causing the propellor to fall off -- and yet it was brought safely back to base.

(vi) Decline of the Blenheim.

Losses of two or three Blenheims per strike became common, owing to the intensification of flak and fighter defences, and averaged about 8% at a time when Blenheims were urgently needed for the Middle East and Malta. In August it was ruled that Blenheims should be conserved as much as possible, and following representations from No.2

/Group....

HQBC. ORB.
Appx. A. 144

Ibid.
A. 129.

Ibid A.
144. 164.
197. 224.

BQ/S22573/2
8 Nov.

Group this policy was quoted by A/V/M Saundby in a request to Air Ministry on 8 November 1941 that No. 2 Group should terminate their daylight offensive against shipping until the squadrons were reequipped with a new type of aircraft. The result of daylight operations had forced the enemy to provide heavy flak and fighter protection for his ships, and success was only obtainable at high cost.

The proposed employment of the Group during the moon period was attack of precise targets at low level by night, with a secondary role of disorganising defences; in the non-moon period, Circus and Ramrod (i.e., day) operations.

This request was opportunely timed. On 11 November, following severe heavy bomber losses the Prime Minister issued a fresh direction concerning the conservation of aircraft. Three days later C.A.S. informed the Prime Minister that in the light of his (Mr. Churchill's) directive, and because of the heavy losses sustained by the Blenheim squadrons in attacking ships he had come to the conclusion that they should be replaced in that work by the torpedo-bombers of Coastal and the Hurricane bombers and cannon-fighters of Fighter Command. Until the Blenheims could be replaced by a better type such as the Mosquito, he proposed to use them by day in conjunction with twice-monthly fighter sweeps, and by night in the role outlined above.

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136A.

This plan was approved and the new directive to Bomber Command contained a proviso that the secondary role of the Blenheims should be extended to include occasional intruder attacks on enemy night bomber aerodromes, seeking, for example, to harass the airfields in Holland and east and south of Paris which were beyond the range of Fighter Command intruders.

/While,.....

While the same directive asked the A.O.C.-in-C. to consider the practicability of shipping attacks being undertaken by Boston Mk III aircraft, which were earmarked to replace the Blenheims, it should be noted that by 29 October 1941 A.O.C.-in-C. Coastal Command was again pressing the Air Ministry for another Conference to settle the vexed question of the anti-shipping responsibility, on the ground that No. 2 Group possessed neither the information nor the facilities effectively to deal with shipping in certain areas of the Dutch and French coasts. The termination of the responsibility of Bomber Command on the ground of the Blenheim's unsuitability seems to have made discussion of this point superfluous.

6. - STEPS TO THWART INVASION PLANS.

(i) - Bombers' Commitment.

As has been noted above, ^(1.) security of the United Kingdom was the first commitment of the armed forces and of merchant shipping at the opening of the phase of the war under review. In addition to the defensive bombing, policy set out in the previous sections, Bomber Command still maintained its commitment to place its light bomber squadrons at the service of the Army for close support in the event of invasion. Moreover, freshmen crews of the medium and also of the newly-arriving heavy bombers were usually given a sortie against one of the invasion ports, from Rotterdam to Cherbourg, as a preliminary to their operational tours.

A considered view of the work done over a very long period was given by A/M Harris a year later, when examining, at the direction of the Prime Minister, the role and work of Bomber Command, of which he had by then been for six months the A.O.C.-in-C.

(1.) See page 50.

"By smashing up the invasion ports and the invasion barges and ship concentrations," he said, "Bomber Command impressed upon the enemy the difficulties, if not the impossibility, of invasion. History may yet show invasion was prevented by the Command. It can be, if it is attempted in the future".

(ii) - Preparations for September.

At the beginning of the period under review, on 5 July 1941, C.A.S. informed Bomber and other Commands that all forms of offence and defence to resist invasion must be brought to the highest pitch of efficiency by 1 September 1941.

This was a call not only to the air forces under his various Commanders-in-Chief but to their ground staffs as well. The keynote of the measures to be taken was that no-one must be allowed to rely on others for protection; all must kill attacking Germans by every means in their power and hold on to their station, to the death if necessary. Invasion, he said, would give the Service the opportunity to show that the fighting spirit of the Air Force was not confined to a small number whose duty took them into the air.

(iii) - Bomber Training for Invasion.

While staffs throughout the Command were busy about their preparations, the Blenheim squadrons were being called on to train in conjunction with the Army — a fact which caused the A.O.C.-in-C. to approach C.A.S. on the subject on July 1. His Blenheim group was at a very low ebb of fighting strength and at a moment when the battle was at its hottest he did not feel justified in pulling units out to train with the Army for a hypothetical situation that might never arise.

/C.A.S....

RECP/DO/6.
1 July.

S.5714/65A

7 July.

C.A.S. replied on 7 July that he fully realised the difficulties, but in spite of these they must train with the Army on lines already agreed with the Chief of the Imperial General Staff, these lines having been arranged to interfere as little as possible with operations.

DO(41)
48th.
8 July.

The Defence Committee were informed by C.A.S. next day that all squadrons of No.2 Group would be ready to operate in case of invasion.

(iv) - Night Attacks on Occupied Ports.

DAK.1169 &
1172.

Although classed as an "invasion port", and therefore bombed to lessen the risks of concentration of sea-going barges, Rotterdam was really far more important as a "transportation" target. Freshman crews dropped nearly 100 tons of bombs aimed at the docks by night during June, July and August 1941; but most of the damage observed in October seems to have been due to the attack of 3/4 October, which caused extensive damage to warehouses in the docks areas. (1.)
Two daylight attacks were made in the period.

The docks at Ostend were attacked 19 times by night during the period, in each case by freshmen crews, who claimed to have dropped a total of 300 tons of bombs. Virtually all the discoverable damage on land was, however, attributed to daylight attacks. Antwerp received only two attacks by small forces.

During the nine months under review, Dunkirk was claimed to have been bombed by 220 aircraft with 350 tons of bombs. Calais by 50 with 65 tons, and Boulogne by 205 with 250 tons. At each, damage caused was slight in comparison with that which arose during the evacuation by our troops. The effect on invasion barges was, of course, often not discernible in photographs.

(1.) See pages 147 - 149.

The most-bombed port was Le Havre, with 400 tons from 250 aircraft, while Cherbourg had 250 tons from 188 aircraft. Again, more damage could be ascertained from daylight attacks, and it is to be considered that most of our bombs fell on the ships for which they were intended, or else harmlessly in the water.

(v) - Complaints About Invasion Port Bombing.

WM(41)103rd
16 Oct.

The only major point regarding anti-invasion measures which called for a decision was one involving the bombing of Rotterdam on 3/4 October 1941. This was an attack by 32 Wellingtons which aimed 51 tons of H.E. and 6 tons of incendiaries at the docks. The Dutch Minister in London complained to the Foreign Secretary of the deaths of Dutch inhabitants, and Mr. Eden stated in the War Cabinet that our aircraft had evidently bombed the town in mistake for the harbour. The Prime Minister thereupon ruled that the C.A.S. should direct that the greatest care be taken in carrying out attacks on objectives in enemy-occupied countries friendly to ourselves.

S.46368/II
121A

This had already been done in a letter to the A.O.C.-in-C on 6 October 1941, requesting that the instructions as regards identifying targets of that nature should again be brought to the notice of all air crews. At the same time it was laid down that in the existing strategical situation, night attacks on the Channel ports were not justified except on the scale necessary to provide training for inexperienced crews. They were not, except in the case of Rotterdam, to be treated as convenient targets for main force crews when weather conditions debarred more important operations. The reason why this restriction did not

/apply.....

apply to Rotterdam was the great significance of that port as a communications centre: but again care must be exercised.

MS. 9432.

After the instruction was issued, it was found that the attack on Rotterdam had in fact been well directed on to the dock areas and was in no sense indiscriminate. The Director of Bomber Operations therefore, in a letter to the Director of Plans, on 25th October 1941, recorded his strong feeling that such protests should not be allowed to influence us to a point where they might hamper the strategic offensive. German-inspired propaganda had resulted in the complaint to the Foreign Secretary over Rotterdam. The consequent instructions to Bomber Command would inevitably mean, in his opinion, that they would not be able to attack Rotterdam, a point of vital importance to the enemy, except in ideal weather, which rarely occurred. He could imagine nothing better calculated to serve Germany's needs than that these protests should be heeded.

There had been a similar protest, through the Ambassador in Madrid, which reached the War Cabinet in August 1941, concerning the deaths of 80 persons in the bombing of Brest and of six in an attack on Lille. On that occasion the Prime Minister said a distinction should be drawn between the latitude given when bombing targets in Occupied France as compared with that given when attacking Germany.

WM (41)
85th.
21 Aug.

The whole question of the attack of French targets, by night as well as day, came up for discussion towards the end of the period now under review, in connection with a scheme to attack French factories, and will be dealt with in Vol. IV.

/7....

7. - THE MINE-LAYING OFFENSIVE.

Hampdens of No. 5 Group carried the whole of the mines laid by Bomber Command during the months from June 1941 to January 1942, during which the scale of this offensive remained at about the same level as during the period from April 1940 to May 1941. The effort was almost entirely limited to freshmen crews and rarely exceeded five or six sorties on any one night. An average of about 100 sorties a month was maintained, though this effort fluctuated between 50 and 150 sorties; and an average of 80 mines a month was laid. The policy adopted by the Admiralty was merely to cover as great an area as possible, and the areas mined extended therefore from the western approaches to the Baltic -- particularly Swinemunde, Warnemunde, the Fehmarn Belt, Great and Little Belts, and Kiel Bay -- to the Frisian Isles, Heligoland and the Dutch coast. A few mines were laid round the Brest Peninsula and in Oslo Fiord.

At this time the technique was still to make land-fall at about 1,000 ft. at some well-defined pin-point on the coast and thence fly on a timed run to the dropping area. The mines were laid at from 600-1,000 ft. Usually the pin-point chosen was lightly-defended, and considerable accuracy in locating the right area was maintained. Losses were light in comparison with bombing sorties over Germany - 14 Hampdens were lost in 779 sorties.

By February 1942 Manchesters of No. 5 Group were made ready to carry mines. Each could carry four 1,500 -lb. mines on North Sea missions, compared with the Hampden's one. The first attempt, on 4 February, was spoilt by weather, as only three of 15 Manchesters were able to take off. However, before the escape of the Scharnhorst, Gneisenau and Prinz Eugen took place on 12 February over 100 minelaying

/sorties.....

sorties were made to the Frisian Isles dropping areas, mainly by day, and 98 mines were laid, involving the loss of 4 Hampdens. These daylight sorties were heavily opposed by fighters.

On receipt of the news of the break-out from Brest, 14 Hampdens and 9 Manchesters were detailed to take off in the late afternoon to lay mines in the forecasted track of the naval units as they passed the Frisian coast. In wretched weather 11 Hampdens and 9 Manchesters took off, but only 5 Hampdens and 2 Manchesters located their areas, and laid 13 mines.

The offensive was kept up on the 16/17, 18/19, 21/22, February and on the six succeeding nights, to try to oppose the safe arrival of either of the ships at Kiel.

In this month 259 Hampdens and 60 Manchesters undertook sorties and laid 306 mines -- easily a record but merely a fragment of the effort throughout the rest of the war.

Though the successes gained in this offensive were considerable, they cannot, of course, be related to any particular minelaying operations. It is known that both Scharnhorst and Gneisenau struck mines on their homeward voyage and were damaged.

During the nine months from 1 June 1941 to 28 February 1942 the known casualties to German and neutral shipping carrying cargoes to or from Germany amounted to 19 ships sunk, totalling at least 30,000 tons, and 7 damaged, totalling nearly 20,000 tons. Victories of this kind were recorded in each of the areas visited by the Hampdens and Manchesters.

CHAPTER IV. - SUMMARY AND CONCLUSIONS

The aim of high policy in June 1941⁽¹⁾ was to take the modest bombing offensive already in progress, release it from the shackles of defensive requirements as far as was possible, and utilise it in the direction judged to be the most profitable. Thus it was hoped to develop an offensive of attrition which would be progressive and cumulative as our resources grew, reaching such a scale eventually that it would fatally weaken Germany's power to resist. Meanwhile, in at least partial realisation of the night bomber's limitations, it was decided not to attempt the destruction of German synthetic oil plants, key industries or growing crops; and to make only a secondary objective of morale.⁽²⁾

A main objective was, however, required; for the Chiefs of Staff were convinced that the German air attack on this country had lost potency because it failed to concentrate on one main aim.⁽³⁾ The principal objective which they believed to be within the scope of the force was to be the transportation system of Western Germany, based mainly on a scheme to isolate the industrial Ruhr from the rest of the Reich and from the German armies in Europe and North Africa. Moreover, a day-light offensive by heavy bombers, operating without fighter escort, was to be attempted as these new four-engined aircraft came forward.⁽⁴⁾

This was the policy just before Russia came into the war. Its origin and manner of introduction, as well as simple chronology, all point to the fact that this would have been the policy had Russia not been attacked. It represented almost all that could be attempted and - as emerged very clearly - more than could be performed.

The Russian conflict began just as this policy was inaugurated, and the policy was upheld as the best available means of helping the new Ally.⁽⁵⁾ It was confirmed, in preference

(1) See page 51.

(3) See page 58.

(5) See page 106.

(2) See page 53.

(4) See page 106.

preference to an attempt to drain Germany of oil by an air offensive on two fronts -- not only because of our inability to spring the leaks, but because it was suspected the Germans might soon obtain unlimited oil in Russia itself, so rendering futile our attempts. (1).

The inauguration of the new offensive policy is important also because it carried British bombing further along the road to the large-scale attack of civilian populations in Germany. Whereas, in autumn 1940 we had made a moderate reply to the bombing of British cities by selecting military objectives in populous areas of Germany, aiming thereby to demonstrate the power and severity of air bombardment, we now accepted, in the words of the Air Ministry's plan, that the successful attack of a specific target at night could only be undertaken in clear moonlight. (2) So, for three weeks in each month, we could obtain satisfactory results only by heavy, concentrated and continuous area attacks of large working-class and industrial areas in carefully selected towns. Those towns that could usefully be attacked, as part of the attempt to disrupt communications, were duly selected.

British policy, for the more distant future, was clearly intending to demand of the Germans an eye for an eye, trusting that with one eye less or perhaps two they would be unable to continue the fight. Morale was to be the eventual objective, because loss of morale meant failure of the will to resist. (3) This standpoint, involving the bombing of civilians in future on a heavy scale, evidently came as a surprise to the Americans when they learnt of our plans during the Atlantic Conference. (4)

A lesser scale of attack on morale, such as the nuisance raid by night, was virtually discarded as being unlikely to weaken, and possibly prone to stiffen, German morale, though (5) later the desire to spread attacks over less heavily defended /districts

(1) See page 92.
(2) See page 55.

(3) See page 84.
(4) See page 86.

(5) See page 52.

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districts led to further reconsideration^(1.)

Meanwhile, a good deal more was to be attempted for the sake of relieving the Russians. Hazardous penetration to Berlin and Stettin was to be attempted with this in view, as well as the commencement of the long series of raids on Krupps at Essen. We had already tried, in daylight operations, to add to the enemy's preoccupation in Western Europe and so to draw or hold in the West short-range day fighters that could be used by the Germans against our forces in Greece and Crete. The same policy was accepted on behalf of the Russians,^(2.) and in the implementing of it heavy commitments were undertaken for the light Blenheims attacking fringe targets in France with fighter cover, or making surprise raids on vital ports in Germany and Holland. The heavy bombers were also pledged to the same cause. They were to penetrate into Germany, without long-range escort, and relying on cloud cover and the effects of surprise, or to attempt to extend the enemy's defences by raids on the West French Atlantic sea-board.

The Cabinet even sanctioned the bombing of French industries at work for the Germans, to make the threat in the West more realistic -- this being a notable extension of the policy as regards bombing occupied territory.

All this, with an additional eye on opportunities for long-range night attacks as far as Italy and Czechoslovakia,^(3.) was the main offensive aim of Bomber Command. A subsidiary, but probably more successful aim, was to harass the enemy's merchant shipping and sea communications along the extended North Sea and Channel coasts, and particularly to close the Straits of Dover, by day^(4.)

The defensive commitment consisted of the Battle of the Atlantic,^(5.) in its broadest sense, covering ports and submarine yards, interior industrial towns making naval equipment, and the surface raiders, "Scharnhorst,"

"Gneisenau" and "Prinz Eugen" in Brest or, La Pallice.^(6.)

(1.) See page 79. (2.) See page 106. /when
(3.) See pages 103 & 105. (4.) See page 166.
(5.) See page 137 et seq. (6.) See page 150 et seq.

When these vessels broke out it was to Bomber Command, unsuited though it was for the job in the weather conditions chosen by the enemy, that the main task of attempting to destroy or damage these vessels was given, and it was their laying of magnetic mines along the path of the vessels that caused the only tangible result.

Over and above all this, there was, until September, the prospect of turning Bomber Command as a whole against any invasion force the Germans might raise, and the continuing, but slight, requirement to demonstrate, by bombing the Channel docks, how difficult invasion might be. (1.)

The defensive role occupied some 40% of the overall effort of Bomber Command, even after it had in theory been relegated to the minimum requirement of security; yet 40% could not be regarded as enough, especially when the worst spell of weather for many years reduced both the defensive and offensive effort drastically.

Night after night targets were covered with cloud or haze; icing conditions were frequently unavoidable, and meteorological information from the interior of the Continent was not so highly developed as it was later to become with the advent of the Mosquito.

Night photography was suggesting, if it fell short of proving, that only under the best, and rarest, weather conditions could 50% of sorties be expected to find their targets on the German coast; only 45% in Prussia or on the Upper Rhine, and only 30% in the vital Ruhr. (2.) Since the scale of attack put out by the Command at this time never exceeded 150 tons of bombs per raid, rarely indeed could 50 tons of bombs be expected to fall on any big town. At only a few lightly-protected towns such as Münster, Aachen and Kassel had there been any serious overburdening of A.R.P. services, as evidenced by inability to extinguish fires in time to prevent large areas from being devastated. The nearest approach to a "blitz" was the four-night attack on Münster, resulting in the burning out of about (3.)

(1.) See page 174. (2.) See page 41 et seq.

(3.) See page 65.

SECRET

20 acres. Photographic reconnaissance by daylight was giving a fair indication of the scattered nature of damage in the bigger towns; though one might reasonably have deduced from these prints a larger number of hits on vital points, and more widespread effects therefrom, than are found narrated in such German records as are now available.

What was needed was not 150 tons of bombs per raid, with 20-30 tons of incendiaries, but 1,000 tons in one night, as the success of the "Thousand Bomber Raid" of 30/31 May 1942 was later to demonstrate. But that could only be achieved by a much larger and better equipped force, backed by a solid and sound training organisation, and adequate reserves.

Although the Cabinet was right in refusing, with the force available, to consider morale as a primary objective, the nature and scale of attacks at this period constituted only a harassing effort at best and, lacking concentration and incisiveness, probably tended to stiffen morale instead of weaken it.

On the other hand, a beginning had to be made with the night bombing offensive before experiment and expansion could produce better attacks.

Ironically, it is suggested that the most notable contribution of the offensive at this time may have been to divert the Germans' attention to combatting it before it made much improvement, thus starting the increase in night defences in the Reich which did so much to rob the G.A.F. of its striking power, and pinned down many thousands of potential soldiers on anti-aircraft sites.

Meanwhile, the 150-ton scale of offensive itself was more than the Command could maintain. In that long period of bad weather, not only over the Continent, but over our own often fog-bound bases, operations had often to be

/cancelled,

cancelled, or our aircraft recalled; or, as happened on a few nights -- missions had been carried through at the cost of heavy casualties due to aircraft straying off course, losing fuel, or landing in difficult conditions which were too much for the pilot to overcome. Wastage became excessive,^(1.) and the inability of industry here and in America at the time to supply in sufficient numbers the heavy and medium bombers required for an offensive and a defensive war in the air, as well as the drain of reinforcements to the Middle East, kept the effort on a small scale.

The four vital needs of the force at the time were (i) expansion (ii) better training (iii) the introduction of navigational aids, and (iv) a new attitude towards the incendiary bomb.

Expansion could only come with time and a careful husbanding of the forces already available. By August 1941 the intensive phase of operations came to an end; by November the brake was hard on. The Prime Minister himself took the leading role in ordering that attacks should not be pressed too hard if weather was unfavourable, and that aircraft and crews were not to be exposed to extreme hazards in the course of routine operations.^(2.) The bomber force, like the fighter force, was to gather its strength for a renewed attack in the spring.

The training problem was vigorously tackled, with an all-round improvement in attention to the needs of night bomber pilots at the earlier stages; and, finally, by the policy of producing one pilot per aircraft.

The navigational aid problem was already in hand. "Gee" had been undergoing trials, and was known to be an asset for the future as early as the autumn of 1940.

During this period a few experimental sorties were actually made over Germany, and one aircraft was lost in doing so,

(1.) See page 30.
(2.) See page 35.

-187-

but "Gee" was to make its debut in March 1942 and to prove a remarkable help to the force.

S.46368/III
116b.

AHB (1)
Records

S.46368/III
116b.

As for the incendiary bomb, the Air Staff had made up their minds by September 1941 that the best method of reducing output from industrial areas in Germany was to launch heavy-scale incendiary attacks which would saturate the fire-fighting services and cause the burning of vital towns. This technique they believed to have been justified in the case of German attacks on this country. They believed the incendiary load used against us had been as high as 60% and had averaged 30% of the bomb-lift. In fact, German documents captured much later show that between November 1940 and October 1941 the average was only 11%, that it rose in January 1941 to 24%, and that only in three individual raids did it exceed 30%. The Air Staff suggested, however, that the minimum incendiary load carried to any town on one night should be 45-55 tons, to be followed by H.E. bombs dropped on the areas of the principal fires. What was needed was a full-scale trial of such a technique; but, perhaps owing to the fear that fires raised in the wrong place would lead the whole attack astray this was never made until the new C.-in-C., Sir Arthur Harris, sent over 100 tons of incendiaries on the bombers which went to Essen in early March 1942; combined the new technique with the introduction of Gee; and followed it up with the burning of Lübeck and Rostock before the end of April.

In its main defensive role Bomber Command had, during the nine months under review, immobilised but failed to damage permanently, the enemy naval units in Brest -- a task it never pretended to be able to carry out effectively owing to the minute size of the targets, their lack of vulnerability and their ease of repair, the use of heavy defences and a smoke screen, and the costliness of daylight

/precision

precision attacks. It had, however, numbered both "Scharnhorst" and "Gneisenau" among the remarkably high toll of shipping damaged (and in many cases sunk) as a result of comparatively small-scale minelaying. (1.)

At high cost its light bombers had by daylight almost closed the Straits of Dover to enemy merchant shipping, and made voyages along the Frisian and Dutch coasts extremely hazardous. (2.) In Circus and Ramrod operations the light bombers had kept the Germans pre-occupied with day fighter needs in the West (as they had in the Mediterranean) at the expense of forces on the Russian Front, and thereby given further valuable aid to the new ally.

The heavy bomber offensive by daylight had not been a success owing to various reasons -- notably the unsuitability of the Fortress Mk I., of which too high a ceiling was demanded by tactical considerations over the Western theatre, (3.) and the inability to obtain sufficient Stirlings and Halifaxes to enable a daylight as well as a longer-range night offensive to be carried on. Moreover fighter protection was needed, and was lacking except in a very restricted sphere.

The light bombers, again, had done useful and glorious work in swooping on enemy and occupied ports, and even on inland targets near Cologne -- but again at too high a cost.

Finally, bombers had proved their worth in the small-scale combined operation at Vaagso.

There can be no doubt that the policy of conserving the force was correctly conceived. The extraordinary weather of the autumn and winter of 1941-2, together with the enemy's improving defences, would otherwise have whittled away the small force available, and robbed the command of the foundation on which it began to build in the spring of 1942.

(1.) See page 161.
(2.) See page 109.

(3.) See page 17.

SECRET

FIRST DRAFT

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

VOL, III

APPENDICES

APPENDIX A.1

CHANGES IN THE EQUIPMENT OF BOMBER COMMAND

1st JUNE, 1941 - 28th FEBRUARY, 1942

HEAVY BOMBERS

INCREASES	DECREASES
<u>LANCASTERS</u>	
No. 44 Sqdn. (5 Gp.) re-equipped from Hampdens.	Nil
No. 97 Sqdn. (5 Gp.) re-equipped from Manchesters.	
<u>HALIFAXES</u>	
No. 10 Sqdn. (4 Gp.) re-equipped from Whitleys.	Nil
No. 78 Sqdn. (4 Gp.) re-equipped from Whitleys.	
No. 102 Sqdn. (4 Gp.) re-equipped from Whitleys.	
<u>STIRLINGS</u>	
No. 149 Sqdn. (3 Gp.) re-equipped from Wellingtons.	Nil
No. 218 Sqdn. (3 Gp.) re-equipped from Wellingtons.	
<u>MANCHESTERS</u>	
No. 83 Sqdn. (5 Gp.) re-equipped from Hampdens.	No. 97 Sqdn. (5 Gp.) re-equipped with Lancasters.
No. 106 Sqdn. (5 Gp.) re-equipped from Hampdens.	
<u>FORTRESSES</u>	
Nil	No. 90 Sqdn. - a detachment to the Middle East; remainder disbanded.
<u>LIBERATORS</u>	
No. 150 Sqdn. acquired a few non-operational Liberators, but	reverted to Wellingtons.

APPENDIX A.2

MEDIUM BOMBERS

INCREASES	DECREASES
<u>WELLINGTONS</u>	
No. 460 Sqdn. (RAAF) formed in 8 Gp. and transferred to 1 Gp.	No. 218 Sqdn. re-equipped with Stirlings.
No. 458 Sqdn. (RAAF) formed in 1 Gp., but	No. 458 (RAAF) Sqdn. transferred to M.E. Command.
No. 156 Sqdn. (3 Gp.) formed from the remnants of	No. 40 Sqdn. transferred to M.E. Command.
No. 158 Sqdn. (4 Gp.) formed from the remnants of	No. 104 Sqdn. transferred to M.E. Command.
No. 419 Sqdn. (RCAF) formed in 3 Gp.	No. 99 Sqdn. transferred to India.
No. 215 Sqdn. formed in 3 Gp. but	No. 215 Sqdn. transferred to India.
	No. 149 Sqdn. re-equipped with Stirlings.
<u>HAMPDENS</u>	
No. 408 (RCAF) Sqdn. formed in 5 Gp.	No. 44 (Rh) Sqdn. re-equipped with Lancasters.
No. 420 (RCAF) Sqdn. formed in 5 Gp.	No. 83 Sqdn. re-equipped with Manchesters.
No. 455 (RAAF) Sqdn. formed in 5 Gp.	No. 106 Sqdn. re-equipped with Manchesters.
<u>WHITLEYS</u>	
Nil	No. 10 Sqdn. re-equipped with Halifaxes.
	No. 78 Sqdn. re-equipped with Halifaxes.
	No. 102 Sqdn. re-equipped with Halifaxes.

APPENDIX A.3

LIGHT BOMBERS

INCREASES	DECREASES
<u>MOSQUITOS</u> No. 105 Sqdn. (2 Gp.) re-equipped from Blenheims	Nil.
<u>BOSTONS</u> No. 226 Sqdn. re-equipped from Blenheims No. 107 Sqdn. re-equipped from Blenheims. No. 88 Sqdn. re-equipped from Blenheims.	Nil.
<u>BLLENHEIMS</u> No. 88 Sqdn. returned from Northern Ireland No. 114 Sqdn. returned from Coastal Command	No. 88 Sqdn. re-equipped with Bostons. No. 226 Sqdn. re-equipped with Bostons. No. 107 Sqdn. re-equipped with Bostons. No. 105 Sqdn. re-equipped with Mosquitos. No. 82 Sqdn. transferred to India. No. 110 Sqdn. transferred to India. No. 139 Sqdn. transferred to Far East. No. 18 Sqdn. detached to Middle East. No. 21 Sqdn. detached to Middle East.
<u>MISCELLANEOUS</u> No. 138 Sqdn. formed from No. 1419 Flt. (3 Gp.) No. 161 Sqdn. formed in 3 Gp. No. 109 Sqdn. transferred to Bomber Command with No. 26 Group.	No. 271 (Transport Sqdn.) transferred.

APPENDIX A.4

SQUADRON STATES ON 28TH FEBRUARY, 1942

As a result of these changes in the composition of the bomber force, the squadron states on 28th February, 1942 were as follows:-
(Squadrons non-operational shown in parenthesis).A.M.W.R.R.O.2, Record Vol.7.

Class & Type	Group	Squadrons	Total Squadrons	Squadron	
		(Non-Operational) Squadrons in Brackets		I.E.	I.R.
<u>HEAVY BOMBERS</u>					
Lancasters	5	(44RH) and (97)	(2)	16	2
Halifaxes	4	35, 76, 10, (78), (102)	5	16	2
Stirlings	3	7, 15, 149 & 218	4	16	2
Manchesters	5	207, 61, 83 & (106)	4	16	2
Fortresses	-	Nil			
Liberators	-	Nil			
		(No. 150 Sqdn. had a few non-operational)			
		Total	15		
<u>MEDIUM BOMBERS</u>					
Wellingtons	1	103, 150, 304(P) Mk. IC 305(P), 12 Mk. II 142, 300(P) 301(P), 460(RAAF) Mk. IV	8 1	16 24	2 3
	3	214, 311(CZ) Mk. IC 9, 57, 75(NZ) 101, 115 156 (ex 40) 419 (RCAF) Mk. III	9	16	2
	4	158 (ex 104) 405 (RCAF) Mk. II	2	16	2
	5	49, 50, 144 408 (RCAF) 420 (RCAF) 455 (RAAF)	5 1 3	24 16 24	3 2 3
Hampdens					
Whitleys	4	(51), 58, 77	3		
		Total	29		
<u>LIGHT BOMBERS</u>					
Boston III	2	88, 107, 226	3	16	4
Blenheim IV	2	114	1*	16	4
Mosquito	2	105	1		
		Total	5		
<u>MISCELLANEOUS</u>					
	3	138 (SD), 161 (SD)	2		
	26	109 (SD)	1		
		Total	3		

* Excluding the remnants of 18 and 21 Squadrons after detachments had transferred to the Middle East; and also excluding Nos: 82, 110 and 139 Squadrons in process of transfer overseas.

APPENDIX B

Page 1

CHANGES IN THE LOCATION OF BOMBER SQUADRONS

1.6.41 - 26.2.42

Sqdn.	Group	Location on 1.6.41	Changes in Location	Date of Change in Location Week-Ending	Location on 26.2.42	Group
7	3	Oakington	-	-	Oakington	3
9	3	Honington	-	-	Honington	3
10	4	Leeming	-	-	Leeming	4
12	1	Binbrook	-	-	Binbrook	1
15	3	Wyton	Wyton/Alconbury	19. 2.42	Wyton/ Alconbury	3
18	2	Temp. at Oulton	Returned to Horsham St. Faith. Flying Crews temporarily detached from Bomber Command Wattisham.	17. 7.41 16.10.41 11.12.41	Wattisham	2
21	2	Watton, temporarily at Lossiemouth	Returned to Watton Detached to Manston Returned to Watton Detached to Lossiemouth Returned to Watton Flying Crews temp. detached from Bomber Command	19. 6.41 17. 7.41 31. 7.41 4. 9.41 25. 9.41 1. 1.42	Watton	2
35	4	Linton	-	-	Linton	4
40	3	Temporarily at Wyton/ Alconbury	Part temporarily detached to Middle East	30.10.41	(See 156 Sqdn)	
44	5	Waddington	Re-numbered 44 (Rhodesia) Waddington/ Skellingthorpe	11. 9.41 12. 2.42	Waddington/ Skelling- thorpe	5
49	5	Temporarily at Scampton/ Dunholme Lodge	Scampton	12. 2.42	Scampton	5
50	5	Lindholme	Swinderby Swinderby/ Skellingthorpe	24. 7.41 27.11.41	Swinderby/ Skelling- thorpe	5

Sqdn.	Group	Location on 1.6.41	Changes in Location	Date of Change in Location Week-Ending	Location on 26.2.42	Group
51	4	Dishforth	Topcliffe Temporarily detached for Army Co-op. Training at Andover/Thrupton	29. 1.42 5. 2.42	Andover/Thrupton	
57	3	Feltwell/Methwold	-	-	Feltwell/Methwold	3
58	4	Linton	-	-	Linton	4
61	5	Temporarily at Hemswell/Ingham	N. Luffenham N. Luffenham/Woolfox Lodge	17. 7.41 4. 9.41	N. Luffenham/Woolfox Lodge	5
75(N.Z)	3	Feltwell	-	-	Feltwell	3
76	4	Temporarily at Linton	Middleton St. George	19. 6.41	Middleton/St. George	4
77	4	Topcliffe	Leeming	11. 9.41	Leeming	4
78	4	Middleton St. George	Middleton/Croft	23.10.41	Middleton/Croft	4
82	2	Temporarily Watton/Bodney	Flying Crews transferred to India	-	-	-
83	5	Scampton/Dunholme Lodge	Scampton	12. 2.42	Scampton	5
88	-	Under R.A.F.N.I.	Swanton Morley to re-equip Attlebridge Manston Attlebridge Long Kesh (N.I.) Swanton Morley/Attlebridge	10. 7.41 7. 8.41 11. 9.41 2.10.41 15. 1.42 5. 2.42	Swanton Morley/Attlebridge	2
90	2	Temporarily at West Raynham/Gt. Massingham	Polebrook (8 Grp.) Part temporarily detached from Bomber Command Flying Crews detached from Bomber Command Transferred to M.E.	3. 7.41 30.10.41 22. 1.42 5. 2.42	Middle East	

APPENDIX B

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Sqdn.	Group	Location on 1.6.41	Changes in Location	Date of Change in Location Week-Ending	Location on 26.2.42	Group
97	5	Coningsby	Coningsby/Woodhall Spa	4.12.41	Coningsby/Woodhall Spa	5
99	3	Waterbeach	Flying Crews transferred overseas	19. 2.42	-	
101	2	West Raynham	Oakington Oakington/Bourn	10. 7.41 30.10.41	Oakington/Bourne	3
102	4	Topcliffe	Topcliffe/Dalton	13.11.41	Topcliffe/Dalton	4
103	1	Newton	Elsham Wolds	17. 7.41	Elsham Wolds	1
104	4	Driffield	Part detached from Bomber Command	16.10.41	(See 158 Sqdn)	
105	2	Swanton Morley	Horsham St. Faith	11.12.41	Horsham St. Faith	2
106	5	Coningsby	-	-	Coningsby	5
107	2	Temporarily at West Raynham/Gt. Massingham	Temp. detached to Manston Returned to West Raynham/Gt. Massingham Flying Crews detached from Bomber Command Flying Crews returned to West Raynham/Gt. Massingham	31. 7.41 7. 8.41 16.10.41 12. 2.42	W. Raynham/Gt. Massingham	2
109	-	-	Transferred from 26 Group	19. 2.42	Tempsford, Upper Heyford & Boscombe Down	26
110	2	Wattisham temp. at Manston	Returned to Wattisham, Temp. detached to Lossiemouth Returned to Wattisham Transferred to India	12. 6.41 25.12.41 1. 1.42 26. 2.42	India	
114	-	Horsham St. Faith temp. attached to Coastal Cmd. at Leuchars	Returned to W. Raynham Temp. detached to Lossiemouth Returned to W. Raynham	24. 7.41 25.12.41 1. 1.42	W. Raynham	2

Sqdn.	Group	Location on 1.6.41	Changes in Location	Date of Change in Location Week-ending	Location on 26.2.42	Group
115	3	Temp. at Marham/Barton Bendish	Returned to Marham	26. 6.41	Marham	3
138	-	-	Formed at Stradishall	28. 8.41	Stradishall	3
139	2	Horsham St. Faith	Oulton Manston Oulton Horsham St. Faith Horsham/Oulton Transferred to Far East	17. 7.41 28. 8.41 11. 9.41 23.10.41 11.12.41 12. 2.42	Far East	
142	1	Binbrook	Binbrook/Grimsby	27.11.41	Binbrook/Grimsby	1
144	5	Temp. at Hemswell/Ingham	N. Luffenham	17. 7.41	N. Luffenham	5
149	3	Mildenhall	Lakenheath	12. 2.42	Lakenheath	3
150	1	Newton	Snaith	17. 7.41	Snaith	1
156	-	-	Formed from remnant of 40 Sqdn. at Wyton/Alconbury	26. 2.42	Wyton/Alconbury	3
158	-	-	Formed from remnant of 104 Sqdn. at Driffield/Pocklington	26. 2.42	Driffield/Pocklington	4
161	-	-	Formed at Stradishall	5. 2.42	Stradishall	3
207	5	Waddington	Bottesford	20.11.41	Bottesford	5
214	3	Stradishall	-	-	Stradishall	3
215	-	-	Began to form at Stradishall Transferred overseas	11.12.41 22. 1.42	Transferred overseas	-
218	3	Marham	-	-	Marham	3
226	2	Temp. Transferred from R.A.F.N.I. to Wattisham	Permanently in 2 Grp. Manston Wattisham Swanton Morley	19. 6.41 7. 8.41 21. 8.41 11.12.41	Swanton Morley	2

Sqdn.	Group	Location on 1.6.41	Changes in Location	Date of Change in Location Week-Ending	Location on 26. 2.42	Group
271 (Trans- port)		Doncaster	Transferred from Bomber Command	5. 6.41	-	
300(P)	1	Swinderby	Hemswell	24. 7.41	Hemswell	1
301(P)	1	Swinderby	Hemswell	24. 7.41	Hemswell	1
304(P)	1	Syerston	Lindholme	24. 7.41	Lindholme	1
305 P	1	Syerston	Lindholme	24. 7.41	Lindholme	1
311(CZ)	3	Temporarily at Honington/ /E. Wretham	E. Wretham/Stradishall	19. 2.42	E. Wretham/ Stradishall	3
405 (RCAF)	4	Drifffield	Pocklington	19. 6.41	Pocklington	4
408 (RCAF)	-	-	Began to form at Lindholme Syerston Syerston/Balderton Syerston/N. Luffenham	19. 6.41 24. 7.41 11.12.41 5. 2.42	Syerston/ N.Luffenham	5
419 (RCAF)	-	-	Began to form at Mildenhall (3 Group)	11.12.41		
420 (RCAF)			Began to form at Waddington (5 Group)	11.12.41		
455 (RAAF)	-	-	Began to form at Swinderby (5 Group) Swinderby/Skelling- thorpe Swinderby/Wigsley	30. 6.41 27.11.41 19. 2.42	Swinderby/ Wigsley	5
458 (RAAF)	-	-	Formed at Holme (1 Group) Flying Crews trans- ferred to M.E.	11. 9.41 19. 2.42		
460 (RAAF)	-	-	Formed at Molesworth (8 Group) Holme/Breighton	27.11.41 8. 1.42	Holme/ Breighton	1

APPENDIX "C"

AVERAGE AVAILABILITY OF AIRCRAFT, CREWS and
AIRCRAFT WITH CREWS IN OPERATIONAL GROUPS

I - By Months, Light, Medium and Heavy

Month	LIGHT BOMBERS			MEDIUM BOMBERS			HEAVY BOMBERS			TOTAL FORCE		
	A/C	Crews	A/C & Crews	A/C	Crews	A/C & Crews	A/C	Crews	A/C & Crews	A/C	Crews	A/C & Crews
<u>1941</u>												
June	107	70	68	436	410	366	30	53	29	573	533	463
July	101	69	68	425	409	358	24	40	23	550	518	449
Aug.	97	71	68	447	438	389	31	40	29	575	549	486
Sept.	99	88	84	409	446	368	38	41	33	546	575	485
Oct.	101	94	87	430	460	384	60	51	46	591	605	517
Nov.	79	68	61	462	449	391	69	63	55	610	580	507
Dec.	78	80	65	474	436	400	75	80	65	627	596	530
<u>1942</u>												
Jan.	50	57	48	354	369	309	65	69	53	469	495	410
Feb.	67	68	55	319	328	275	54	66	44	440	462	374

II - By Types of Aircraft(a) LIGHT BOMBERS

Month	<u>BLENHEIMS</u>			<u>BOSTONS</u>			
	Aircraft	Crews	Aircraft with Crews	Aircraft	Crews	Aircraft with Crews	
<u>1941</u>							
June	107	70	68)			
July	101	69	68				
Aug.	97	71	68				
Sept.	99	88	84				
Oct.	101	94	87				
Nov.	79	68	61				
Dec.	68	69	55	(Dec. 9-31)	10	11	10
<u>1942</u>							
Jan.	45	52	43		5	5	5
Feb.	53	45	41		14	23	14

APPENDIX "C"

(b) MEDIUM BOMBERS

Month	<u>WELLINGTONS</u>			<u>WHITLEYS</u>			<u>HAMPTONS</u>		
	A/C	Crews	A/C & Crews	A/C	Crews	A/C & Crews	A/C	Crews	A/C & Crews
<u>1941</u>									
June	265	222	204	74	81	70	97	107	92
July	244	220	199	64	69	57	117	120	102
Aug.	232	212	191	72	81	67	143	145	131
Sept.	243	231	207	57	81	55	109	134	106
Oct.	241	234	202	63	88	62	126	138	120
Nov.	250	235	209	62	82	58	150	132	124
Dec.	266	246	227	62	69	57	146	121	116
<u>1942</u>									
Jan.	195	209	174	53	71	52	106	89	83
Feb.	170	175	151	49	69	47	100	84	77
<u>(c) HEAVY BOMBERS</u>									
<u>1941</u>	<u>STIRLINGS</u>			<u>HALIFAXES</u>			<u>MANCHESTERS</u>		
June	12	16	12	8+	15+	8+	10*	22*	9*
July	10	13	9	12	16	12	0*	9*	0*
Aug.	10	11	9	9	13	9	8	10	7
Sept.	13	14	12	9	9	7	12	13	10
Oct.	21	18	17	12	9	8	24	22	19
Nov.	18	21	17	17	11	11	31	27	24
Dec.	21	24	20	23	18	17	27	33	24
<u>1942</u>									
Jan.	19	22	17	19	12	11	22	30	21
Feb.	17	21	16	19	13	12	16	29	15
<u>1941</u>	<u>FORTRESSES %</u>			<u>LANCASTERS %</u>					
June	0	0	0						
July (11th on)	2	2	2						
Aug.	4	6	4						
Sept.	4	5	4						
Oct.	3	2	2				0	0	0
Nov.	3	4	3						
Dec.	4	5	4						
<u>1942</u>									
Jan.	5	5	4						
Feb.	0	0	0				2	3	1

+ No Halifaxes were available between June 1st - 8th.

* No Manchesters were available between June 8th - 11th, 13th - 19th and 30th June - 31st July.

APPENDIX "D"DRAFT LAY-OUT FOR EXPANSION OF BOMBER COMMAND25th DECEMBER, 1941APPENDIX "A" to LM15/OP36Bomber Command - Organisation

<u>Group</u>	<u>Parent</u>	<u>Satellites</u>
No. 1 Group:-	Snaith	Burn Riccall
	Holme	Brighton Howden
	Lindholme	Askorn Tickhill
	Finningley	Bawtry Worksop
	Hemswell	Blyton Ingham
	Market Rasen	Wickenby Faldingworth
	Binbrook	Grimsby Kelstern
	Elsham	Kirlington N. Killingholme
No. 2 Group:-	Foulsham	Gt. Snoring (x)
	W. Raynham	Gt. Massingham Sculthorpe
	Swanton Morley	Attlebridge (x)
	Horsham St. Faith	Oulton Rock Heath
	Shipdham	Wendling Deopham
	Watton	Bodney N. Pickenham
	Hethel	Tibenham (x)
No. 3 Group:-	Marham	Downham Market (x)
	Feltwell	Methwold Lakenheath
	Mildenhall	Tuddenham Newmarket
	Waterbeach	Ely Mepal

<u>Group</u>	<u>Parent</u>	<u>Satellites</u>
No. 3 Group (Contd.)	Oakington	Fenstanton Bourn
	Tempsford	Gransden Graveley
	Bassingbourne	Steeple Morden Nuthampstead
No. 4 group:-	Middleton	Croft (x)
	Leeming	Skipton (x)
	Dishforth	Topcliffe Dalton
	Linton	Tholthorpe East Moor
	Marston	Rufforth (x)
	Pocklington	Elvington Melbourne
	Driffield	Cottam (x)
	Leconfield	Lisset (x)
No. 5 Group:-	Cranwell	South Kyme Barkston Heath
	Bottesford	Newton Langar
	Grantham	Harlaxton N. Witham
	Melton Mowbray	Saltby Eastwell
	Cottesmore	Woolfox Lodge Swinstead
	N. Luffenham	Harringworth Kingscliffe
	Wymeswold	Castle Donnington Tollerton
No. 8 Group:-	Polebrook	Glatton Deenethorpe
	Market Harborough	Desborough Harrington
	Bruntingthorpe	Bitteswell Husbands Bosworth

APPENDIX "D"

<u>Group</u>	<u>Parent</u>	<u>Satellites</u>
No. 8 Group (Contd.)	Chelveston	Grafton Underwood Finedon
	Molesworth	Alconbury Kimbolton
	Wyton	Upwood Warboys
	Thurleigh	Little Staughton Podington
"A" Group:-	Ossington	Gamston (x)
	Swinderby	Wigsley Fulbeck
	Syerston	Balderton Winthorpe
	Waddington	Skeelingthorpe Bardney
	Coningsby	Metheringham Woodhall Spa
	East Kirkby	Spilsby Strubby
	Scampton	Dunholme Lodge Fiskerton
"B" Group:-	Stradishall	West Wickham Chedburgh
	Ridgewell	Hadstock Wethersfield
	Wattisham	Rattlesden Sudbury
	Copdook	Bosted Wormingford
	Earls Colne	Braintree Birch
	Gt. Dunmow	Gt. Saling Stansted
"D" Group:-	Snetterton	Wretham Old Buckingham
	Honnington	Knettisall (x)
	Hardwick	Bungay Seething
	Halesworth	Metfield Beccles
	Horham	Eye Thorpe Abbots
	Framlingham	Debach Mondlsham
	Bury	Lavenham Gt. Ashfield

(x) = Sites still to be found

APPENDIX "E" 1

BOMBER EFFORT, BY DAY, NIGHT AND

DAY AND NIGHT

(a) SORTIES FLOWN

Month	Total Sorties	By Day		By Night	
		Sorties	% of total	Sorties	% of total
<u>1941</u>					
June	3,935	633	16%	3,302	84%
July	4,040	674	20%	3,366	80%
Aug.	3,988	539	15%	3,449	85%
Sept.	3,021	348	13%	2,673	87%
Oct.	2,715	204	8%	2,511	92%
Nov.	1,765	47	3%	1,718	97%
Dec.	1,582	164	11%	1,418	89%
<u>1942</u>					
Jan.	2,226	24	1%	2,202	99%
Feb.	1,506	346	30%	1,160	60%
Total	24,778	2,979	12%	21,799	88%

(b) BY BOMBS DROPPED

Month	Total Bombs Dropped	By Day		By Night	
	Tons	Tons	% of total	Tons	% of total
<u>1941</u>					
June	4,310	146	3%	4,164	97%
July	4,384	491	11%	3,893	89%
Aug.	4,242	166	4%	4,076	96%
Sept.	2,889	101	3%	2,788	97%
Oct.	2,984	46	2%	2,938	98%
Nov.	1,907	16	1%	1,891	99%
Dec.	1,794	222	12%	1,572	88%
<u>1942</u>					
Jan.	2,292	8	app. 0%	2,284	app. 100%
Feb.	1,011	61	6%	950	94%
Total	25,813	1,257	4%	24,556	96%

Compiled from Air Ministry War Room Statistical Section's Records. Tonnages by night include bombs dropped by aircraft on minelaying and leaflet missions. For analysis by aircraft categories and types see the following pages. See also A.M.W.R. Manual and B.C. Operations Page 26.

APPENDIX "E" 2

(c) BY CATEGORIES, SHOWING SORTIES FLOWN AND BOMBS AND

MINES DROPPED

BY DAY

Month	LIGHT BOMBERS		MEDIUM BOMBERS			HEAVY BOMBERS			TOTAL FORCE		
	S.	T.	S.	T.	M.	S.	T.	M.	S.	T.	M.
<u>1941</u>											
June	609	129	4	1	-	20	16	-	633	146	-
July	480	118	97	105	-	97	268	-	674	491	-
Aug.	505	133	12	11	-	22	22	-	539	166	-
Sept.	300	79	30	10	-	18	12	-	348	101	-
Oct.	204	46	-	-	-	-	-	-	204	46	-
Nov.	37	12	-	-	-	10	4	-	47	16	-
Dec.	19	8	78	13	12	67	201	-	164	222	12
<u>1942</u>											
Jan.	-	-	24	8	-	-	-	-	24	8	-
Feb.	73	7	221	39	51	52	15	44	346	61	95
Total	2,227	532	466	187	63	286	538	44	2,979	1,257	107

BY NIGHT

Month	LIGHT BOMBERS		MEDIUM BOMBERS			HEAVY BOMBERS			TOTAL FORCE		
	S.	T.	S.	T.	M.	S.	T.	M.	S.	T.	M.
<u>1941</u>											
June	-	-	3,062	3,480	76	240	684	-	3,302	4,164	76
July	-	-	3,245	3,556	133	121	337	-	3,366	3,893	133
Aug.	-	-	3,219	3,436	81	230	640	-	3,449	4,076	81
Sept.	-	-	2,498	2,371	101	175	417	-	2,673	2,788	101
Oct.	-	-	2,275	2,359	75	236	579	-	2,511	2,938	75
Nov.	-	-	1,543	1,465	111	175	426	-	1,718	1,891	111
Dec.	35	16	1,284	1,315	35	99	241	-	1,418	1,572	35
<u>1942</u>											
Jan.	69	22	1,873	1,747	62	260	515	-	2,202	2,284	62
Feb.	9	1	965	675	120	186	274	91	1,160	950	211
Total	113	39	19,964	20,404	794	1,722	4,115	91	21,799	24,556	885

BY DAY AND NIGHT

Month	LIGHT BOMBERS		MEDIUM BOMBERS			HEAVY BOMBERS			TOTAL FORCE		
	S.	T.	S.	T.	M.	S.	T.	M.	S.	T.	M.
<u>1941</u>											
June	609	129	3,066	3,481	76	260	700	-	3,935	4,310	76
July	480	118	3,342	3,661	133	218	605	-	4,040	4,384	133
Aug.	505	133	3,231	3,447	81	252	662	-	3,988	4,242	81
Sept.	300	79	2,528	2,381	101	193	429	-	3,021	2,889	101
Oct.	204	46	2,275	2,359	75	236	579	-	2,715	2,984	75
Nov.	37	12	1,543	1,465	111	185	430	-	1,765	1,907	111
Dec.	54	24	1,362	1,328	47	166	442	-	1,582	1,794	47
<u>1942</u>											
Jan.	69	22	1,897	1,755	62	260	515	-	2,226	2,292	62
Feb.	82	8	1,186	714	171	238	289	135	1,506	1,011	306
Total	2,340	571	20,430	20,591	857	2,008	4,651	135	24,778	25,813	992

Note:- S = No. of Sorties flown.
T = Tons of Bombs dropped.
M = No. of Mines laid.

APPENDIX "E" 3

(d) BY TYPES OF AIRCRAFT, SHOWING SORTIES FLOWN AND
BOMBS AND MINES DROPPED

(i) LIGHT BOMBERS

BY DAY

Month	BLENHEIMS		BOSTONS		TOTAL FOR LIGHT BOMBERS	
	Sorties	Tonnage	Sorties	Tonnage	Sorties	Tonnage
<u>1941</u>						
June	609	129			609	129
July	480	118			480	118
Aug.	505	133			505	133
Sept.	300	79			300	79
Oct.	204	46			204	46
Nov.	37	12			37	12
Dec.	19	8			19	8
<u>1942</u>						
Jan.	-	-			-	-
Feb.	43	5	30	2	73	7
Total	2,197	530	30	2	2,227	532

BY NIGHT

Month	BLENHEIMS		BOSTONS		TOTAL FOR LIGHT BOMBERS	
	Sorties	Tonnage	Sorties	Tonnage	Sorties	Tonnage
<u>1941</u>						
June-Nov. incl.	-	-	-	-	-	-
Dec.	35	16	-	-	35	16
<u>1942</u>						
Jan.	69	22	-	-	69	22
Feb.	9	1	-	-	9	1
Total	113	39	-	-	113	39

BY DAY AND NIGHT

Month	BLENHEIMS		BOSTONS		TOTAL FOR LIGHT BOMBERS	
	Sorties	Tonnage	Sorties	Tonnage	Sorties	Tonnage
<u>1941</u>						
June	609	129	-	-	609	129
July	480	118	-	-	480	118
Aug.	505	133	-	-	505	133
Sept.	300	79	-	-	300	79
Oct.	204	46	-	-	204	46
Nov.	37	12	-	-	37	12
Dec.	54	24	-	-	54	24
<u>1942</u>						
Jan.	69	22	-	-	69	22
Feb.	52	6	30	2	82	8
Total	2,310	569	30	2	2,340	571

Note:- S = Sorties flown.
T = Tonnage of Bombs dropped.
M = No. of Mines laid.

APPENDIX "E" 4

(ii) MEDIUM BOMBERS

BY DAY

Month	WELLINGTONS		WHITLEYS		HAMPDENS			TOTAL MEDIUM BOMBERS		
	S.	T.	S.	T.	S.	T.	M.	S.	T.	M.
<u>1941</u>										
June	4	1	-	-	-	-	-	4	1	-
July	79	90	-	-	18	15	-	97	105	-
Aug.	-	-	-	-	12	11	-	12	11	-
Sept.	-	-	-	-	30	10	-	30	10	-
Oct.	-	-	-	-	-	-	-	-	-	-
Nov.	-	-	-	-	-	-	-	-	-	-
Dec.	-	-	-	-	78	13	12	78	13	12
<u>1942</u>										
Jan.	-	-	-	-	24	8	-	24	8	-
Feb.	92	21	-	-	129	18	51	221	39	51
Total	175	112	-	-	291	75	63	466	187	63

BY NIGHT

Month	WELLINGTONS		WHITLEYS		HAMPDENS			TOTAL MEDIUM BOMBERS		
	S.	T.	S.	T.	S.	T.	M.	S.	T.	M.
<u>1941</u>										
June	1,617	1,977	643	863	802	640	76	3,062	3,480	76
July	1,799	2,132	487	741	959	683	133	3,245	3,556	133
Aug.	1,585	1,866	565	755	1,069	815	81	3,219	3,436	81
Sept.	1,432	1,495	402	444	664	432	101	2,498	2,371	101
Oct.	1,206	1,469	368	433	701	457	75	2,275	2,359	75
Nov.	840	967	179	199	524	299	111	1,543	1,465	111
Dec.	716	894	218	227	350	194	35	1,284	1,315	35
<u>1942</u>										
Jan.	1,010	1,175	276	304	587	268	62	1,873	1,747	62
Feb.	489	502	137	102	339	71	120	965	675	120
Total	10,694	12,477	3,275	4,068	5,995	3,859	794	19,964	20,404	794

BY DAY AND NIGHT

Month	WELLINGTONS		WHITLEYS		HAMPDENS			TOTAL MEDIUM BOMBERS		
	S.	T.	S.	T.	S.	T.	M.	S.	T.	M.
<u>1941</u>										
June	1,621	1,978	643	863	802	640	76	3,066	3,481	76
July	1,878	2,222	487	741	977	698	133	3,342	3,661	133
Aug.	1,585	1,866	565	755	1,081	826	81	3,231	3,447	81
Sept.	1,432	1,495	402	444	694	442	101	2,528	2,381	101
Oct.	1,206	1,469	368	433	701	457	75	2,275	2,359	75
Nov.	840	967	179	199	524	299	111	1,543	1,465	111
Dec.	716	894	218	227	428	207	47	1,362	1,328	47
<u>1942</u>										
Jan.	1,010	1,175	276	304	611	276	62	1,897	1,755	62
Feb.	581	523	137	102	468	89	171	1,186	714	171
Total	10,869	12,589	3,275	4,068	6,286	3,934	857	20,430	20,591	857

Note:- S = Sorties flown.
T = Tonnage of Bombs dropped.
M = No. of Mines laid.

APPENDIX "E" 5

(iii) HEAVY BOMBERS

BY DAY

Month	STIRLINGS		HALIFAXES		MANCHESTERS			FORTRESSES		TOTAL HEAVY BOMBERS		
	S.	T.	S.	T.	S.	T.	M.	S.	T.	S.	T.	M.
<u>1941</u>												
June	14	3	6	13	-	-	-	-	-	20	16	-
July	71	230	15	25	-	-	-	11	13	97	268	-
Aug.	-	-	-	-	-	-	-	22	22	22	22	-
Sept.	-	-	-	-	-	-	-	18	12	18	12	-
Oct.	-	-	-	-	-	-	-	-	-	-	-	-
Nov.	10	4	-	-	-	-	-	-	-	10	4	-
Dec.	22	61	34	120	11	20	-	-	-	67	201	-
<u>1942</u>												
Jan.	-	-	-	-	-	-	-	-	-	-	-	-
Feb.	11	3	13	3	28	9	44	-	-	52	15	44
Total	128	301	68	161	39	29	44	51	47	286	538	44

BY NIGHT

Month	STIRLINGS		HALIFAXES		MANCHESTERS			FORTRESSES		TOTAL HEAVY BOMBERS		
	S.	T.	S.	T.	S.	T.	M.	S.	T.	S.	T.	M.
<u>1941</u>												
June	112	382	67	168	61	134	-	-	-	240	684	-
July	34	102	87	235	-	-	-	-	-	121	337	-
Aug.	89	291	91	246	50	103	-	-	-	230	640	-
Sept.	93	241	46	121	36	55	-	-	-	175	417	-
Oct.	103	305	57	148	76	126	-	-	-	236	579	-
Nov.	81	209	42	118	52	99	-	-	-	175	426	-
Dec.	69	185	7	18	23	38	-	-	-	99	241	-
<u>1942</u>												
Jan.	70	170	46	105	144	240	-	-	-	260	515	-
Feb.	39	87	32	90	115	97	91	-	-	186	274	91
Total	690	1,972	475	1,249	557	892	91	-	-	1,722	4,113	91

BY DAY AND NIGHT

Month	STIRLINGS		HALIFAXES		MANCHESTERS			FORTRESSES		TOTAL HEAVY BOMBERS		
	S.	T.	S.	T.	S.	T.	M.	S.	T.	S.	T.	M.
<u>1941</u>												
June	126	385	73	181	61	134	-	-	-	260	700	-
July	105	332	102	260	-	-	-	11	13	218	605	-
Aug.	89	291	91	246	50	103	-	22	22	252	662	-
Sept.	93	241	46	121	36	55	-	18	12	193	429	-
Oct.	103	305	57	148	76	126	-	-	-	236	579	-
Nov.	91	213	42	118	52	99	-	-	-	185	430	-
Dec.	91	246	41	138	34	58	-	-	-	166	442	-
<u>1942</u>												
Jan.	70	170	46	105	144	240	-	-	-	260	515	-
Feb.	50	90	45	93	143	106	135	-	-	238	289	135
Total	818	2,273	543	1,410	596	821	135	51	47	2,008	4,651	135

Note:- S = Sorties flown.
T = Tonnage of Bombs dropped.
M = No. of Mines laid.

APPENDIX "F"(a) TONS OF BOMBS DROPPED BY CATEGORY OF TARGETMONTHLY TOTALS

<u>1941</u>	Indus- trial Towns	Trans- porta- tion	Naval Targets	Oil Targets	A/F's & A/c Factories	Specific Indus- tries	Misc. Targets	Total Tons
June	2,138	768	865	4	103	115	317	4,310
July	1,348	1,532	901	48	122	424	9	4,384
Aug.	1,411	1,874	546	6	144	103	158	4,242
Sept.	962	708	901		80	204	34	2,889
Oct.	910	1,029	686		164	144	51	2,984
Nov.	1,062		482		38	8	317	1,907
Dec.	697		940		8	58	91	1,794
<u>1942</u>								
Jan.	853		1,219		82		138	2,292
Feb.	285		376		36		314	1,011
Total	9,666 = 37%	5,911 = 23%	6,916 = 27%	58 = -%	777 = 3%	1,056 = 4%	1,429 = 6%	25,813 = 100%

(b) TERRITORIAL DISTRIBUTION OF TONNAGE OF BOMBS DROPPED

(From Air Ministry War Room Manual of B.C. Ops. 1939-45, P. 32)

<u>1941</u>	Germany	France	Low Countries	Norway	Denmark	Italy	Targets at Sea	Total Tons
June	3,473	693	115	1			28	4,310
July	3,190	947	199				48	4,384
Aug.	3,689	364	147				42	4,242
Sept.	2,000	667	73	7		107	35	2,889
Oct.	2,223	510	238				13	2,984
Nov.	1,374	380	118	5	7		23	1,907
Dec.	799	864	115	8			8	1,794
<u>1942</u>								
Jan.	985	1,191	99	14			3	2,292
Feb.	705	202	19	25	2		58	1,011
Total	18,438 = 71%	5,818 = 23%	1,123 = 5%	60	9	107	258 = 1%	25,813 = 100%

(From Air Ministry War Room Manual of B.C. Ops. 1939-45, P. 29-30)

APPENDIX "G"

COMPARISON BETWEEN OFFENSIVE AND DEFENSIVE EFFORT

Note. The categories of targets listed here do not comprise the whole total of Bomber Command sorties, but illustrate the conflict between offensive and defensive bombing, where the distinction can be drawn - in each case between 89% and 96% of monthly sorties. Percentages are of the whole number of sorties flown per month. In the case of mine-laying sorties are treated as offensive, except in February, 1942, when the whole effort was devoted to laying mines to damage naval units - a defensive undertaking.

(a) OFFENSIVE

Sorties Flown Against:-

Month	German Industry and Transport	French Industry and Transport	Italian Industry and Transport	Mine-laying	Total
<u>1941</u>					
June	2,494 63%	176 4%		84 2%	2,754 69%
July	2,581 63%	195 5%		155 3%	2,931 71%
Aug.	2,885 72%	135 4%		93 2%	3,113 78%
Sept.	1,603 53%	164 5%	151 5%	110 3%	2,028 66%
Oct.	1,640 60%	52 2%		55 2%	1,747 64%
Nov.	942 53%			110 6%	1,052 59%
Dec.	713 45%			72 5%	785 50%
<u>1942</u>					
Jan.	884 40%			100 5%	984 45%
Feb.	294 20%			See Note above	294 20%
Total	14,036 56%	722 3%	151 1/2%	779 3 1/2%	15,688 63%

(b) DEFENSIVE

Sorties Flown Against:-

Month	German ship-yards and harbours	French docks and harbours	Naval Units and Mine- laying	Low Country docks and harbours	Shipping and sweeps	Total
<u>1941</u>						
June	271 7%	494 12%			253 6%	1,018 26%
July	142 4%	517 12%		66 1%	287 7%	1,012 25%
Aug.	166 4%	233 6%		108 2%	223 6%	730 18%
Sept.	142 5%	531 17%		44 1%	145 5%	862 28%
Oct.	246 9%	359 13%		138 5%	108 4%	851 31%
Nov.	201 11%	286 16%		83 5%	30 2%	600 34%
Dec.	3 -	623 40%		89 6%	6 -	721 46%
<u>1942</u>						
Jan.		1,010 45%		40 1%		1,050 46%
Feb.	261 17%	197 13%	561 37%	11 1%	20 1%	1,050 69%
Total	1,432 6%	4,250 17%	561 2%	579 2%	1,072 4%	7,894 31%

APPENDIX "H" 1*

AIRCRAFT DESPATCHED AND MISSING

Month	By Day			By Night			Total		
<u>1941</u>	Sorties	Missing	%	Sorties	Missing	%	Sorties	Missing	%
June	633	26	4.1	3,302	73	2.2	3,935	99	2.5
July	674	65	9.6	3,366	87	2.6	4,040	152	3.8
Aug.	539	35	6.5	3,449	121	3.5	3,988	156	3.9
Sept.	348	14	4.0	2,673	81	3.0	3,021	95	3.1
Oct.	204	16	7.8	2,511	70	2.8	2,715	86	3.2
Nov.	47	-	-	1,718	83	4.8	1,765	83	4.7
Dec.	164	19	11.6	1,418	28	2.0	1,582	47	3.0
<u>1942</u>									
Jan.	24	-	-	2,202	56	2.5	2,226	56	2.5
Feb.	346	19	5.5	1,160	22	1.9	1,506	41	2.7
Total	2,979	194	6.5	21,799	621	2.8	24,778	815	3.3
AIRCREW KILLED AND MISSING				CLAIMS AGAINST ENEMY A/C					
Day and Night Combined				Day			Night		
Month	Killed	Missing		Dest.	Prob.	Dam.	Dest.	Prob.	Dam.
<u>1941</u>									
June	35	490		6	2	3	3	6	4
July	80	723		31	8	11	7	3	5
Aug.	79	666		0	0	5	2	2	5
Sept.	97	500		1	0	3	7	4	6
Oct.	36	455		0	0	3	3	0	2
Nov.	7	437		1	2	1	1	0	1
Dec.	30	231		7	5	6	0	1	1
<u>1942</u>									
Jan.	80	293		0	0	0	0	2	2
Feb.	36	204		0	4	0	0	0	0
Total	480	3,999		46	21	32	23	18	26

* Compiled from Air Ministry War Room's Manual and Bomber Command Operations, 1939-34, supplemented by The A.M.W.R's R.O.2 Record.

APPENDIX "H" 2

AIRCRAFT MISSING OR DAMAGED, DAY AND NIGHT

Month	"A" - Ascribed to Enemy Action; "N" - Not due to Enemy Action									
	By Day			By Night			By Day and Night			
	Missing	Cat. E.	Cat. B and AC.	Missing	Cat. E.	Cat. B. and AC.	Missing	Cat. E.	Cat. B. and AC.	
	A. N.	A. N.	A. N.	A. N.	A. N.	A. N.	A. N.	A. N.	A. N.	
<u>1941</u>										
June	26 -	1 1	12 1	71 2	5 19	30 19	97 2	6 20	42 20	
July	63 2	2 -	32 3	86 1	6 27	39 32	149 3	8 27	71 35	
Aug.	35 -	4 1	17 1	119 2	8 38	47 54	154 2	12 39	64 55	
Sept.	14 -	- -	7 2	78 3	10 64	16 57	92 3	10 64	23 59	
Oct.	16 -	- -	6 1	65 5	3 28	33 34	81 5	3 28	39 35	
Nov.	- -	- -	- 1	74 9	- 21	19 27	74 9	- 21	19 28	
Dec.	19 -	5 -	5 1	27 1	1 15	17 9	46 1	6 15	22 10	
<u>1942</u>										
Jan.	- -	- -	1 -	54 2	2 30	20 28	54 2	2 30	21 28	
Feb.	19 -	1 -	8 1	21 1	1 16	10 11	40 1	2 16	18 12	
Total	192 2	13 2	88 11	595 26	36 258	231 271	787 28	49 260	319 282	
Total A. & N.	194	15	99	621	294	502	815	309	601	
Total Sorties					21,799			24,778		
% Casualties	6.5%		3.3%	2.8%	1.3%	2.3%	3.3%	1.2%	2.4%	

SECRET

APPENDIX "H" 3

MISSING AIRCRAFT BY TYPES - LIGHT BOMBERSBY DAY

Month	BLENHEIMS			BOSTONS			TOTAL FOR LIGHT BOMBERS		
	Sorties	Missing	%	Sorties	Missing	%	Sorties	Missing	%
<u>1941</u>									
June	609	22	3.6				609	22	3.6
July	480	43	9.0				480	43	9.0
Aug.	505	35	6.9				505	35	6.9
Sept.	300	12	4.0				300	12	4.0
Oct.	204	16	7.8				204	16	7.8
Nov.	37	-	-				37	-	-
Dec.	19	6	31.6				19	6	31.6
<u>1942</u>									
Jan.	-	-	-				-	-	-
Feb.	43	2	4.7	30	-	-	73	2	2.7
Total	2,197	136	6.2	30	-	-	2,227	136	6.1

BY NIGHT

Month	BLENHEIMS			BOSTONS			TOTAL FOR LIGHT BOMBERS		
	Sorties	Missing	%	Sorties	Missing	%	Sorties	Missing	%
<u>1941</u>									
June-Nov. incl.	-	-	-	-	-	-	-	-	-
Dec.	35	1	2.9	-	-	-	35	1	2.9
<u>1942</u>									
Jan.	69	4	5.8	-	-	-	69	4	5.8
Feb.	9	-	-	-	-	-	9	-	-
Total	113	5	4.4	-	-	-	113	5	4.4

BY DAY AND NIGHT

Month	BLENHEIMS			BOSTONS			TOTAL FOR LIGHT BOMBERS		
	Sorties	Missing	%	Sorties	Missing	%	Sorties	Missing	%
<u>1941</u>									
June	609	22	3.6	-	-	-	609	22	3.6
July	480	43	9.0	-	-	-	480	43	9.0
Aug.	505	35	6.9	-	-	-	505	35	6.9
Sept.	300	12	4.0	-	-	-	300	12	4.0
Oct.	204	16	7.8	-	-	-	204	16	7.8
Nov.	37	-	-	-	-	-	37	-	-
Dec.	54	7	13.0	-	-	-	54	7	13.0
<u>1942</u>									
Jan.	69	4	5.8	-	-	-	69	4	5.8
Feb.	52	2	3.8	30	-	-	82	2	2.4
Total	2,310	141	6.1	30	-	-	2,340	141	6.0

APPENDIX "H" 4

MISSING AIRCRAFT BY TYPES - MEDIUM BOMBERS

BY DAY

Month	WELLINGTONS			WHITLEYS			HAMPDENS			TOTAL MEDIUM BOMBERS		
	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%
<u>1941</u>												
June	4	2	50.0	-	-	-	-	-	-	4	2	50.0
July	79	9	11.4	-	-	-	18	2	11.1	97	11	11.3
Aug.	-	-	-	-	-	-	12	-	-	12	-	-
Sept.	-	-	-	-	-	-	30	-	-	30	-	-
Oct.	-	-	-	-	-	-	-	-	-	-	-	-
Nov.	-	-	-	-	-	-	-	-	-	-	-	-
Dec.	-	-	-	-	-	-	78	6	7.7	78	6	7.7
<u>1942</u>												
Jan.	-	-	-	-	-	-	24	-	-	24	-	-
Feb.	92	4	4.3	-	-	-	129	13	10.1	221	17	7.7
Total	175	15	8.6	-	-	-	291	21	7.2	466	36	7.7

BY NIGHT

Month	WELLINGTONS			WHITLEYS			HAMPDENS			TOTAL MEDIUM BOMBERS		
	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%
<u>1941</u>												
June	1,617	29	1.8	643	25	3.9	802	11	1.4	3,062	65	2.1
July	1,799	39	2.2	487	19	3.9	959	24	2.5	3,245	82	2.5
Aug.	1,585	50	3.2	565	25	4.4	1,069	28	2.6	3,219	103	3.2
Sept.	1,432	38	2.7	402	18	4.5	664	14	2.1	2,498	70	2.8
Oct.	1,206	39	3.2	368	7	1.9	701	16	2.3	2,275	62	2.7
Nov.	840	38	4.5	179	20	11.2	524	21	4.0	1,543	79	5.1
Dec.	716	6	0.8	218	7	3.2	350	12	3.4	1,284	25	1.9
<u>1942</u>												
Jan.	1,010	19	1.9	276	7	2.5	587	20	3.4	1,873	46	2.5
Feb.	489	9	1.8	137	3	2.2	339	7	2.1	965	19	2.0
Total	10,694	267	2.5	3,275	131	4.0	5,995	153	2.5	19,964	551	2.8

BY DAY AND NIGHT

Month	WELLINGTONS			WHITLEYS			HAMPDENS			TOTAL MEDIUM BOMBERS		
	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%
<u>1941</u>												
June	1,621	31	1.9	643	25	3.9	802	11	1.4	3,066	67	2.2
July	1,878	48	2.6	487	19	3.9	977	26	2.7	3,342	93	2.8
Aug.	1,585	50	3.2	565	25	4.4	1,081	28	2.6	3,231	103	3.2
Sept.	1,432	38	2.7	402	18	4.5	694	14	2.0	2,528	70	2.8
Oct.	1,206	39	3.2	368	7	1.9	701	16	2.3	2,275	62	2.7
Nov.	840	38	4.5	179	20	11.2	524	21	4.0	1,543	79	5.1
Dec.	716	6	0.8	218	7	3.2	428	18	4.2	1,362	31	2.3
<u>1942</u>												
Jan.	1,010	19	1.9	276	7	2.5	611	20	3.3	1,897	46	2.4
Feb.	581	13	2.2	137	3	2.2	468	20	4.3	1,186	36	3.0
Total	10,869	282	2.6	3,275	131	4.0	6,286	174	2.8	20,430	587	2.9

Note:- S = Sorties flown.
M = Missing.

APPENDIX "H" 5

MISSING AIRCRAFT BY TYPES - HEAVY BOMBERS

BY DAY

Month	STIRLINGS			HALIFAXES			MANCHESTERS			FORTRESSES			TOTAL HEAVY BOMBERS		
	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%
<u>1941</u>															
June	14	1	7.1	6	1	16.7	-	-	-	-	-	-	20	2	10.0
July	71	6	8.5	15	5	33.3	-	-	-	11	-	-	97	11	11.3
Aug.	-	-	-	-	-	-	-	-	-	22	-	-	22	-	-
Sept.	-	-	-	-	-	-	-	-	-	18	2	11.1	18	2	11.1
Oct.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nov.	10	-	-	-	-	-	-	-	-	-	-	-	10	-	-
Dec.	22	4	18.2	34	2	5.9	11	1	9.1	-	-	-	67	7	10.4
<u>1942</u>															
Jan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb.	11	-	-	13	-	-	28	-	-	-	-	-	52	-	-
Total	128	11	8.6	68	8	11.8	39	1	2.6	51	2	3.9	286	22	7.7

BY NIGHT

Month	STIRLINGS			HALIFAXES			MANCHESTERS			FORTRESSES			TOTAL HEAVY BOMBERS		
	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%
<u>1941</u>															
June	112	5	4.5	67	1	1.5	61	2	3.3	-	-	-	240	8	3.3
July	34	2	5.9	87	3	3.4	-	-	-	-	-	-	121	5	4.1
Aug.	89	6	6.7	91	6	6.6	50	6	12.0	-	-	-	230	18	7.8
Sept.	93	5	5.4	46	4	8.7	36	2	5.6	-	-	-	175	11	6.3
Oct.	103	1	1.0	57	2	3.5	76	5	6.6	-	-	-	236	8	3.4
Nov.	81	2	2.5	42	2	4.8	52	-	-	-	-	-	175	4	2.3
Dec.	69	-	-	7	1	14.3	23	1	4.3	-	-	-	99	2	2.0
<u>1942</u>															
Jan.	70	-	-	46	-	-	144	6	4.2	-	-	-	260	6	2.3
Feb.	39	-	-	32	1	3.1	115	2	1.7	-	-	-	186	3	1.6
Total	690	21	3.0	475	20	4.2	557	24	4.3	-	-	-	1,722	65	3.8

BY DAY AND NIGHT

Month	STIRLINGS			HALIFAXES			MANCHESTERS			FORTRESSES			TOTAL HEAVY BOMBERS		
	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%	S.	M.	%
<u>1941</u>															
June	126	6	4.8	73	2	2.7	61	2	3.3	-	-	-	260	10	3.8
July	105	8	7.6	102	8	7.8	-	-	-	11	-	-	218	16	7.3
Aug.	89	6	6.7	91	6	6.6	50	6	12.0	22	-	-	252	18	7.1
Sept.	93	5	5.4	46	4	8.7	36	2	5.6	18	2	11.1	193	13	7.1
Oct.	103	1	1.0	57	2	3.5	76	5	6.6	-	-	-	236	8	3.4
Nov.	91	2	2.2	42	2	4.8	52	-	-	-	-	-	185	4	2.2
Dec.	91	4	4.4	41	3	7.3	34	2	5.9	-	-	-	166	9	5.4
<u>1942</u>															
Jan.	70	-	-	46	-	-	144	6	4.2	-	-	-	260	6	2.3
Feb.	50	-	-	45	1	2.2	143	2	1.4	-	-	-	238	3	1.3
Total	818	32	3.9	543	28	5.2	596	25	4.2	51	2	3.9	2,008	87	4.3

APPENDIX "J" 1

COMPARISON BETWEEN (i) RAIDS ON COLOGNE from JUNE, 1941 to
FEBRUARY, 1942 and (ii) THOUSAND BOMBER RAID 30/31st MAY, 1942

BOMBER COMMAND RECORDS	JUNE, 1941 - FEBRUARY, 1942	30/31st MAY, 1942
Sorties flown against Cologne.	2,010 sorties	1,047 sorties
do. do (heavy bombers)	111 sorties	338 sorties
Total tonnage dropped	1,934 tons	1,516 tons
" H.E. "	1,672 tons	534 tons
" Incendiaries dropped	262 tons	982 tons
No. of aircraft missing	55 aircraft	42 aircraft
No. of nights attacked	33 nights	1 night
GERMAN A.R.P. RECORDS	JUNE, 1941 - FEBRUARY, 1942	30/31st MAY, 1942
No. of actual attacks	39 occasions	1 occasion
Total duration of attacks	58 hrs. 34 mins.	1 hr. 48 mins.
No. of H.E. bombs	1,106 bombs	864 bombs
No. of U.X.B. or D.A. (included in above)	114 bombs	23 bombs
No. of "mines"	1 mine	20 mines
No. of incendiaries	11,768 bombs	110,000 bombs
No. of phosphorous incendiaries	10 bombs	565 bombs
No. of industrial plants damaged (including warehouses, oil- storage and dumps, etc.)	67 properties	328 properties
No. of incidents of damage to transport and communications	41	18
No. of military installations damaged	10	15
No. of residential properties	947	908
No. of major fires	53 fires	1,961 fires
No. of medium fires	44 fires	4,625 fires
No. of small fires	368 fires	5,414 fires
No. of buildings evacuated (including temporary)	459 buildings	3,035 buildings
No. of people involved (including temporary)	13,116 persons	45,132 persons

APPENDIX "J" 2

	JUNE, 1941 - FEBRUARY, 1942	30/31st MAY, 1942
<u>CASUALTIES</u>		
<u>Killed</u>		
Wehrmacht	10	58
Civil Defence	4	27
Civilians	124	384
Total	<u>138</u>	<u>469</u>
<u>Injured</u>		
Wehrmacht	10	10
Civil Defence	14	35
Civilians	253	515
Total	<u>277</u>	<u>560</u>
<u>First Aid Cases</u>	Not Stated	4,467
<u>LOSS OF PRODUCTION</u>		
<u>100%</u>		
For Uncertain Period	4 Small Works	36 Factories totally destroyed
For 31 days	1 Medium Works	
For 8 days	1 Medium Works	
	1 Small Works	
For 7 days	1 Small Works	
For 3 days	3 Medium Works	
For 2 days	1 Medium Works	
<u>50-90%</u>		
For 3 days	1 Large Works	
	1 Medium Works	
For 2 days	2 Large Works	
For 1 day	1 Large Works	
<u>50-80%</u>		
		70 Factories Major Damage
<u>UP TO 50%</u>		
		242 Factories Damaged
<u>20 - 50%</u>		
For Indefinite Period	1 Large Works (20%)	
For 2 days	2 Large Works	
For 1 day	1 Large Works	
<u>10 to 15%</u>		
For Indefinite Period	1 Medium Works	
For 7 days	1 Large Works	

"APPENDIX "K"DIARY OF BOMBER COMMAND OPERATIONS1st June, 1941 to 28th February, 1942

(x) Signifies that the target was not reported as having been attacked

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
June 1941			June 1941		
2	Kiel Canal Shipping Bremerhaven ("Europa") Ships off Norway N.W. German towns	9 6 8 <u>21</u> 44	2/3	Düsseldorf Duisburg Berlin	150 25 <u>11</u> 186
4	Boulogne (Ships) Ships off Norway Dutch airfields (x)	12 6 <u>36</u> 54			
5	Ships off Ostend Shipping Patrol	3 <u>6</u> 9			
6	Shipping Patrol	<u>3</u> 3			
7	Shipping Patrol	<u>22</u> 22	7/8	Brest (Prinz Eugen)	<u>37</u> 37
			8/9	Dortmund	<u>37</u> 37
9	Shipping Patrol	<u>18</u> 18			
10	Shipping Patrol Emden area (x)	8 <u>2</u> 10	10/11	Brest (Pz Eugn.) " (Scharnhorst and Gneisenau) Minelaying	38 66 <u>9</u> 113
11	Bremerhaven Targets in N.W. Germany	3 <u>22</u> 25	11/12	Düsseldorf Duisburg Rotterdam Boulogne Minelaying Leaflets	98 80 2 9 20 <u>12</u> 241
12	Ships in Channel Brest (S. & G.) Shipping Patrol	3 2 <u>8</u> 13	12/13	Osnabrück Hamm Schwerte Soest Huls Rotterdam Emden	61 82 84 91 18 2 <u>1</u> 339

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
June 1941			June 1941		
13	"Lutzow" (off Norway)	<u>4</u> 4	13/14	Brest (S. & G.) " (Pz. Eg.) Schwerte Boulogne Minelaying Leaflets	60 50 42 5 4 <u>12</u> 173
14	St. Omer Brest (S. & G.) (x) Shipping Patrols	12 3 <u>15</u> 30	14/15	Cologne	<u>29</u> 29
15	Brest (x) Shipping Patrols Cherbourg Bremerhaven	3 14 3 <u>3</u> 23	15/16	Düsseldorf Cologne Hannover Dunkirk Minelaying Leaflets	59 91 16 12 4 <u>1</u> 183
16	Shipping Patrols	<u>25</u> 25	16/17	Duisburg Düsseldorf Cologne Boulogne	39 72 105 <u>7</u> 223
17	Chocques	<u>23</u> 23	17/18	Duisburg Cologne Düsseldorf Hannover Boulogne Rotterdam Minelaying Leaflets	26 76 57 11 8 8 4 <u>8</u> 198
18	Bois de Licques	<u>6</u> 6	18/19	Bremen Brest (S. & G.) Leaflets	100 65 <u>2</u> 167
19	Le Havre	<u>36</u> 36	19/20	Cologne Düsseldorf	28 <u>20</u> 48
20	Shipping Patrols	<u>11</u> 11	20/21	Kiel (Shipyards) " ("Tirpitz") Cologne & Essen Boulogne Leaflets	91 24 4 5 <u>2</u> 126
21	French airfields St. Omer Shipping Patrols	6 6 <u>11</u> 23	21/22	Cologne Düsseldorf Dunkirk Boulogne Leaflets	68 56 10 18 <u>2</u> 154

APPENDIX "K"

Page 3

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
June 1941			June 1941		
22	Hazebroock m/y Shipping Patrol	12 <u>5</u> 17	22/23	Bremen Emden Wilhelmshaven Düsseldorf	79 3 27 <u>1</u> 110
23	Chocques Mardyck a/d Shipping Patrol	23 6 <u>10</u> 39	23/24	Cologne Düsseldorf Kiel Emden Hannover Bremen Boulogne Minelaying Leaflets	62 41 26 1 1 1 2 1 <u>8</u> 143
24	Commynes	<u>18</u> 18	24/25	Kiel Cologne Düsseldorf Emden (x) Boulogne Leaflets	48 54 31 2 1 <u>2</u> 138
25	Hazebrouck m/y St. Omer Shipping Patrol	12 12 <u>10</u> 34	25/26	Bremen Kiel Cologne Düsseldorf Rotterdam Minelaying Leaflets	64 47 1 1 6 1 <u>7</u> 127
26	Commynes	<u>23</u> 23	26/27	Düsseldorf Cologne Kiel Emden Minelaying (Frisns) Leaflets	44 51 41 3 1 <u>3</u> 143
27	Lille	<u>23</u> 23	27/28	Bremen and Vegesack Emden Cologne Düsseldorf Dunkirk Minelaying (Frisns) Leaflets	136 3 1 1 4 3 <u>4</u> 152
28	Commynes Bremen (x) Bremerhaven (x)	24 18 <u>6</u> 48	28/29	Minelaying (Elbe)	<u>34</u> 34
29			29/30	Bremen Hamburg Minelaying	106 28 <u>3</u> 137
30	Bremen Norderney Westerland a/d Kiel Hamburg Pont a Vendin	15 6 7 3 3 <u>18</u> 52	30/1	Düsseldorf Cologne Duisburg	23 23 <u>18</u> 64

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
July 1941			July 1941		
1	Bremerhaven (Ships) (x) Kiel Canal Ships (x) Cuxhaven (Port) (x) Borkum (Sea-plane base) Chocques (Chem. works) (x) Oldenburg (Power station)	3 7 3 3 24 <u>5</u> 45	1/2	Brest (Docks) Brest (S. & G.) Brest (Pz. E.) Cherbourg (Docks)	9 24 19 <u>5</u> 57
2	Lille Sequedin Power Station (x)	<u>12</u> 12	2/3	Bremen (Shipyards and town) Cologne Duisburg Cherbourg Docks Leaflets	67 42 39 6 <u>7</u> 161
3	Hazebrouck m/y (x)	<u>12</u> 12	3/4	Bremen (Shipyards and town) Essen (Krupps and m/y) Gilze Rijen a/d	68 90 <u>5</u> 163
4	Bremen Norderney Scaplane base Chocques Chem. works	15 5 <u>12</u> 32	4/5	Lorient (Submarines) Brest (S. & G.) Brest (Pz. E.) Cherbourg docks Cologne Dortmund (Oil) Düsseldorf Hamborn (Station) Minelaying Leaflets	47 47 41 4 2 2 1 1 3 <u>2</u> 150
5	Lille (Fives Steel works) Abbeville m/y Shipping Patrol	3 1 <u>14</u> 18	5/6	Bielefeld (Power Station) Munster m/y Magdeburg m/y Osnabrück m/y Rotterdam docks Minelaying Leaflets	33 94 23 39 14 7 <u>5</u> 208
6	Shipping Patrols Le Trait (Shipyards) (x) Lille (Fives Steel works)	21 3 <u>6</u> 30	6/7	Brest (S. & G.) Emden Munster Dortmund Rotterdam Leaflets	109 2 47 46 5 <u>6</u> 215

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
July 1941			July 1941		
7	Hazebrouck m/y Meaulte (a/c factory) Chocques (Chem. works) Shipping Patrols	1 4 3 <u>20</u> 28	7/8	Cologne Frankfurt Munster Munich Gladbach (station) Osnabruck m/y Boulogne docks Leaflets	114 17 49 40 72 5 <u>4</u> 301
8	Mazingarbe (works and power station) Lille (Loos Chem. works) Shipping Patrols Wilhelmshaven	3 3 5 <u>3</u> 14	8/9	Merseburg (Leuna Oil) Bielefeld (Power Station) Munster Hamm m/y	14 33 51 <u>73</u> 171
9	Mazingarbe (oil) (x) Shipping Patrols	3 <u>15</u> 18	9/10	Osnabruck (tn. and railway) Aachen Le Havre docks	57 82 <u>1</u> 140
10	Cherbourg docks Le Havre (Shipping) Chocques (Chem. works)	12 12 <u>3</u> 27	10/11	Cologne Boulogne docks	130 <u>2</u> 132
11	Le Trait (Ship- yard) (x) Lille (Fives Steel) (x)	3 <u>3</u> 6	11/12	Wilhelmshaven	<u>36</u> 36
12	Arques (ship-lift) (x) Shipping Patrols	3 <u>38</u> 41	12/13	Bremen	<u>61</u> 61
			13/14	Vegesack (Ship- yard) (x) Bremen (x) Emden (x)	20 47 <u>2</u> 69
14	Cherbourg (Ships) Le Havre " Hazebrouck m/y Shipping Patrols	6 6 6 <u>11</u> 32	14/15	Bremen Hannover (Chem. works and town) Rotterdam Minelaying	97 85 9 <u>10</u> 201
			15/16	Duisburg	<u>38</u> 38
16	Shipping Patrols Rotterdam	4 <u>37</u> 41	16/17	Hamburg Boulogne docks Bernay St. Martin a/d Minelaying	107 8 6 <u>5</u> 126

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
July 1941			July 1941		
			17/18	Cologne Rotterdam docks (x)	75 <u>5</u> 80
18	Aachen m/y (x)	1			
	Munchen Gladbach m/y (x)	1			
	Munster/Wesel m/ys.	1			
	Flushing (oil) (x)	1			
	Krefeld m/y (x)	1			
	Shipping Patrols	<u>3</u>			
		8			
19	Lille Sequedin (Power Station) (x)	3	19/20	Hannover Minelaying	49 <u>35</u> 84
	Shipping Patrols	<u>21</u>			
		24			
20	Shipping Patrols	12	20/21	Cologne	113
	Hazebrouck m/y (x)	<u>3</u>		Rotterdam docks	24
		15		French a/ds.	<u>9</u> 146
21	Lille (Tudor Works)	3	21/22	Frankfurt	71
	Mazingarbe (Power Station and Chem. Works) (x)	3		Mannheim	44
	Shipping Patrols	<u>7</u>		Cherbourg docks	6
		13		Minelaying	2
				Leaflets	<u>1</u> 124
22	Le Trait (Shipyard)	6	22/23	Frankfurt	63
	Shipping Patrols	<u>6</u>		Mannheim	29
		12		Dunkirk docks	19
				French a/ds.	5
				Minelaying	<u>8</u> 124
23	Zoydecoote (ammunition)	6	23/24	Mannheim	51
	Fort d'Eperlecques	6		Frankfurt	33
	Mazingarbe	6		La Pallice (Scharnhorst)	30
	La Pallice (Scharnhorst)	6		Le Havre docks	3
	Shipping Patrols	11		Ostend docks	5
	Target in Germany	<u>3</u>		French a/ds.	3
		38		Minelaying	<u>1</u> 126
24	Brest (Gneisenau)	100	24/25	Kiel (Krupps and ship-yards)	64
	La Pallice (Scharnhorst)	15		Emden	47
	Cherbourg docks	<u>36</u>		Rotterdam docks (x)	4
		151		Minelaying	<u>6</u> 121
			25/26	Hannover	55
				Berlin	9
				Hamburg	43
				Emden	<u>2</u> 109

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
July 1941			July 1941		
26	Hamburg (x)	<u>2</u> 2			
27	Yainville (Power Station) (x)	<u>6</u> 6	27/28	Dunkirk docks French a/ds. Minelaying	<u>14</u> 3 <u>36</u> 53
28	Yainville (Power Station)	<u>6</u> 6	28/29	Minelaying	<u>42</u> 42
30	Bremerhaven (x) N.W. German towns (x) Kiel (x) Shipping Patrols	6 18 12 <u>7</u> 43	30/31	Cologne Boulogne docks (x)	<u>116</u> <u>12</u> 128
31	Shipping Patrols	<u>4</u> 4			

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Aug. 1941			Aug. 1941		
1	Shipping Patrols	<u>3</u> 3			
2	Kiel Bremen Shipping Patrols	<u>2</u> <u>1</u> <u>24</u> 27	2/3	Hamburg Berlin Kiel Cherbourg docks Minelaying	80 48 50 20 <u>5</u> 203
			3/4	Hannover (r/y centre) Frankfurt (m/y and town) Calais docks	39 39 <u>7</u> 85
4	Shipping Patrols	<u>12</u> 12			
5	Shipping Patrols	<u>20</u> 20	5/6	Mannheim Karlsruhe Frankfurt Aachen Boulogne docks Minelaying	98 97 68 13 8 <u>5</u> 289
6	Brest (S, G, and P. E.) Shipping Patrols Berck A/D (x)	<u>2</u> <u>17</u> <u>6</u> 25	6/7	Karlsruhe Frankfurt Mannheim Calais docks Leaflets	38 53 38 38 <u>2</u> 169
7	Lille Sequedin (Power Station) St. Omer A/D	<u>6</u> <u>6</u> 12	7/8	Essen Hamn Dortmund Boulogne Docks Brachy and Chartres A/Ds. Minelaying	106 46 40 6 2 <u>8</u> 208
			8/9	Hamburg Kiel Minelaying	44 90 <u>7</u> 141
9	Gosnay Power Station	<u>5</u> 5			
10	Shipping Patrols	<u>6</u> 6			
			11/12	Munchen Gladbach (Station) Krefeld M/Y Rotterdam (Docks) Antwerp	29 28 34 <u>1</u> 92

APPENDIX "K"

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DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Aug. 1941			Aug. 1941		
12	Cologne (Power Stations)	56	12/13	Berlin	70
	Emden Docks	1		Magdeburg	36
	De Kooy A/D	1		Hannover	78
	St. Omer A/D	6		Essen	35
	Gosnay (Power Station)	6		Le Havre docks	14
	Le Trait (Ship-yard)	<u>6</u>		Bielefeld	<u>1</u>
		76			234
14	Marquise (shell factory)	5	14/15	Magdeburg	52
	Shipping Patrols	15		Hannover	152
	Boulogne docks	<u>11</u>		Brunswick	81
		31		Boulogne docks	13
				Dunkirk docks	2
				Rotterdam docks	<u>9</u>
					314
16	Brest (S. and H.)	2	16/17	Cologne	72
	Düsseldorf	2		Duisburg m/y	54
	Marquise (shell factory)	6		Düsseldorf m/y	58
	Shipping Patrols	18		Rotterdam docks	10
	St. Omer a/d	<u>6</u>		Ostend docks	6
		34		Leaflets	<u>1</u>
					201
17	Le Havre docks	6	17/18	Duisburg	41
	Shipping Patrols	<u>14</u>		Bremen	59
		20		Dunkirk docks	1
				Melun a/d	6
				Minelaying	<u>12</u>
					119
18	Lille (Fives Steel)	9	18/19	Duisburg	41
	Marquise (shell factory)	6		Cologne	62
	Shipping Patrols	<u>24</u>		Dunkirk docks	18
		39		Evreux a/d	<u>1</u>
					122
19	Düsseldorf	2	19/20	Le Havre docks	9
	Gosnay Power Station	6		Kiel	108
	Hazebrouck m/y	6		Minelaying	<u>3</u>
	Shipping Patrol	<u>6</u>			120
		20			
20	Bergen/Alkmaar a/d	6			
	Shipping Patrols	<u>12</u>			
		18			
21	Düsseldorf	3			
	Ijmuiden steel works	12			
	Chocques Chem. works	<u>12</u>			
		27			

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Aug. 1941			Aug. 1941		
22	Shipping Patrols	<u>18</u> 18	22/23	Mannheim Le Havre docks Abbeville/Drucat a/d	97 23 <u>1</u> 121
24	Bremerhaven	<u>6</u> 6	24/25	Düsseldorf Intruders	44 <u>6</u> 50
25	Shipping Patrols	<u>6</u> 6	25/26	Karlsruhe Mannheim	49 <u>45</u> 94
26	Heligoland Shipping Patrols St. Omer a/d	6 28 <u>6</u> 40	26/27	Cologne Le Havre docks Boulogne docks Intruders Minelaying	109 31 14 6 <u>17</u> 177
27	Lille Sequedin Power Station St. Omer a/d	9 <u>4</u> 13	27/28	Mannheim Boulogne docks Dunkirk docks Minelaying	91 2 2 <u>17</u> 112
28	Rotterdam docks	<u>35</u> 35	28/29	Duisburg Ostend docks Dunkirk docks Evreux a/d Intruders	118 14 10 2 <u>6</u> 150
29	Düsseldorf Hazebrouck m/y	1 <u>6</u> 7	29/30	Mannheim Frankfurt Le Havre docks	94 143 <u>5</u> 242
30	Shipping Patrols	<u>6</u> 6	30/31	Cherbourg docks Minelaying	6 <u>2</u> 8
31	Kiel Bremen Hamburg Le Trait Ship-yard Lille Sequedin Power Station St. Omer a/d Lannion a/d	1 1 1 6 12 6 <u>6</u> 33	31/1	Essen Cologne Intruders Boulogne Minelaying	71 103 6 6 <u>12</u> 198

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APPENDIX "K"

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DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Sept. 1941			Sept. 1941		
1	Mazingarbe (x)	<u>12</u> 12	1/2	Cologne Minelaying	54 <u>4</u> 58
2	Duisburg (x) Hamburg (x) Bremen Shipping Patrols	1 1 1 <u>6</u> 9	2/3	Frankfurt Berlin Ostend docks Minelaying	126 49 10 <u>15</u> 200
			3/4	Brest (S. and G.) Brest (P. E.) Le Havre docks Minelaying	103 37 2 <u>5</u> 147
4	Mazingarbe Hamburg (x) Hannover (x) Essen (x) Cherbourg, (ship)	12 1 1 1 <u>6</u> 21			
6	Oslo ("Admiral Scheer")	<u>4</u> 4	6/7	Huls (Chem. works) Minelaying	86 <u>24</u> 110
7	Shipping	<u>12</u> 12	7/8	Berlin Kiel Boulogne docks Minelaying	197 51 47 <u>8</u> 303
8	Oslo (x) (Ship-yards) Shipping Patrols	4 <u>10</u> 14	8/9	Kassel Cherbourg docks Minelaying	95 7 <u>6</u> 108
10	Shipping Patrols	<u>6</u> 6	10/11	Turin m/y and arsenal French a/ds.	76 <u>3</u> 79
11	Shipping Patrols	<u>23</u> 23	11/12	Rostock (ship-yards) Kiel (ship-yards) Warnemunde (docks) Le Havre (docks) Boulogne (docks) Minelaying (docks)	56 55 32 20 8 <u>20</u> 191
12	Shipping Patrols	<u>11</u> 11	12/13	Frankfurt Cherbourg docks Minelaying	130 21 <u>10</u> 161
			13/14	Brest (S. and G.) Brest (P. E.) Le Havre docks Leaflets	137 10 8 <u>1</u> 156

DAY OPERATIONS			NIGHT OPERATIONS		
Date	- Target	Total Sorties	Date	Target	Total Sorties
Sept. 1941			Sept. 1941		
14	Shipping Patrols	<u>12</u> 12			
15	Cologne (x) Haugesund (seaplane base) (x) Shipping Patrols	1 6 <u>8</u> 15	15/16	Hamburg Le Havre docks Minelaying	159 45 <u>5</u> 209
16	Cologne (x) Shipping Patrols	1 <u>18</u> 19	16/17	Karlsruhe Le Havre docks	55 <u>10</u> 65
17	Mazingarbe (power station and Chem. works) Marquise (shell factory) (x) Shipping Patrols	24 6 <u>3</u> 33	17/18	Karlsruhe Le Havre (x) (docks) Minelaying	38 1 <u>14</u> 53
18	Grand Quevilly (power station) Abbeville m/y (x) Shipping Patrols	11 6 <u>9</u> 26	18/19	Le Havre docks	<u>10</u> 10
			19/20	Stettin	<u>72</u> 72
20	Emden Grand Quevilly (power station) Hazebrouck m/y Flores (oil factory) Cherbourg docks Shipping Patrols Abbeville m/y	1 12 3 3 6 24 <u>6</u> 55	20/21	Berlin Frankfurt Ostend docks	77 34 <u>34</u> 145
21	Gosnay power station Lille (railway works)	12 <u>6</u> 18			
22	Amiens (x) Mazingarbe power station (x)	24 <u>6</u> 30	22/23	Boulogne docks	<u>3</u> 3
25	Emden (x)	<u>1</u> 1	23/27	Cologne Genoa Emden Mannheim	35 34 18 <u>17</u> 104

APPENDIX "K"

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DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Sept. 1941			Sept. 1941		
27	Amiens m/y Mazingarbe (power station) (x)	12 <u>12</u> 24			
28	Shipping Patrols	<u>3</u> 3	28/29	Genoa Frankfurt Emden	41 44 <u>7</u> 92
			29/30	Stettin Hamburg Le Havre docks Cherbourg docks Minelaying	139 95 6 3 <u>5</u> 248
			30/1	Stettin Hamburg Cherbourg docks Intruders	40 76 41 <u>2</u> 159

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Oct. 1941			Oct. 1941		
			1/2	Stuttgart Karlsruhe Boulogne docks Minelaying	31 45 7 <u>2</u> 85
2	Le Havre power station	<u>6</u> 6	2/3	Brest (S. and G.)	<u>6</u> 6
3	Ostend (Sluykens power station) (x)	<u>6</u> 6	3/4	Rotterdam docks Antwerp docks Dunkirk docks Brest (S. and G.)	33 20 41 <u>9</u> 103
			10/11	Cologne Essen (Krupps) Rotterdam docks Ostend docks Bordeaux (port and m/y) Dunkirk docks Intruders	69 83 13 22 22 23 <u>6</u> 238
11	Shipping Patrol	<u>11</u> 11	11/12	Emden Minelaying	27 <u>12</u> 39
12	Boulogne docks Shipping Patrol	24 <u>12</u> 36	12/13	Nürnberg Bremen Hüls (Chem. works) Boulogne docks Intruders	152 99 90 24 <u>8</u> 373
13	Mazingarbe (power station and Chem. works) Arcques ship-lift	18 <u>6</u> 24	13/14	Düsseldorf Cologne Boulogne docks Minelaying	60 39 6 <u>13</u> 118
			13/15	Nürnberg Leaflets	80 <u>12</u> 92
15	Le Havre docks Shipping Patrols	12 <u>12</u> 24	15/16	Cologne Boulogne	34 <u>8</u> 42
			16/17	Duisburg Dunkirk docks Ostend docks Intruders	87 22 15 <u>5</u> 129
17	Shipping Patrols (x)	<u>12</u> 12			

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Oct. 1941			Oct. 1941		
20	Shipping Patrols	<u>8</u> 8	20/21	Bremen Wilhelmshaven Emden Antwerp docks Minelaying Leaflets	153 47 36 35 10 <u>8</u> 289
21	Shipping Patrols	<u>17</u> 17	21/22	Bremen Boulogne docks Minelaying	120 12 <u>4</u> 136
22	Shipping Patrols (x)	<u>3</u> 3	22/23	Mannheim Brest (S. and G.) Le Havre docks	133 6 <u>22</u> 161
23	Lannion and Morlaix a/ds.	<u>12</u> 12	23/24	Kiel Brest (S. and G.) Cherbourg docks Le Havre docks	114 9 4 <u>13</u> 140
24	Shipping (x)	<u>18</u> 18	24/25	Frankfurt Emden Brest (P. E.) Cherbourg docks	80 12 6 <u>1</u> 99
25	Shipping Patrols	<u>4</u> 4			
26	Shipping Patrols	<u>8</u> 8	26/27	Hamburg Cherbourg docks Minelaying	115 17 <u>5</u> 137
27	Shipping Patrols	<u>6</u> 6			
			28/29	Pilzen (Skoda works (x)) Cherbourg docks Leaflets	10 24 <u>2</u> 36
			29/30	Brest (S. and G.) Schipel a/d	16 <u>45</u> 61
			30/31	Leaflets	<u>1</u> 1
31	Shipping Patrols	<u>9</u> 9	31/1	Hamburg Bremen Dunkirk docks Boulogne docks Minelaying Leaflets	123 48 28 7 18 <u>2</u> 226

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Nov. 1941			Nov. 1941		
1	Morlaix a/d Shipping Patrols	<u>12</u> 4 16	1/2	Kiel Brest (S. and G. and P.E.) Le Havre docks Shipping Patrols Minelaying Leaflets	134 17 13 4 7 <u>3</u> 178
2	Shipping Patrols	<u>4</u> 4	3/4	Brest (S. and G.) Boulogne docks Shipping Patrols Minelaying	8 7 6 <u>10</u> 31
			4/5	Essen (Krupps) Ostend docks Dunkirk docks Shipping Patrols Intruders Minelaying	28 10 10 6 3 <u>28</u> 85
5	Roving commissions	<u>5</u> 3	5/6	Cherbourg docks Shipping Patrols Intruders Minelaying	24 5 6 <u>24</u> 59
			6/7	Le Havre docks Intruders Shipping Patrol Minelaying St. Nazaire docks	9 5 1 15 <u>3</u> 33
			7/8	Berlin Mannheim Cologne Essen Ostend docks Boulogne docks Intruders Minelaying	169 55 83 24 28 22 6 <u>13</u> 400
8	Lille	<u>11</u> 11	8/9	Essen (Krupps) Dunkirk docks Ostend docks Intruders	54 18 8 <u>6</u> 86
			9/10	Hamburg Ostend docks Dunkirk docks Minelaying	107 9 7 <u>5</u> 128

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Nov. 1941			Nov. 1941		
			15/16	Kiel	47
				Emden docks	49
				Boulogne docks	9
				Minelaying	<u>5</u>
					110
			18/19	Brest (P.E.)	<u>6</u>
					6
			23/24	Brest (S. and G.)	11
				Lorient (submarine yard)	53
				Dunkirk docks	37
				Leaflets	<u>4</u>
					105
24	Roving commissions (Ruhr) (x)	2			
	Roving commissions (Bremen Osnabrück area)	<u>2</u>			
		4			
25	Roving commissions (Ruhr) (x)	3	25/26	Brest (S. and G.)	18
	Morlaix a/d	<u>6</u>		Cherbourg docks	<u>17</u>
		9			35
			26/27	Emden	100
				Ostend docks	<u>18</u>
					118
			27/28	Düsseldorf	86
				Ostend docks	7
				Minelaying	<u>5</u>
					98
			30/1	Hamburg	181
				Emden	50
				Ostend docks	3
				Minelaying	8
				Leaflets	<u>4</u>
					246

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Dec. 1941			Dec. 1941		
			7/8	Aachen	132
				Brest (S. and G.)	30
				Calais docks	24
				Boulogne docks	19
				Dunkirk docks	22
				Ostend docks	23
				Leaflets	3
					253
			8/9	Leaflets	6
					6
9	Roving commissions (Ruhr)	<u>4</u> 4			
10	Emden	1			
	Wilhelmshaven	1			
	Aurich	1			
	Soesterberg and Gilze Rijen a/ds.	3			
	Minelaying	<u>10</u> 16			
11	Aurich (x)	1	11/12	Cologne	60
	Borkum (x)	1		Brest (S. and G.)	26
	Leeuwarden	1		Le Havre docks	34
	Emden (x)	1		Minelaying	5
	Norderney (x)	1			125
	Gilze Rijen a/d	<u>1</u> 6			
12	Brest (S. and G.) (x)	6	12/13	Brest (S. and G.)	24
	Roving commission (N.W. Germany)	<u>6</u> 12		Dunkirk docks	9
					33
13	Brest (S. and G.) (x)	6			
	Minelaying	<u>10</u> 16			
			14/15	Brest (S. and G.)	28
				Cherbourg docks	3
				Minelaying	2
					33
			15/16	Brest (S. and G.)	17
				Ostend docks	25
				Minelaying	5
					47
			16/17	Wilhelmshaven	83
				Brest (S. and G.)	22
				Ostend docks	32
				Dunkirk docks	14
				Minelaying	18
				Leaflets	4
					173

APPENDIX "K"

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DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Dec. 1941			Dec. 1941		
			17/18	Brest (S. and G.) Le Havre docks Leaflets	121 14 <u>2</u> 137
18	Brest (S. and G.)	<u>47</u> 47	18/19	Brest (S. and G.)	<u>19</u> 19
21	Roving commission (x)	<u>12</u> 12			
22	Dutch airfields (x)	<u>3</u> 3	22/23	Wilhelmshaven	<u>22</u> 22
			23/24	Brest (S. and G.) Cologne Ostend docks Dunkirk docks Minelaying Leaflets	47 68 9 3 17 <u>2</u> 146
24	Roving commission Brest (S. and G.)	6 <u>4</u> 10			
27	Herdla a/d Rugsund a/d Vaagso Island Shipping patrol	13 3 7 <u>6</u> 29	27/28	Düsseldorf Brest (S. and G.) Boulogne docks Soesterberg a/d Minelaying	132 29 34 6 <u>5</u> 206
			28/29	Emden Wilhelmshaven Hulls (Chem. works) Dunkirk docks Dutch a/ds.	40 86 81 5 <u>6</u> 218
30	Brest (S. and G.)	<u>16</u> 16			

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Jan. 1942			Jan. 1942		
2	Roving commission	<u>12</u> 12	2/3	Brest (S. and G.) St. Nazaire Leaflets Minelaying	31 27 8 <u>36</u> 102
			3/4	Brest (S. and G.) Minelaying	18 <u>10</u> 28
4	Roving commission	<u>12</u> 12			
			5/6	Brest (S. and G.) Brest docks Cherbourg docks Minelaying Leaflets	87 67 37 5 <u>5</u> 201
			6/7	Brest (S. and G.) Stavanger a/d Cherbourg docks Roving commissions Leaflets	31 11 5 19 <u>16</u> 82
			7/8	Brest (S. and G.) St. Nazaire	68 <u>27</u> 95
			8/9	Brest (S. and G.) Cherbourg docks Minelaying Leaflets	151 31 5 <u>2</u> 189
			9/10	Brest (S. and G.) Minelaying Leaflets	82 5 <u>1</u> 88
			10/11	Wilhelmshaven Emden Boulogne docks Dutch a/ds. Minelaying Leaflets	124 29 2 6 5 <u>1</u> 167
			11/12	Brest (S. and G.)	<u>26</u> 26
			14/15	Hamburg Rotterdam docks Emden Dutch a/ds. Minelaying	95 11 18 17 <u>5</u> 146

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Jan. 1942			Jan. 1942		
			15/16	Hamburg	96
				Emden	50
				Dutch a/ds.	9
				Minelaying	5
					160
			17/18	Bremen	83
				Emden	24
				Dunkirk docks	2
				Intruders	2
				Minelaying	8
					119
			20/21	Emden	25
					25
			21/22	Bremen	55
				Emden	38
				Intruders	8
				Leaflets	12
				Minelaying	1
				Boulogne docks	7
					121
			22/23	Munster	47
				Dunkirk docks	5
				Intruders	6
				Minelaying	9
				Leaflets	5
					72
			25/26	Brest (S. and G.)	71
				Leaflets	3
					74
			26/27	Brest (S. and G.)	25
				Hannover	71
				Emden	31
				Minelaying	6
				Leaflets	4
					137
			27/28	Brest (S. and G.)	35
				Boulogne docks	10
					45
			28/29	Munster	84
				Boulogne docks	48
				Rotterdam docks	29
				Intruders	16
				Leaflets	2
					179
			29/30	Trondheim	
				("Tirpitz") (x)	16
					16
			31/1	Brest (S. and G.)	72
				St. Nazaire	31
				Le Havre docks	14
				Leaflets	13
					130

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Feb. 1942			Feb. 1942		
			4/5	Minelaying	<u>3</u> 3
6	Minelaying	<u>46</u> 46	6/7	Brest (S. and G.)	<u>60</u> 60
7	Minelaying	<u>32</u> 32	8/9	Intruders	<u>4</u> 4
			10/11	Brest (S. and G.) Bremen Emden	20 55 <u>3</u> 78
			11/12	Mannheim Le Havre Brest (S. and G.) Leaflets Minelaying	49 31 18 5 <u>1</u> 104
12	"Scharnhorst", "Gneisenau" and "Prinz Eugen" at sea off Dutch coast	<u>242</u> 242	12/13	Minelaying	<u>20</u> 20
			13/14	Cologne Aachen Le Havre docks Leaflets	39 18 27 <u>1</u> 85
			14/15	Mannheim Le Havre docks Leaflets	98 15 <u>1</u> 114
			15/16	St. Nazaire	<u>26</u> 26
16	Shipping Patrol	<u>8</u> 8	16/17	Roving commissions Intruders Leaflets Minelaying	20 5 22 <u>49</u> 96
17	Shipping Patrol	<u>8</u> 8	17/18	Roving commissions Leaflets	13 <u>4</u> 17
			18/19	Leaflets Minelaying	7 <u>25</u> 32
			19/20	Roving commissions Leaflets	8 <u>7</u> 15

DAY OPERATIONS			NIGHT OPERATIONS		
Date	Target	Total Sorties	Date	Target	Total Sorties
Feb. 1942			21/22	Roving commissions Stavanger area a/ds. Minelaying	42 15 <u>6</u> 63
			22/23	Wilhelmshaven (floating dock) Emden Ostend docks Minelaying Leaflets	50 7 5 2 <u>2</u> 66
			23/24	Minelaying	<u>23</u> 23
			24/25	Minelaying Leaflets	51 <u>5</u> 56
			25/26	Kiel (Gneisenau) Minelaying Odda (Chem. and zinc plants) (x) Heroya (x) Leaflets	61 20 14 7 <u>3</u> 105
			26/27	Kiel (Gneisenau) Minelaying Leaflets	49 27 <u>2</u> 78
			27/28	Kiel (Gneisenau) Wilhelmshaven (Scharnhorst) Minelaying	68 33 <u>15</u> 116
26	Shipping Patrols	<u>4</u> 4			
28	Ostend submarine pens	<u>6</u> 6			

TARGETS ATTACKED, BY TOWNS, ETC., ACCORDING TO
CATEGORIES, SHOWING SORTIES DESPATCHED,
SORTIES CLAIMED EFFECTIVE, AIRCRAFT MISSING,
BOMB TONNAGES DROPPED *, AND TYPES OF AIRCRAFT,
WITH GROUP NUMBERS, PARTICIPATING

<u>TYPE OF TARGET</u>	<u>APPENDIX NO.</u>
Transportation and Morale.....	L. 1
Night Attack on Oil.....	L. 2
The German Capital and Other Towns.....	L. 3
Italy and Czecho-slovakia.....	L. 4
Night Attacks on German Ports.....	L. 5
Night Attacks on Naval Units.....	L. 6
Night Attacks on Occupied Ports.....	L. 7
Night Attacks on Shipping.....	L. 8
Night Attacks over Norway.....	L. 9
The Minelaying Offensive.....	L. 10
Daylight Attacks on Occupied Countries.....	L. 11
Daylight Attacks on Occupied Ports.....	L. 12
German Naval Units at Sea.....	L. 13
Daylight Attacks on Shipping in German Ports.....	L. 14
Daylight Attacks on Germany.....	L. 15
Attacks on Shipping at Sea.....	L. 16
Daylight Operations over Norway.....	L. 17

* Bomb tonnages in respect of raids before 1st January, 1942 are approximate only, and are intended to serve as an indication of the size of the raids. The weights have been calculated from summaries in O.R.B. Appendices, and are as nearly accurate as can be secured. From 1st January, 1942 the figures have the authority of the Air Ministry War Room Statistical Section, and are identical with figures published in the Manual of Bomber Command Operations.

APPENDIX "L" 1

TARGETS ATTACKED BY TOWNS ETC.

TYPE OF TARGET

TRANSPORTATION AND MORALE

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Aachen	1941								
	July 9/10	Haze; up to 3/10ths.	82	70	2	74.5	15.4	Whitley Wellington Hampden	4 4 5
	Aug. 5/6	Clear	13	8	2	10.7	1.6	Wellington	1
	Dec. 7/8	10/10ths.	132	67	2	75.0	10.0	Wellington Hampden Manchester Halifax Whitley	3 5 5 4 4
	1942								
	Feb. 13/14	10/10ths.	18	10	-	13.4	-	Whitley	4
Bielefeld	1941								
	July 5/6	Slight haze	33	29	-	31.9	7.0	Wellington	1, 2
	8/9	Haze	33	19	-	19.8	4.4	Wellington	1
	Aug. 12/13	N/A	1	-	-	-	-	Stirling	3
Brunswick	1941								
	Aug. 14/15	6 8/10ths.	81	42	1	46		Hampden	5
Cologne	1941								
	June 14/15	10/10ths.	29	25	-	23.4	-	Hampden	5
	15/16	10/10ths.	91	69	1	68.6	7.0	Wellington Hampden	3 5
	16/17	No cloud but thick ground haze	105	86	3	58.2	21.0	Whitley Wellington Hampden Halifax	4 4 5 4
	17/8	Thick haze	76	65	1	56.0	16.7	Whitley Hampden	4 5
	19/20	Intense darkness	28	23	1	21.5	5.5	Wellington	3
	20/21		2	1	-	.7		Hampden	5
	21/22	Cloud and thick ground haze	68	59	-	75.2	8.7	Wellington	1, 2, 3
	23/24	Patchy cloud and thick ground haze	62	55		70.6	8.6	Wellington	1, 3
	24/25	Broken low cloud and thick ground haze	54	49	-	56.5	17.3	Wellington Whitley	1 4
	25/26		1	1	-	1.1	.4	Whitley	4
	26/27	10/10ths. Severe electrical storms	51	14	1	19.7	3.0	Wellington Whitley	3 4
	27/28	10/10th cloud	1	1	-	1.1	-	Hampden	5
	30/1	No cloud; Haze	23	21	-	26.6	2.3	Wellington	3
	July 2/3	Ground haze	42	31	1	41.7	12.4	Whitley Wellington	4 4

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Cologne Contd.	1941 July 4/5	Clear	2	2		2.2		Hampden	5
	7/8	Perfect night for slight ground haze	114	90	3	107.8	17.0	Wellington	1, 3
	10/11	Very thick haze	130	75	2	73.9	11.0	Wellington Hampden	1, 3 5
	17/18	Cloud, heavy haze and darkness	75	59		58.2	2.7	Wellington Hampden	1, 3 5
	20/21	8 10/10ths.	113	86	-	83.6	18.9	Wellington Whitley Hampden	1, 3 4 5
	30/31	Severe fog 9 10/10ths.	116	67	3	92.0	13.8	Wellington Halifax Hampden Stirling	1, 3 4 5 3
	Aug. 16/17	Cloud and haze	72	53	8	77.1	15.6	Wellington Whitley Halifax	1, 4 4 4
	18/19		62	53	6	54.2	4.9	Wellington Whitley Hampden	3 4 5
	26/27	Cloud, visibility good in gaps	109	96	2	90.0	18.0	Wellington Whitley Hampden Manchester	1, 3 4 5 5
	31/1	8 10/10ths. cloud	103	68	6	88.8	12.2	Wellington Stirling Halifax Hampden Manchester	3 3 4 5 5
	Sept. 1/2	Thick ground haze	54	45	1	43.7	10.4	Wellington Hampden	3 5
	26/27	Heavy ground haze	35	10	-	18.6	0.6	Wellington Stirling	1, 3 3
	Oct. 10/11	Much cloud and industrial haze	69	53	5	76.0	11.2	Wellington Stirling	1, 3 3
	13/14	No cloud, good visibility	39	29	4	34.4	1.0	Hampden Manchester	5 5
	15/16	Much cloud and haze	34	31	3	54.8	8.1	Stirling Wellington	3 4
	Nov. 7/8	Much cloud	83	52	1	58.0	3.2	Hampden Manchester	5 5
	Dec. 11/12	8 10/10ths. cloud	60	22	1	44.1	4.3	Wellington Stirling Whitley Halifax Hampden	1, 3 3 4 4 5
	23/24	9 10/10ths. cloud	68	29	-	29.3	6.0	Wellington Whitley Hampden	1, 4 4 5
	1942 Feb. 13/14	7 10/10ths. cloud, snow on ground	39	31	-	64.0	-	Wellington Stirling Halifax Whitley	1, 3 3 4 4
Dortmund	1941 June 8/9	Clear, but some industrial haze	37	25	-	29.8	8.4	Whitley	4

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Dortmund Contd.	1941 July 6/7	Thick haze	46	35	2	44.6	15.1	Whitley Wellington	4 4
	Aug. 7/8	Visibility good	40	32	-	44.4	10.0	Whitley Wellington	4 4
Duisburg	1941 June 2/3	Thick cloud and haze	25	24		25.6	7.5	Wellington	1
	11/12	8 10/10ths. Cloud gaps	30	69	1	69.9	15.6	Whitley	4
	16/17	Ground haze	39	32	1	34.9	12.9	Hampden	4
	17/18	Ground haze	26	17		18.1	6.7	Wellington	1
	30/1	Thick ground haze	18	14	2	18.5	6.4	Wellington	1
	July 2/3	Thick cloud and haze	39	18	2	10.7	3.0	Whitley	4
	4/5		1	1		.4		Hampden	5
	15/16	Cloudy	38	18	4	27.2	3.1	Wellington	3
	Aug. 16/17	Drifting cloud and haze	54	37	1	48.9	5.8	Wellington	3
	17/18		41	23		28.3	4.5	Wellington	1, 3
	18/19	No cloud	41	26	2	31.7	6.4	Wellington	1, 3
	28/29	Cloud patches and some haze	118	90	6	133.7	16.0	Wellington	1, 3, 4
								Stirling	3
								Halifax	4
								Hampden	5
								Manchester	5
	Oct. 16/17	Ground haze and cloud	87	36	1	43.7	8.6	Wellington	1, 3, 4
								Whitley	4
								Hampden	5
Dusseldorf	1941 June 2/3	6 10/10ths., poor visibility	150	105	3	119.3	21.3	Wellington	3, 4
								Whitley	4
								Hampden	5
	11/12	5 10/10ths. Slight haze	98	72	6	112.2	7.4	Wellington	1, 3
								Stirling	3
	15/16	10/10th cloud	59	37		54.2	7.1	Wellington	1
								Whitley	4
	16/17	Industrial haze	72	58	-	90.4	14.8	Wellington	3
								Stirling	3
	17/18	Ground haze	57	43		66.2	5.9	Wellington	3
	19/20	Very thick ground haze	20	18	1	18.7	6.8	Whitley	4
	21/22	5 10/10th cloud and thick haze	56	50		48.8	10.6	Whitley	4
								Hampden	5
	22/23	Haze	1	1		1.1	-	Hampden	5
	23/24	Thick haze	41	25		37.9	2.8	Hampden	5
								Manchester	5
	24/25	Broken and low cloud. Thick ground haze	31	28		40.5	7.9	Wellington	3
								Manchester	5
	25/26	N/A	1	-				Whitley	4
	26/27	Much cloud, snow, thunder and occasional severe icing	44	19	1	19.2	2.4	Wellington	1
								Hampden	5
	27/28	Thick cloud	1	1		1.1		Hampden	5
	30/1	No cloud, but thick ground haze	23	17	2	17.2	2.8	Wellington	1
								Hampden	5
	July 4/5	N/A	1		1			Hampden	5
	Aug. 16/17	Broken cloud	58	47	5	50.9	4.0	Hampden	5
								Manchester	5
	24/25	Intense darkness and ground haze	44	35	3	49.2	8.2	Whitley	4
								Halifax	4
								Hampden	5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Dusseldorf Contd.	1941 Oct. 13/14	Cloudy, ground haze	60	35	1	55.0	7.8	Wellington Stirling	1, 3 3
	Nov. 27/28	Variable cloud and ground haze	86	52	1	61.7	11.8	Wellington Hampden Manchester Stirling	3 5 5 3
	Dec. 27/28	Medium cloud, good visibility through the breaks	132	96	7	111.6	19.3	Wellington Whitley Hampden Manchester	1, 3 4 5 5
Emden	1941 June 12/13	Thick ground haze	1	1		1.1	.2	Wellington	3
	22/23	Ground haze	3	2		1.8	.4	Wellington	3
	23/24	Haze	1	1		1.3	.2	Wellington	3
	24/25	N/A	2	-	1			Wellington	3
	26/27	Cloud and ground haze	3	3		4.0	-	Wellington	1
	27/28		3	2		2.7	.9	Whitley	4
	July 6/7	Ground mist	2	2		2.5	.4	Wellington	1
	13/14	N/A	2	-				Wellington	3
	24/25	Some haze	47	41	2	55.8	2.7	Wellington Whitley	1 4
	25/26		2	2		2.8		Wellington	3
	Sept. 26/27	Clear	18	8	1	9.9	1.7	Wellington Stirling	3 3
	28/29	Clear	7	5		6.9	.8	Wellington Stirling	3 3
	Oct. 11/12	Considerable cloud	27	17	-	25.3	2.5	Wellington	3
	20/21	Medium cloud and ground haze	36	31	1	43.1	3.7	Wellington Halifax	1, 4 4
	24/25	Visibility good	12	7	-	9.7	.7	Wellington	3
	Nov. 15/16	10/10ths. cloud	49	15		24.3	.4	Wellington Whitley Hampden Manchester	1, 3, 4 4 5 5
	26/27	10/10ths. cloud	100	21	1	29.6	15.2	Wellington Hampden	1, 3 5
	Dec. 30/1	Good moon	50	41	3	64.2	6.1	Wellington Whitley Hampden Manchester Stirling	1, 3, 4 4 5 5 3
	Dec. 28/29	Clear, snow on ground	40	35	2	52.3	3.5	Wellington Whitley Stirling	1, 3, 4 4 3
	1942 Jan. 10/11	8 10/10ths.	29	23	-	31.9	4.2	Wellington Whitley Hampden Stirling Manchester	1, 3 4 5 3 5
	14/15	Poor	18	16	1	23.3	4.0	Wellington Hampden Stirling	1, 3 5 3
	15/16	Snow on ground, good	50	42	2	56.1	8.2	Wellington Whitley	1, 3, 4 4

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Emden Contd.	1942 Jan. 17/18	Clear	24	19	2	24.5	3.0	Wellington Whitley Hampden Manchester Stirling	1, 4 4 5 5 3
	20/21	Clear, good visibility	25	17	4	22	2.7	Wellington Hampden	1, 3 5
	21/22	Good visibility, little cloud	38	34	4	45.1	4.5	Wellington Hampden Manchester Whitley Stirling	3, 4 5 5 4 3
	26/27	Ground haze	31	29	2	43.3	-	Wellington Whitley Manchester	1 4 5
	Feb. 10/11	Good visibility	3	3	-	8.4	-	Whitley	4
	22/23	10/10ths.	7	3	-	5.4	-	Wellington Hampden Manchester	3 5 5
	1941 July 7/8	Clear	17	15	1	43.5	3.7	Stirling Halifax	3 4
	21/22	Visibility mod/ good, but ground haze	71	63	-	56.2	15.2	Wellington Hampden	1, 4 5
	22/23	Cloud and haze	63	39	-	33.6	2.0	Wellington Whitley Hampden	1 4 5
	23/24	Poor visibility on account of haze	33	29	1	26.0	2.0	Hampden	5
	Aug. 3/4	10/10ths. cloud	39	34	-	42.8	7.2	Whitley	4
	5/6	Variable cloud	68	57	3	49.9	20.7	Wellington Whitley	1, 3 4
	6/7	9 10/10ths. cloud	53	30	3	26.1	8.6	Wellington Whitley	1 4
	28/30	Very bad. Much cloud and electrical storms	143	105	3	105.0	21.0	Whitley Halifax Hampden Manchester	4 4 5 5
Frankfurt	Sept. 2/3	2 8/10ths. cloud	126	94	3	83.6	24.0	Wellington Whitley Hampden	1, 3 4 5
	12/13	Very thick cloud and intense darkness	130	113	2	132.4	25.7	Wellington Whitley Hampden	1, 3, 4 4 5
	20/21	Moderate visibility	34	24	-	21.0	4.2	Wellington Hampden	1, 3 5
	28/29	Thick haze	44	30	2	29.7	3.0	Wellington Hampden	3 5
	Oct. 24/25	Bad, considerable cloud	80	14	3	14.2	4.2	Wellington Whitley Hampden Manchester	1, 3, 4 4 5 5
	1941 June 12/13	Heavy darkness and ground haze	82	74		48.9	1.3	Wellington	3
	July 8/9	Ground haze	73	34	6	35.3	5.2	Whitley Hampden	4 5
	Aug. 7/8	6/10ths. cloud Clear patch over target at times	46	32	-	42.8	5.1	Wellington Stirling	3 3
Hamm									

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Hannover	1941 June 15/16	10/10ths.	16	13	1	41.7	1.5	Stirling	3
								Wellington	3
								Halifax	4
	17/18	Thick haze	11	3	-	12.7	-	Stirling	3
								Wellington	3
								Halifax	4
	23/24		1	1	-	0.9	-	Hampden	5
	July 14/15	Haze	85	68	2	106.0	12.7	Stirling	3
								Wellington	3, 4
								Halifax	4
								Hampden	5
	19/20	Slight ground haze	49	39	2	63.7	10.9	Wellington	3
								Whitley	4
								Halifax	4
	25/26	Haze	55	41	5	54.1	6.1	Whitley	4
								Hampden	5
	Aug. 3/4	Thick haze	39	29	1	25.6	5.8	Wellington	3
	12/13	Poor visibility	78	66	4	57.5	11.8	Wellington	3
								Hampden	5
Hüls	14/15	5/10ths. some haze	152	125	8	136.8	28.4	Whitley	4
								Wellington	1, 3
	1942 Jan. 26/27	Good visibility, moonlight, clear, slight ground haze	71	34	-	41.9	-	Wellington	1, 4
								Hampden	5
								Halifax	4
	1941 June 12/13	Thick haze	18	6		24.4	2.1	Stirling	3
								Halifax	4
	Sept. 6/7	Good visibility, clear	86	57	13	56.9	16.0	Wellington	3
								Whitley	4
								Hampden	5
Karlsruhe	Oct. 12/13	Thick 10/10ths. cloud	90	23	3	24.9	1.5	Hampden	5
								Manchester	5
	Dec. 28/29	No cloud, bright moonlight, snow on ground	81	65	4	54.6	5.8	Hampden	5
	1941 Aug. 5/6	Clear	97	77	3	99.1	12.6	Wellington	1, 3, 4
								Stirling	3
								Halifax	4
								Hampden	5
	6/7	9/10ths. cloud, icing and thunder	38	31	1	28.3	3.0	Hampden	5
	25/26	9/10ths. cloud, severe icing and electrical storms	49	27	3	39.2	7.5	Wellington	3
								Stirling	3
Kassel	Sept. 16/17	Little cloud, but intense darkness and haze	55	37	-	39.6	3.9	Wellington	1, 3
	17/18	No cloud, but ground haze	38	31	1	40.0	2.6	Wellington	3
	Oct. 1/2	9/10ths. thick haze	45	5	-	3.8	.6	Wellington	1
								Hampden	5
	1941 Sept. 8/9	Little cloud and slight haze	95	74	0	63.6	17.4	Wellington	1, 3
								Whitley	4
								Hampden	5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Krefeld	1941 Aug. 11/12	8 10/10ths. cloud	28	11	-	14.0	1.5	Whitley Hampden	4 5
Magdeburg	1941 July 5/6	Hazy	28	9	-	23.5	3.0	Stirling Halifax	3 4
	Aug. 12/13	Clear	36	18	-	17.3	.6	Hampden	5
	14/15	Gaps in cloud; poor visibility	52	21	4	42.3	2.1	Wellington Stirling Halifax Manchester	1, 3, 4 3 4 5
Mannheim	1941 July 21/2	Mod/good visibility but some ground haze	44	38	1	49.6	1.6	Wellington Halifax	3 4
	22/23	Visibility bad on account of haze	29	14	-	13.0	3.0	Wellington	3
	23/24	Thick haze	51	41	-	34.0	9.5	Wellington	1, 3
	Aug. 5/6	Variable cloud, good visibility	98	86	3	88.5	18.8	Wellington Hampden	3 5
	6/7	9/10ths. cloud, icing and thunder	38	29	4	26.2	6.4	Wellington	3
	22/23	Broken cloud and haze	97	80	1	79.3	11.9	Wellington Hampden	1, 3, 4 5
	25/26	Haze and variable cloud	45	34	3	33.9	3.0	Hampden Manchester	5 5
	27/28	Little cloud; ground haze and darkness	91	72	-	69.9	11.1	Wellington Hampden Whitley	1, 3 5 4
	29/30	10/10ths. electrical storms	94	70	3	55.0	23.1	Wellington	1, 3
	Sept. 26/27	(Recalled - fog)	17	-	-			Whitley	4
	Oct. 22/23	Considerable cloud and severe icing	133	58	3	60.1	8.6	Whitley Wellington Halifax Hampden	4 1, 3, 4 4 5
	Nov. 7/8	Cloud increasing from 3 - 8/10ths.	55	43	7	53.7	3.8	Wellington	1, 3
	1942 Feb. 11/12	Good. Little cloud and clear visibility	49	37	-	62.8	-	Wellington Whitley Hampden Halifax Manchester	3 4 5 4 5
	14/15	Unfavourable - 8 - 9/10ths.	98	69	-	82.1	-	Wellington Hampden Manchester Stirling Whitley	1, 3, 4 5 5 3 4
Munchen Gladbach	1941 July 7/8	Ground haze	40	18	2	10.3	.8	Hampden	5
	Aug. 11/12	8 - 10/10ths. cloud	29	23		30.9	4.2	Wellington	1, 3
Munster	1941 July 5/6	Visibility excellent	94	89	1	147.0	19.5	Wellington Whitley	3 4
	6/7	No cloud, slight haze	47	34	2	35.5	10.2	Wellington	3
	7/8	Visibility excellent	49	41	-	57.1	9.0	Wellington	3

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Munster Contd.	1941 July 8/9	Haze	51	45	1	61.5	9.6	Wellington	3
	1942 Jan. 28/29	10/10ths. severe icing	84	54	5	57.5	-	Wellington Hampden	1, 3 5
Nurnberg	1941 Oct. 12/13	Good	152	112	6	128.8	32.1	Wellington Stirling Whitley Halifax	1, 3, 4 3 4 4
	14/15	Bad. Cloud, icing and poor visibility	80	35	2	38.8	6.9	Wellington Stirling Whitley Halifax	1, 3, 4 3 4 4
	1941 June 12/13	Thick ground haze	61	53	1	82.8	-	Wellington	1
	July 5/6 7/8 8/10	Haze in patches Slight haze Ground mist	39 72 57	30 56 38	3 3 2	27.7 77.7 64.8	1.3 20.8 6.4	Hampden Whitley Wellington Wellington	5 4 4 1, 3,
Schwertc	1941 June 12/13	Very thick ground haze	84	41	2	57.4	5.5	Whitley Wellington	4 4
	13/14	Very thick ground haze	42	24	1	29.9	7.3	Whitley Wellington	4 4
Soest	1941 June 12/13	Medium cloud, thick haze	91	42	2	42.5	1.3	Hampden	5
Stuttgart	1941 Oct. 1/2	7/10ths. and ground haze	31	18	1 (in Sea)	16.9	4.8	Wellington Whitley	3 4

APPENDIX "L" 2

TYPE OF TARGET

NIGHT ATTACK ON OIL

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Merseburg	1941 July 8/9	Haze	14	10	1	24.5	-	Stirling Halifax	3 4
Dortmund	1941 July 4/5	N/A	2	-	2			Hampden	5

APPENDIX "L" 3

TYPE OF TARGET

THE GERMAN CAPITAL AND OTHER TOWNS

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Berlin	1941 June 2/3	Hazy	11	5	1	14.7	1.3	Wellington Stirling	3 3
	July 25/26	Some ground haze	9	4	3	13.9	0.2	Stirling Halifax	3 4
	Aug. 2/3	Little cloud, but ground haze and poor visibility	48	36	4	66.8	7.5	Wellington Stirling Halifax	1, 3, 4 3 4
	12/13	Little cloud	70	43	9	74.6	7.8	Wellington Stirling Halifax	1, 3, 4 3 4
	Sept. 2/3	2 - 8/10ths.	49	35	4	48.4	3.3	Stirling Halifax Hampden Manchester	3 4 5 5
	7/8	Very good, clear visibility and no cloud	197	130	17	138.2	29.0	Wellington Whitley Stirling Halifax Hampden Manchester	1, 3, 4 4 3 4 5 5
	20/21	(Fog at base - recalled)	77	18	3	13.3	2.8	Wellington Whitley Halifax Hampden	1, 3 4 4 5
	Nov. 7/8	10/10ths.	169	73	21	92.2	18.8	Wellington Stirling Whitley Halifax	1, 3, 4 3 4 4
Stettin	1941 Sept. 19/20	Some cloud and haze	72	52	2	62.6	5.8	Wellington Stirling Manchester Whitley Halifax	1, 3, 4 3 5 4 4
	29/30	Fine but slight ground haze	139	95	9	84.6	21.6	Wellington Stirling Whitley Halifax	1, 3, 4 3 4 4
	30/1	Good	40	29	-	25.8	2.3	Wellington	1, 3
Essen	1941 June 20/21		2	2	-	1.1		Hampden	5
	July 3/4	No cloud, thick haze	90	61	3	82.4	16.0	Wellington Whitley	3 4
	Aug. 7/8	Haze	106	84	3	108.5	13.2	Wellington Stirling Halifax Hampden Manchester	1, 3 3 4 5 5
	12/13	10/10ths. Severe thunder storms. No visibility	35	23	1	38.3	4.5	Wellington Stirling Halifax	1, 3 3 4
	31/1	8/10ths. cloud	71	53	1	39.8	20.3	Wellington Whitley	1 4

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Essen Contd.	1941 Oct. 10/11	8 - 10/10ths.	83	13	4	58.6	12.5	Wellington	4
								Whitley	4
								Halifax	4
								Hampden	5
								Manchester	5
	Nov. 4/5	10/10ths.	28	9	-	10.7	-	Wellington	3
	7/8	10/10ths.	24	16	4	27.5	1.9	Wellington	3, 4
								Whitley	4
								Halifax	4
	8/9	Visibility fair, hazy	54	35	4	45.3	7.0	Wellington	3, 1
								Hampden	5
								Whitley	4

APPENDIX "L" 4

TYPE OF TARGET

ITALY AND CZECHOSLAVAKIA

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Genoa	1941 Sept. 26/7 28/29	(Recalled - fog at base). Cloud Cloudy with considerable ground haze	34	1		.2	.3	Wellington	3
			41	35	3	23.3	3.2	Wellington Stirling	3 3
Turin	1941 Sept. 10/11	No cloud. Haze	76	60	4	65.6	9.2	Wellington Stirling Halifax	1, 3, 4 3 4
Pilsen	1941 Oct. 28/9	Thick cloud. Visibility nil	10	-				Stirling	3

APPENDIX "L" 5

TYPE OF TARGET

NIGHT ATTACKS ON GERMAN PORTS

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Bremen Vezerach	1941 June 18/9	C _L and C _M and thick haze	100	77	6	91.8	5.8	Wellington Whitley Hampden	1, 4 4 5
	22/23	Thick ground haze	79	50	2	51.9	6.6	Wellington Hampden	1, 3 5
	23/24		1	-				Hampden	5
	25/26	Thick ground haze. Severe electrical storms en route	64	26	1	26.7	4.0	Wellington Whitley	1, 2, 3 4
	27/28	6 10/10ths. in layers up to 15,000 feet. Severe icing.	136	87	10	96.0	20.8	Wellington Whitley Hampden	1, 2, 3 4 5
	28th		18	-				Blenheim	2
	29/30	Visibility good	106	69	6	55.8	24.7	Wellington Whitley Hampden	1, 2, 3 4 5
	July 2/3	Cloud and haze	67	60	1	88.4	12.6	Wellington Stirling Halifax	1, 3 3 4
	3/4	Weather fair. Bad visibility on account of cloud	68	40	3	36.0	10.9	Wellington Hampden	1 5
	12/13	Thick haze. Heavy thunder clouds and bad icing	61	38	2	33.1	5.1	Wellington Hampden	3 5
	13/14	10/10ths. and icing	67	21	1	25.5	3.7	Wellington	1, 3
	14/15	Clear except for haze	97	66	4	73.9	17.7	Wellington Whitley	1, 3 4
	Aug. 17/18	Cloud	59	34	1	30.8	5.8	Whitley Hampden	4 5
	Oct. 12/13	9 - 10/10ths. cloud	99	65	2	71.2	15.6	Wellington Whitley Halifax Hampden	1, 3 4 4 5
	20/21	Fair, but intense darkness and slight ground haze	153	92	4	137.8	6.0	Wellington Stirling Hampden Manchester	3 3 5 5
	21/22	Fair. C _N . Heavy industrial haze	120	95	2	110.9	14.6	Wellington Whitley Halifax Hampden Manchester	1, 3 4 4 5 5
	31/1	Cloud increasing to 10/10ths.	48	13	1	27.3	3.2	Wellington Stirling	3 3
	1942 Jan. 17/18	10/10ths.	83	48	2	67.5	5.3	Wellington Hampden Manchester Halifax Stirling	1, 3, 4 5 5 4 3
	21/22	Visibility excellent	55	26	3	29.2	3.9	Wellington Hampden Halifax Stirling	1, 3, 4 5 4 3
	Feb. 10/11	Hazy. Ground snow covered	55	34	-	45.9	-	Wellington Hampden Manchester	1 5 5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Hamburg	1941 June 29/30	Visibility good	28	15	6	43.2	6.4	Wellington Stirling Halifax Manchester	3 3 4 5
	July 16/17	Bad visibility	107	52	4	57.2	12.2	Wellington Whitley Hampden	1, 3 4 5
	25/26	Haze	43	31	1	25.7	8.3	Wellington	1, 3
	Aug. 2/3	3 - 9/10ths. cloud and haze	80	55	1	40.2	11.7	Wellington Stirling Whitley	1, 3, 4 3 4
	8/9	10/10ths. in layers	44	27	1	22.6	7.9	Wellington	1, 3
	Sept. 15/16	Clear	159	110	8	139.8	21.2	Wellington Stirling Hampden Halifax Whitley Manchester	1, 3, 4 3 5 4 4 5
	29/30	Visibility good	95	72	2	78.8	6.8	Wellington Whitley Halifax Hampden Manchester	1, 3, 4 4 4 5 5
	30/1 Oct.	Cloud and ground haze	76	37	1	39.5	3.0	Wellington Whitley Hampden	1, 3, 4 4 5
	Oct. 26/27	3/10ths. Bright moonlight	115	78	3	89.1	13.7	Wellington Whitley Halifax Hampden Manchester	1, 3 4 4 5 5
	31/1 Nov.	Considerable cloud	123	76	4	81.6	16.9	Wellington Whitley Halifax Hampden Manchester	1, 4 4 4 5 5
	Nov. 9/10	Good, clear visibility	107	71	1	96.2	26.3	Whitley Hampden Manchester Wellington	4 5 5 1, 3
	30/1 Dec.	Perfect. Good moonlight	181	122	16	159.9	17.3	Wellington Whitley Hampden Manchester	1, 3 4 5 5
	1942 Jan. 14/15	Low cloud and haze, poor visibility	95	50	3	65.7	6.9	Hampden Manchester Wellington	5 5 1, 3
	15/16	Visibility good. Snow on ground. 2 - 8/10ths. cloud.	96	60	5	39.1	45.4	Wellington Hampden Whitley Manchester	1, 3 5 4 5
Kiel	1941 June 20/21	10/10ths. cloud	115	88	2	133.3	13.1	Wellington Whitley Halifax Stirling Hampden	1, 3 4 4 3 5
	23/24	Visibility good, except for haze.	26	21	1	52.5	4.0	Wellington Stirling Halifax	3 3 4
	24/25	Clear with some thin layers of cloud and thick ground mist	48	42	1	38.8	3.4	Wellington Hampden	3 5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Kiel Contd.	1941 June 25/26	Haze	47	41	1	50.0	3.0	Wellington	4
	26/27	Thick haze and variable cloud	41	31	2	86.3	4.8	Hampden	5
								Stirling	3
								Halifax	4
								Manchester	5
	July 24/25	No cloud, slight haze	64	49	2	36.2	5.5	Wellington	3
								Hampden	5
	Aug. 2/3	Poor visibility	50	33	1	28.3	1.7	Hampden	5
	8/9	Slight cloud and haze	90	82	4	99.7	1.7	Whitley	4
								Hampden	5
	19/20	10/10ths; severe icing and electrical storms	108	68	4	81.6	9.0	Wellington	1, 3, 4
								Stirling	3
								Halifax	4
								Hampden	5
	Sept. 7/8	Clear	51	36	3	33.2	6.3	Wellington	1, 3
								Stirling	3
								Hampden	5
	11/12	Variable cloud	55	51	2	43.2	10.3	Wellington	1, 3
	Oct. 23/24	Variable, 10/10ths. to slight	114	93	1	94.1	15.8	Wellington	1, 3
								Whitley	4
								Hampden	5
								Manchester	5
	Nov. 1/2	10/10ths.	134	70	3	67.3	11.3	Wellington	1, 3
								Whitley	4
								Hampden	5
	15/16	Thick cloud, severe icing	47	8	3	11.1		Wellington	3
								Stirling	3
								Whitley	4
	1942 Feb. 25/26	No cloud; haze and snow on ground	61	36	3	58.8	-	Wellington	1, 3
								Stirling	3
								Manchester	5
	26/27	Visibility good	49	26	3	43.9	-	Wellington	1, 4
								Halifax	4
								Hampden	5
	27/28	10/10ths.	68	50	-	77.1		Wellington	1
								Manchester	5
								Hampden	5
Rostock	1941 Sept. 11/12	8/10ths. cloud	56	48	1	46.8	4.0	Wellington	1
								Hampden	5
								Manchester	5
Warnemunde	1941 Sept. 11/12	Cloud	32	24	2	26.6	6.0	Whitley	4
Wilhelmshaven	1941 July 11/12	Good. No cloud, slight ground haze	36	36	-	31.4	2.4	Hampden	5
	Oct. 20/21	Clear at first, deteriorating	47	35	-	46.8	10.4	Wellington	4
								Whitley	4
								Halifax	4
	Dec. 16/17	2/10ths. cloud at first, 9/10ths. later	83	69	-	71.2	18.0	Wellington	1, 3, 4
								Whitley	4
								Hampden	5
	22/23	Drifting cloud with gaps	22	16	-	20.9	3.2	Wellington	4
								Whitley	4
	28/29	Clear	86	74	1	77.4	18.1	Wellington	1, 3

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Wilhelmshaven Contd.	1942								
	Jan. 10/11	8/10ths. cloud. Good visibility	124	93	5	116.0	5.6	Wellington	1, 3, 4
								Hampden	5
								Halifax	4
								Manchester	8
								Stirling	3
	Feb. 22/23	9 - 10/10ths.	50	36	-	48.4	-	Wellington	1, 3
	27/28	10/10ths. cloud	33	26	3	45.1	-	Hampden	5
								Wellington	3
								Whitley	4
								Stirling	3
								Hampden	5

APPENDIX "L" 6

TYPE OF TARGET

NIGHT ATTACKS ON NAVAL UNITS

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Brest	1941								
	June 7/8	Sea fog (and smoke screen)	37	35	-	75.6		Wellington	3
	10/11	Artificial Smoke Screen	104	96	-	128.0		Stirling	3
								Wellington	3
								Whitley	4
								Hampden	5
	13/4	Haze and Smoke Screen	110	95	-	142.0		Wellington	1, 3
								Stirling	3
								Hampden	5
	10/9	Haze, Smoke Screen and patches of low cloud	65	50	-	84.7		Wellington	3
								Stirling	3
	July 1/2	Ground haze, Smoke Screen and SL glare	52	43	2	64.0		Wellington	2, 3
	4/5	No cloud. Smoke	88	80	1	132.8		Wellington	3, 4
								Whitley	4
	6/7	Perfect (but smoke screen)	109	101	2	130.8		Wellington	1
								Hampden	5
	Sept. 3/4	Clear (but smoke screen)	140	56	-	84.7		Wellington	1, 3, 4
								Stirling	3
								Hampden	5
	13/14	Clear but intense darkness and slight haze	147	120	-	173.3	1.5	Wellington	1, 3
								Stirling	3
								Hampden	5
								Whitley	4
								Halifax	4
								Manchester	5
	Oct. 2/3	No cloud. Smoke.	6	5	-	15.6		Halifax	4
	3/4	10/10ths. thick cloud	9	2	1	8.9		Stirling	3
	22/23	Clear	6	5	-	21.4		Stirling	3
	23/24	Poor visibility	9	7	-	31.2		Stirling	3
	24/25	10/10ths. thick cloud	6	6	-	26.6		Stirling	3
	29/30	Clear visibility	16	14	-	21.4		Wellington	1
	Nov. 1/2	10/10ths. cloud	17	6	-	21.5		Stirling	3
								Wellington	1
	3/4	9 10/10ths. cloud	8	2	-	3.6		Wellington	1
	18/19	10/10ths.	6	3	-	10.7		Stirling	3
	23/24	7 10/10ths. cloud	11	8	-	27.6		Stirling	3
	25/26	Clear. Smoke.	18	18				Stirling	3
								Halifax	4
	Dec. 7/8	Visibility good. 5/10ths. cloud	30	23	-	43.1		Stirling	3
								Wellington	3
	11/12	10/10ths. cloud	26	19	-	31.0		Stirling	3
								Wellington	3
	12/13	Considerable cloud and haze	24	21	-	45.1		Wellington	3
								Stirling	3
	14/15	10/10ths. and severe icing	28	1	-	.7	.3	Stirling	3
								Hampden	5
	15/16	Considerable cloud	17	12	-	31.7		Wellington	3
								Stirling	3
	16/17	Visibility fair. Moderate cloud	22	16	-	32.8		Wellington	3
								Stirling	3
	17/18	Visibility fairly good, although very dark. Cloud 5 10/10ths.	121	101	1	138.2		Wellington	1, 3, 4
								Whitley	4
								Hampden	5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Brest Contd.	1941 Dec. 18/19	Medium cloud	19	15	-	18.3		Whitley	4
	23/24	Good visibility. Little or no cloud	47	43	-	71.9	8.8	Wellington Stirling	3 3
	27/28	Increasing cloud	29	15	-	32.6		Wellington Stirling	3
	1942 Jan. 2/3	8 10/10ths. down to 6,000ft. Moderate visibility	31	27	-	50.2	5.2	Wellington Stirling	3 3
	3/4	10/10ths, cloud	18	14	1	24.8	3.0	Wellington Stirling	3 3
	5/6	7 10/10ths. with occasional good gaps	87	75	-	106.3		Wellington Hampden Manchester	1 5 5
	5/6	" " "	67	65	-	94.7	12.9	Wellington Whitley Stirling Halifax	3 4 3 4
	6/7	Little cloud. Smoke	31	27	1	40.8		Wellington	1
	7/8	8 10/10ths.	68	62	-	75.9	7.4	Wellington	1, 3
	8/9	Gaps in cloud	92	69	1	102.0		Wellington Hampden Manchester	1 5 5
	8/9	" " "	59	49	-	73.3	10.3	Wellington Whitley Halifax	3 4 4
	8/10	8 10/10ths. haze	82	59	-	85.7		Wellington Hampden Stirling Manchester	1, 3 5 3 5
	11/12	No cloud. Smoke	26	24	-	42.2		Wellington Stirling Manchester	3 3 5
	25/26	5 10/10ths, and ground haze	71	46	-	70.8		Wellington Hampden Manchester	1 5 5
	26/27	Excellent visibility and no cloud	25	21	-	38.1		Wellington Stirling	3 3
	27/28	Ground haze	35	23	-	28.5		Hampden Manchester	5 5
	31/1	0 6/10ths, with good visibility through gaps	72	50	5	68.8		Wellington Hampden Manchester Stirling	3, 4 5 5 3
	Feb. 6/7	10/10ths. cloud	60	33	1	43.1		Wellington Stirling	1, 3 3
	10/11	10/10ths. cloud	20	16	-	41.0		Wellington Stirling	3 3
	11/12	Cloudless; ground haze	18	16	1	20.0		Wellington	1
	1941 July 23/4	No cloud, but slight haze	30	27	-	40.1	1.8	Whitley	4

APPENDIX "L" 7

TYPE OF TARGET

NIGHT ATTACKS ON OCCUPIED PORTS

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Antwerp	1941 Aug. 11/12	N/A	1	-				Wellington	1
	Oct. 3/4	Visibility good except for slight ground haze	20	19	-	27.3	.4	Wellington	3
	20/21	10/10ths.	35	10		17.7	1.3	Wellington Stirling Whitley	1, 3 3 4
Bordeaux	1941 Oct. 10/11	Very thick cloud	22	9	1	5.7	1.9	Wellington	3
Boulogne	1941 June 11/12	Moderate visibility	29	25		36.6	4.6	Wellington Whitley	1, 3 4
	13/14	Haze. Poor visibility	5	2		2.2	.4	Wellington	3
	16/17	Haze	7	5		6.0	1.0	Wellington	3
	17/18	Haze	8	6		7.8	.4	Wellington	1, 3
	20/21	Clear	5	2		1.8	.2	Wellington	1, 3
	21/22	Variable cloud	18	13	1	39.7		Manchester	5
	23/24	Haze	2	1		1.1	.2	Wellington	1, 3
	24/25		1	1		1.6	.1	Wellington	1
	July 7/8	Clear	5	5		8.0		Wellington	1
	10/11	Good visibility	2	2		2.2		Wellington	3
	16/17	9/10ths. cloud	8	3		3.1	.6	Wellington Whitley	1, 3 4
	30/31	N/A	12	-					
	Aug. 5/6	10/10ths.	8	1		1.1	.2	Wellington	1, 3
	7/8	Clear	6	4		4.9	.6	Wellington	1, 3
	14/15	7 10/10ths. cloud	13	5		8.3		Wellington	1
	26/27	Haze	14	9		11.0	1.8	Wellington	3
	27/28	Clear	2	1		1.6		Wellington	1
	31/1	Clear	6	5		6.5		Wellington	1, 3
	Sept. 7/8	Clear	47	44		64.6	5.4	Wellington Whitley	1, 3, 4 4
	11/12	Clear	8	7		6.6	.6	Whitley Wellington Hampden	4 4 5
	22/23	Visibility fair. No cloud	3	2		3.6		Wellington	1
	Oct. 1/2	Cloudy. Ground haze	7	5		7.0	.6	Whitley Wellington	4 4
	12/13	Clear	24	23		26.1	2.8	Wellington Whitley	1, 3 4
	13/14	Clear	6	6		9.1	1.7	Wellington Stirling	1, 3 3
	15/16	Cloudy with some haze	8	3		4.8	.8	Wellington	3
	21/22	Medium cloud and icing. Haze	12	3		2.5	.3	Wellington Hampden	3 5
	31/1	Good visibility	7	6		11.9	2.2	Wellington Stirling	3 3
	Nov. 3/4	10/10ths. cloud	7	-				Wellington	1, 4
	7/8	Clear	22	18		28.6	1.0	Whitley Manchester	4 5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Boulogne Contd.	1941 Nov. 15/16	No cloud. Intense darkness	9	4		6.2	.2	Wellington	1, 3
	Dec. 7/8	Visibility poor on account of haze	19	14	1	18.9	1.5	Wellington Manchester Hampden	3 5 5
	27/28	Medium cloud and good visibility	34	26		32.5	1.9	Wellington Whitley Hampden	1, 3, 4 4 5
	1942 Jan. 10/11	No cloud	2	1		1.2	.2	Wellington	3
	21/22	Clear	7	2		2.5	.5	Wellington	3
	27/28	Haze	10	7		3.3		Blenheim	2
	28/29	Little cloud	48	34		52.7		Wellington Whitley Hampden Manchester	1, 3, 4 4 5 5
Calais	1941 Aug. 3/4	Clear	7	5		7.6	1.0	Whitley	4
	6/7	Clear	38	22	1	20.4	1.1	Wellington Whitley Hampden	1, 3 4 5
	Dec. 7/8	Clear	24	23	-	34.5	.5	Wellington Whitley	1, 3 4
Cherbourg	1941 July 1/2	Clear	5	4	1	5.0	0.6	Wellington	3
	2/3	Clear	6	6	-	8.0	-	Wellington	1, 3
	4/5	Clear	4	3	-	4.7	0.2	Wellington	1, 3
	21/22	Clear	6	6	-	5.2	1.2	Wellington	3
	Aug. 2/3	7/10ths.	20	14	-	13.6	-	Wellington	1, 3
	30/31	Clear	6	5	-	8.7	1.7	Wellington Stirling	3 3
	Sept. 8/9	Low cloud and haze	7	3	-	3.6	-	Wellington	3
	12/13	Haze	21	16	-	21.5	2.9	Wellington Whitley	1, 3, 4 4
	29/30	Clear	3	3	-	3.3	0.6	Whitley	4
	30/1	Clear	41	39	-	50.7	3.4	Wellington Whitley Hampden	1, 3 4 5
	Oct. 23/24	10/10ths.	4	3	-	4.8	0.4	Whitley	4
	24/25	N/A	1	-	-	-	-	Wellington	1
	26/27	9/10ths.	17	9	-	14.3	1.0	Wellington Whitley Hampden	3 4 5
	28/29	9/10ths.	24	10	-	16.1	0.4	Wellington Whitley	1, 3 4
	Nov. 5/6	5 10/10ths.	24	23	-	20.2	-	Hampden Manchester	5 5
	25/26	Good visibility	17	15				Wellington	1
	Dec. 14/15	10/10ths.	3	-	1	-	-	Hampden	5
	1942 Jan. 5/6	7 10/10ths.	37	16	-	24.1	1.8	Stirling Wellington Whitley Hampden	3 3 4 5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Cherbourg Contd.	1942 Jan. 6/7	Clear	5	2	-	3.1	0.4	Wellington	4
	8/9	9 10/10ths.	31	11	1	16.1	-	Wellington Hampden Manchester	1 5 5
Dunkirk	1941 June 15/16	10/10ths.	12	5	-	10.4	1.5	Wellington Whitley	1, 3 4
	21/22	Clear	10	7	-	10.5	.6	Wellington	2, 3
	27/28	9 10/10ths.	4	3	-	4.5	.6	Wellington	2, 3
	July 22/23	Clear	19	11	-	15.9	2.3	Whitley Wellington	4 3
	Aug. 27/28	9 10/10ths. cloud	14	9	-	14.6	1.2	Wellington Whitley	1, 3, 4
	Aug. 14/15	N/A	2	-	-	-	-		3
	17/18	N/A	1	-	-			Wellington	3
	18/19	Clear	18	14	-	19.4	2.3	Wellington Whitley	1, 3 4
	27/28	Clear	2	2	-	2.2	0.2	Wellington	3
	28/29	Clear	10	10	1	11.8	2.1	Whitley	4
	Oct. 3/4	Good. Haze developed later	41	40	-	59.1	9.2	Wellington Whitley Stirling	3, 4 4 3
	10/11	Medium cloud	23	19	1	15.8	-	Hampden	5
	16/17	Clear	22	14	1	19.0	1.0	Wellington Hampden	1, 3 5
	31/1	Variable cloud	28	18	1	27.5	1.7	Wellington Halifax Whitley	1, 4 4 4
	Nov. 4/5	9/10ths. cloud	10	3	-	4.7	.6	Wellington Whitley	4 4
	8/9	Visibility good	18	15	1	19.9	1.0	Wellington Hampden Manchester	3 5 5
	9/10	Clear	7	7	-	10.9	1.0	Wellington	1, 3
	23/24	Thick cloud	37	7	-	9.1	1.7	Wellington Stirling	3 3
	Dec. 7/8	Considerable cloud	22	13	1	16.2	3.4	Wellington Whitley	3, 4 4
	12/13	Clear	9	7	-	14.3	3.4	Wellington Stirling	3 3
	16/17	Clear	14	6	1	8.1	.8	Wellington Whitley Hampden	4 4 5
	23/24	2 7/10ths. cloud	3	2	-	2.6	.3	Wellington	3
	28/29	Clear	5	4	-	5.2	.6	Wellington	1, 3
	1942 Jan. 17/18	N/A	2	-	-				
	22/23	Excellent visibility	5	5	-	15.8	-	Wellington Stirling	3 3
Le Havre	1941 July 9/10		1	1				Wellington	3
	23/24	Clear	3	3		3.7	.2	Wellington	1, 3
	Aug. 12/13	Some cloud	14	11	-	11.8	2.1	Wellington	1, 3
	19/20	Good visibility	9	6	-	8.9	.8	Wellington Whitley	1, 3, 4 4

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Le Havre Contd.	1941 Aug. 22/23	Visibility good	23	20	-	33.4	4.0	Wellington	1, 3
								Stirling	3
								Whitley	4
	26/27	Clear	31	25		35.4	3.2	Wellington	1, 4
								Stirling	3
								Whitley	4
	29/30	Clear	5	2		2.6	.4	Wellington	1, 3
	Sept. 3/4	Cloud	2	1		1.5		Wellington	3
	11/12	Considerable cloud	20	8		12.7		Wellington	1, 3
	13/14	Considerable cloud	8	7		9.8		Wellington	1
								Hampden	5
	15/16	Visibility excellent	45	43	1	60.3	5.8	Wellington	1, 3, 4
								Stirling	3
								Whitley	4
								Hampden	5
	16/17	Fine with no cloud but slight ground haze	10	7		7.3	.6	Wellington	1, 3
	17/18	N/A	1	-				Wellington	3
	18/19	Hazy. No cloud	10	10		16.6	.8	Hampden	5
								Wellington	3
								Stirling	3
	29/30	Clear	6	5		9.4	1.5	Wellington	3
								Stirling	3
	Oct. 22/23	Some cloud	22	18	1	27.0	2.3	Wellington	1, 3, 4
								Stirling	3
								Whitley	4
	23/24	Variable cloud	13	11	1	12.7	.9	Wellington	3
								Hampden	5
	Nov. 1/2	Clear	13	12		17.3	2.5	Wellington	1, 3
	6/7	9/10ths. cloud	9	7		9.4	1.8	Wellington	4
								Wellington	3
	Dec. 11/12	10/10ths. cloud	34	10	1	14.8	1.5	Wellington	3
								Stirling	3
								Hampden	5
	17/18	Thick cloud	14	1		1.7		Wellington	3, 4
								Whitley	4
Lorient	1942 Jan. 31/1	8/10ths.	14	6		8.9	-	Wellington	1, 3, 4
								Whitley	4
	Feb. 11/12	Clear at first. Cloud later.	31	22	1	30.5		Wellington	1, 3, 4
Ostend	13/14	7 9/10ths. Poor and hazy visibility	28	11		18.1		Whitley	4
								Wellington	1, 3, 4
								Whitley	4
	14/15	Cloud	15	5		11.0		Wellington	1, 3
								Stirling	3
Lorient	1941 July 4/5	Perfect visibility	47	47	-	64.0		Wellington	1
								Hampden	5
Ostend	Nov. 23/24	Good visibility	53	39	-	44.7		Hampden	5
								Manchester	5
Ostend	1941 July 23/24	Thick haze	5	2	-	2.8	.2	Wellington	3
	Aug. 16/17	Clear	6	5	-	4.5	-	Hampden	5
								Manchester	5
	28/29	Cloudy	14	8	1	10.4	1.4	Wellington	1, 3
								Hampden	5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Ostend Contd.	1941 Sept. 2/3	Clear	10	7	1	9.6	1.4	Wellington	3
	20/21	Clear. Slight ground haze	34	28	-	38.5	4.0	Whitley	4
								Wellington	1, 3, 4
								Whitley	4
								Hampden	5
	Oct. 10/11	Visibility bad	22	16	-	26.6	1.5	Wellington	1, 4
	16/17	Medium cloud	15	4	1	5.2	3.4	Whitley	4
	Nov. 4/5	10/10ths. cloud	10	6	-	7.6	4.6	Wellington	3
	7/8	Cloud decreasing during attack	28	19	-	33.1	7.7	Wellington	3
								Hampden	5
								Stirling	3
	8/9	Slight haze	8	8	-	12.1	6.8	Whitley	4
	9/10	Clear	9	7	1	11.2		Wellington	1
								Hampden	5
								Manchester	5
	26/27	Clear	18	7	-	12.7	.3	Wellington	1, 3
								Stirling	3
	27/28	Good visibility	7	4	-	5.6	.8	Wellington	3
								Stirling	3
	30/1 Dec.	Cloudy	3	2	-	2.2	.4	Wellington	4
								Whitley	4
	Dec. 7/8	Considerable cloud	23	19	1	8.5	.8	Blenheim	2
	15/16	Visibility moderately good	25	16	1	19.8	2.1	Wellington	3, 4
								Stirling	3
								Whitley	4
								Hampden	5
	16/17	Darkness and cloud	32	23	-	33.7	1.6	Wellington	1, 3
	23/24	Clear	9	8	-	11.6	-	Wellington	1
	1942 Feb. 22/23	8 10/10ths. gap	5	3	-	5.4	-	Wellington	3
Rotterdam	1941 June 11/12	Clear	2	2		2.7	-	Wellington	2
	12/13		2	1		1.1	.2	Wellington	3
	17/18		8	7		9.6		Wellington	2
	25/26	Clear	6	5		6.2		Wellington	2
								Whitley	4
	July 5/6	Clear	14	10	-	15.9	.2	Wellington	1, 2, 3
	6/7	Clear	7	7		6.0	1.0	Wellington	1, 3, 4
	17/18	N/A	5	-				Wellington	1, 3
	20/21	Good	24	12	-	17.7	1.9	Wellington	1, 3
								Whitley	4
	24/25	N/A	4	-				Wellington	1, 3
	Aug. 11/12	Gaps in heavy clouds	34	14	-	14.5	.6	Wellington	3
								Hampden	5
	14/15	Clear	9	4		6.2	.8	Wellington	4
								Whitley	4
	16/17	Clear	10	7		10.6	.4	Wellington	1, 3
	Oct. 3/4	Visibility good	33	32		51.8	6.5	Wellington	3
	10/11	8 10/10ths. cloud	13	6	-	9.0	1.2	Wellington	3
	1942 Jan. 14/15	Heavy ground haze	11	5	-	2.3		Wellington	3
								Blenheim	2
	28/29	Very good	29	26	-	4.5		Whitley	4

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
St. Nazaire	1941 Nov. 6/7		3	2	-	.4		Whitley	4
	1942 Jan. 2/3	8 10/10ths. cloud	27	9	-	15.4	1.3	Whitley Manchester	4 5
	7/8	Slight haze	27	25	-	45.7	3.7	Whitley Halifax	4 4
	31/1	10/10ths. with large breaks through which visibility was good	31	14	-	18.9	-	Wellington Hampden Manchester	1, 3 5 5
	Feb. 15/16	9/10ths.	26	9	-	19.2	-	Whitley Halifax	4 4

TYPE OF TARGET

NIGHT ATTACK ON SHIPPING

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Shipping off Frisians	1941 Nov. 3/4		6	5	-	4.0		Hampden	5
"	4/5		6	1	-	1.1		Hampden	5
"	5/6		5	3	2	5.1		Hampden	5
"	6/7		1	-	-			Hampden	5

APPENDIX "L" 9

TYPE OF TARGET

NIGHT ATTACKS OVER NORWAY

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Norway	1942 Jan. 6/7	Bright moonlight and cloudless sky	11	9	-	14.1		Whitley	4
	Feb. 21/22	Variable cloud and icing	15	8	1	24.5		Stirling Halifax Manchester	3 4 5
Heroya and Odda (Carbide and Zinc Plants)	1942 Feb. 25/26	10/10ths. cloud	21	-	-			Whitley	4

APPENDIX "L" 10

TYPE OF TARGET

THE MINELAYING OFFENSIVE

Date of Attack	Actual Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
		Desp.	Mines Laid	Missing	H.E.	Incy.		
1941 June 10/11	Quiberon Bay	9	7				Hampden	5
11/12	Kiel and Frisian Isles	20	19	1	1.3		Hampden	5
13/14	Frisian Isles	4	3	1			Hampden	5
15/16	Frisian Isles	4	2				Hampden	5
17/18	Frisian Isles	4	4				Hampden	5
23/24	Frisian Isles	1	1				Hampden	5
25/26	Frisian Isles	1	-	1			Hampden	5
26/27	Frisian Isles	1	-	-			Hampden	5
27/28	Frisian Isles	3	-	-			Hampden	5
28/29	Elbe Estuary and Heligoland	34	33		2.2		Hampden	5
29/30	Frisian Isles	3	3				Hampden	5
	Total	84	76	3	3.5			
1941 July 4/5	Frisian Islands	3	3				Hampden	5
5/6	St. Nazaire	7	6				Hampden	5
14/15	Frisian Islands and Elbe Estuary	10	10				Hampden	5
16/17	Frisian Islands	5	5		0.2		Hampden	5
19/20	Elbe Estuary and Weser Estuary	35	33		4.2		Hampden	5
21/22	Frisian Islands	2	1	1			Hampden	5
22/23	Brest	8	8				Hampden	5
23/24	Frisian Isles	1	1				Hampden	5
24/25	Frisian Isles	6	6				Hampden	5
27/28	Lorient and St. Nazaire	36	34	1	1.3		Hampden	5
28/29	Kiel; Fehmarn Channel and Langeland Belt	42	26	2	2.4		Hampden	5
	Total	155	133	4	8.1			
1941 Aug. 2/3	Kiel harbour; South end Little Belt; South entrance Little Belt; Eckernforde and Langeland Belt	5	4				Hampden	5
5/6	Kiel harbour; South end Little Belt; South entrance Little Belt; Eckernforde and Langeland Belt	5	2				Hampden	5
7/8	Frisian Isles; Langeland Belt; Little Belt and Great Belt	8	7		0.9		Hampden	5
8/9	Frisian Isles; Aulborg; South end Little Belt; South entrance Little Belt; Eckernforde and Kiel	7	6	1	0.2		Hampden	5
14th	Frisian Isles	5	5				Hampden	5
17th	Frisian Isles; Aulborg; Little Belt; Great Belt	12	10				Hampden	5
19th	Frisian Islands	3	2				Hampden	5
26/27	Frisian Isles; Aulborg; Kiel harbour; Travemunde; Little Belt; Langeland Belt	17	14	1			Hampden	5
27/28	Frisian Isles	17	17				Hampden	5
30/31	Warnemunde	2	2		0.2		Hampden	5
31/1st	Little Belt; Great Belt; Kiel; Travemunde and Frisian Islands	12	12		0.4		Hampden	5
	Total	93	81	2	1.7			

Date of Attack	Actual Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
		Desp.	Mines Laid	Missing	H.E.	Incy.		
1941 Sept. 1/2	Great Belt; Tehmarn Channel; Aulborg; South entrance to Sound	4	4		0.2		Hampden	5
2/3	Frisian Isles; South entrance to Sound Eckernforde; South entrance to Little Belt	15	9	3	0.2		Hampden	5
3/4	(Recalled on account of fog)	5	-	-			Hampden	5
6/7	Oslo Harbour	24	21	2	3.2		Hampden	5
7/8	Frisian Islands	8	7	1	0.4		Hampden	5
8/9	Copenhagen; Great Belt; Langeland Belt; Eckernforde; Flemsburg Fiord; Frisian Islands	6	4		0.4		Hampden	5
11/12	Frisian Isles; Heligoland; Warnemunde	20	19		0.4		Hampden	5
12/13	Frisian Isles; North entrance Sound; Travemunde; Tehmarn Channel and Great Belt	10	8		0.2		Hampden	5
15/16	Warnemunde and Tehmarn Channel	4	4				Hampden	5
17/18	Heligoland and Elbe River	14	10		1.1		Hampden	5
29/30	Swinemunde	5	15				Manchester	5
	Total	115	101	6	6.1			
1941 Oct. 1/2	Frisian Islands	2	1				Hampden	5
11/12	Elbe River; Jade and Wesen River	12	11				Hampden	5
13/14	Frisian Islands; Kiel harbour	13	12				Hampden	5
20/21	Frisian Islands and Saccnitz	10	15	1			Hampden Manchester	5 5
21/22	Kiel harbour	4	12				Manchester	5
26/27	Jade and Wesen Rivers; Kiel harbour	5	5		0.4		Hampden	5
31/1st	Frisian Islands; Kiel harbour; Jade and Wesen Rivers	18	19		0.4		Hampden Manchester	5 5
	Total	64	75	1	0.8			
1941 Nov. 1/2	Kiel harbour and Sassnitz	7	7				Hampden Manchester	5 5
3/4	North and South entrance Sound	10	8		0.7		Hampden	5
4/5	Kiel harbour	28	27		2.5		Hampden Manchester	5 5
5/6	Kiel harbour	24	22	1	0.9		Hampden	5
6/7	Oslo harbour	15	10	1	1.6		Hampden	5
7/8	Oslo harbour	13	7	3	1.1		Hampden	5
9/10	Jade and Weser Rivers and Mouth of Elbe	5	4				Hampden	5
15/16	Frisian Islands	5	3	1			Hampden	5
27/28	Jade and Weser Rivers	5	4		0.2		Hampden	5
30/1st	Sussnitz; Kiel harbour; Warnemunde; North entrance Sound	8	19		0.2		Hampden Manchester	5 5
	Total	120	111	6	7.2			

Date of Attack	Actual Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
		Desp.	Mines Laid	Missing	H.E.	Incy.		
1941 Dec. 10th	Frisian Islands	10	8				Hampden	5
11/12	Kiel harbour	5	3	1			Hampden	5
13th	Brest	10	4	2			Hampden	5
14/15	Brest	2	1	1	0.2		Hampden	5
15/16	Jade and Weser Rivers	5	5		0.2		Hampden	5
16/17	Brest	18	15				Hampden	5
23/24	Kiel harbour and Frisian Isles	17	7		0.6		Hampden	5
27/28	Kiel harbour	5	4		0.2		Hampden	5
	Total	72	47	4	1.2			
1942 Jan.	La Pallice; Frisian Isles; Verdon and St. Nazaire	36	21	1	0.7		Hampden	5
2/3	Frisian Islands	10	7	1			Hampden	5
5/6	Quiberon Bay	5	3				Hampden	5
8/9	Frisian Isles	5	4		0.4		Hampden	5
9/10	Brest	5	3	1			Hampden	5
10/11	Jade and Weser Rivers	5	5				Hampden	5
14/15	Warnemunde and Kiel harbour	5	2				Hampden	5
15/16	Frisian Isles	5	3				Hampden	5
17/18	Frisian Isles and Wangerooge	8	2				Hampden	5
21/22	Frisian Isles	1	1				Hampden	5
22/23	Frisian Isles; Jade and Weser Rivers; Mouth of Elbe Canal	9	6	1			Hampden	5
26/27	Frisian Isles	6	5				Hampden	5
	Total	100	62	4	1.1			
1942 Feb.	(Recalled)	3	-				Manchester	5
4/5								
6th	Frisian Isles	46	70	1			Manchester	5
							Hampden	5
7th	Frisian Isles	32	25	3			Hampden	5
11/12	Frisian Isles	1	3				Manchester	5
12/13	Eastern Frisian Isles	20	13	2			Hampden	5
							Manchester	5
16/17	Frisian Isles	49	52	2	0.4		Hampden	5
							Manchester	5
18/19	Frisian Isles; Jade and Weser Rivers and Heligoland	25	22	1			Hampden	5
21/22	Jade and Weser Rivers	6	8				Manchester	5
22/23	Jade and Weser Rivers	2	4				Manchester	5
23/24	Frisian Isles; Heligoland; Jade and Weser Rivers	23	17	1	0.8		Hampden	5
24/25	Frisian Isles; Heligoland; Jade and Weser Rivers	51	46	2			Hampden	5
							Manchester	5
25/26	Jade and Weser Rivers; Heligoland, Horns, Reef and Elbe Rivers	27	14	1	0.4		Hampden	5
27th	Frisian Isles	15	19				Hampden	5
							Manchester	5
	Total	319	306	13	1.6			

TYPE OF TARGET

DAYLIGHT ATTACKS ON OCCUPIED COUNTRIES

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Abbeville Mar- shalling Yard	1941 July 5th	Clear	1	1		4.5		Stirling	3
	Sept. 18th		5	-				Hampden	5
	20th	Clear	6	6		5.1		Hampden	5
Amiens Mar- shalling Yard	1941 Sept. 22nd	(Aircraft recalled)	24	-				Blenheim	2
	27th	Clear	12	11		4.9		Blenheim	2
Arques Ship- lift	1941 July 12th	Clear	3	2		12.1		Stirling	3
	Oct. 13th	Clear	6	4	1	1.8	.1	Blenheim	2
Berck- Sur- Mer (Aerodrome)	1941 Aug. 6th		6	-				Blenheim	2
Bois de Liegues	1941 June 18th	Clear	6	6		3.1		Blenheim	2
Choques	1941 June 17th	Clear	23	18	-	7.4	1.0	Blenheim	2
Chemical Works	23rd	Cloudy	23	21	-	10.7		Blenheim	2
Power Plant	July 1st	Very thick haze	24	-	-			Blenheim	2
	4th	Cloud	12	10	1	5.0		Blenheim	2
	7th	Clear	3	3		16.1		Stirling	3
	10th	Clear	3	2	1	8.9		Stirling	3
	Aug. 21st	10/10ths. cloud	12	5	-	2.2		Blenheim	2
Comines Power Station	1941 June 24th	Ground haze	18	15	-	7.7		Blenheim	2
	26th	Extensive cloud	23	-	-			Blenheim	2
	28th	Cloudy	24	22	-	11.4		Blenheim	2
Dosovres Aerodrome	June 21st	Clear	6	6	-	3.0		Blenheim	2
Dunkirk Mardyck Aerodrome	June 23rd	N/A	6	-	2			Blenheim	2
Foret d'Eper- leques (Ammuni- tion dumps)	July 23rd	Cloud	6	6	-	2.6		Blenheim	2

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Gosnay Power Station	1941 Aug. 9th	N/A	5	-				Blenheim	2
	12th	Clear	6	6		5.6		Hampden	5
	19th	10/10ths. cloud	6	-				Blenheim	2
	Sept. 21st	Clear	12	12		4.8		Blenheim	2
Hazebrook Marshalling Yard	1941 June 22nd	Clear	12	10	-	4.9		Blenheim	2
	25th	Clear	12	12	-	6.2		Blenheim	2
	July 3rd	Strong sun glare	12	6*	1	3.1		Blenheim	2
	7th	Clear	1	1		5.4		Stirling	3
	14th	Clear	6	6		3.0		Blenheim	2
	20th	Very thick cloud	3	-				Stirling	3
	Aug. 19th	Clear	6	6		3.0		Blenheim	2
	29th	Clear	6	1		.1		Blenheim	2
	Sept. 20th	Clear	3	3		1.3		Blenheim	2
	* 6 attached St. Omer with 3.1 tons H.F.								
Lannion (Aerodrome)	1941 Aug. 31st	Haze	6	6	-	3.0		Blenheim	2
	Oct. 23rd	Clear	6	6		3.1		Blenheim	2
Le Havre Power Station	Oct. 2nd	N/A	6	-				Blenheim	2
Le Trait (Shipyard)	July 6th	Clear	3	2*		8.9		Stirling	3
	11th	Clear	3	3		11.6		Stirling	3
	22nd	Clear	6	6		2.5		Blenheim	2
	Aug. 12th		6	4		1.8		Blenheim	2
	31st	Clear	6	6		2.7		Blenheim	2
* 1 attached Yainville with 4.5 tons									
Lille (Accumulator factory)	1941 July 21st	Clear	3	3		14.7		Stirling	3
Lille Sequefin (Power Station)	1941 July 2nd	Thick haze	12	0 -				Blenheim	2
	8th	Clear	3	3		13.4		Stirling	3
	19th	10/10ths. cloud	3	-	1			Stirling	3
	Aug. 7th		6*	-				Blenheim	2
	27th	N/A	9	-				Blenheim	2
	31st	Cloud and haze	12	6		2.7		Blenheim	2
ø 10 attached functions and aerodromes with 4.0 tons									
* 5 attached Canal barges with 2.1 tons									

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Lille Steel Engineering Works	1941 June 27th	Clear	24	21		10.3		Blenheim	2
Railway Workshops	July 5th	Clear	3	3	-	13.4		Stirling	3
	6th	Clear	6	6		23.2		Stirling	3
	11th	N/A	3*					Stirling	3
	19th	10/10ths. cloud	3	-	1			Stirling	3
	Aug. 10th	8/10ths. cloud	9	9	-	4.3		Blenheim	2
					1 in Sea				
	Sept. 21st	Clear	6	6		5.1		Hampden	5
	Nov. 8th	Haze	11	-	-			Blenheim	2
* 3 attached Hazebrouk with 14.7 tons ø 6 attached Gosnay Chemical Works with 3 tons									
S.E. of Marquise	1941 Aug. 14th		5	-	-			Blenheim	2
(Shell factory)	16th	Cloudy	6	6		3.1		Blenheim	2
	18th	Clear	6	4	-	1.8		Blenheim	2
	Sept. 17th	Variable cloud	6	-				Hampden	5
Mazingarbe (Works and Power Station and Oil Plant)	1941 July 8th	Clear	3	3	1	13.4		Stirling	3
	9th	Haze up to 6,000 ft.	3*	-				Stirling	3
	21st	N/A	3	-				Stirling	3
	23rd	Clear	6	3	-	1.3		Blenheim	2
	Sept. 1st	N/A	12	-				Blenheim	2
	4th	Clear	12	12	1	4.9	.5	Blenheim	2
	17th	Cloud	24	22	1	9.8	.8	Blenheim	2
	22nd	N/A	6	-				Hampden	5
	27th		12 ø	-				Blenheim	2
	Oct. 13th	Clear	18	18	-	8.1	.8	Blenheim	2
* 3 attached in aerodrome with 13.4 tons ø 11 attached railway junction with 4.9, 2.5									
Meaulte (Aircraft Factory)	1941 July 7th	Clear	4	4		17.6	1.7	Stirling	3
Morlaix Ploujean Aerodrome	1941 Oct. 23rd	10/10ths.	6	-				Blenheim	2
	Nov. 1st	10/10ths. cloud	12 *	-				Blenheim	2
	25th	Cloud	6	6				Blenheim	2
* 12 attached Lannion aerodrome with 12.6									
Ostend (Power Station)	1941 Oct. 3rd	Clear	6	6		2.7	.2	Blenheim	2

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Pont-a-Vendin (Power Station)	1941 June 30th	Clear	18	11	-	5.7		Blenheim	2
Rouen-Grand Quevilly (Power Station)	1941 Sept. 18th	Clear	11	11	-	4.8	.5	Blenheim	2
	20th	Clear	12	6		2.7	.1	Blenheim	2
St. Omer (Aerodrome)	1941 June 14th	Gaps in clouds	12	9	1	4.3		Blenheim	2
	21st	Clear	6	5	1	2.6		Blenheim	2
	25th	Clear	12	12	1	6.2		Blenheim	2
	Aug. 7th	Clear	6	6		3.1		Blenheim	2
	12th	Cloudy	6	-				Hampden	5
	16th	Clear	6	6		3.1		Blenheim	2
	26th	Clear	6	6	-	2.6		Blenheim	2
	27th	N/A	4	-				Blenheim	2
	31st	Thick haze	6*	-				Blenheim	2
		* 6 attached railway siding with 3.1 tons							
Yainville (Power Station)	1941 July 27th	N/A	6	-				Blenheim	2
	28th	N/A	6	-				Blenheim	2

TYPE OF TARGET

DAYLIGHT ATTACKS ON OCCUPIED PORTS

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Brest (Scharnhorst Gneisenau Prinz Eugen)	1941 June 12th	N/A	2	-	-	-	-	Blenheim	2
	14th	N/A	3	-	-	-	-	Blenheim	2
	15th	N/A	3	-	-	-	-	Blenheim	2
	July 24th	Clear	100	87	11	110.9	-	Fortress Hampden Wellington	2 5 1, 3, 4
	Aug. 6th	Clear	2	2	-	3.9	-	Fortress	2
	16th	Variable cloud	2	2	-	3.9	-	Fortress	2
	Dec. 12th	No cloud cover	6	-	-	-	-	Hampden	5
	13th	No cloud cover	6	-	-	-	-	Hampden	5
	18th	Visibility excellent	47	40	5	91.0	-	Stirling Halifax Manchester	3 4 5
	24th		4	1	-	0.8	-	Hampden	5
	30th	Good visibility	16	14	3	57.8	-	Halifax	4
La Pallice (Scharnhorst)	1941 July 23rd	Haze	6	4	1	9.9		Stirling	3
	24th	Clear	15	8	5	25.2		Halifax	4
Oslo (Admiral Scheer)	1941 Sept. 6th		4	3	-	5.9		Fortress	2
	8th		4	-	2			Fortress	2
Le Havre	1941 June 19th	Thick haze and cloud	36	9	-	4.0		Blenheim	2
	July 10th	(Low level) Clear	12	12	-	5.4	.4	Blenheim	2
	14th	Clear	6	3	2	1.3	.1	Blenheim	2
	Aug. 17th	10/10ths. cloud	6	-				Blenheim	2
	Oct. 15th	Clear	12	11	2	5.7		Blenheim	2
Ostend	1942 Feb. 28th	Clear	6	6	-	2.7	.3	Blenheim	2
Rotterdam	1941 July 16th	(Low level) Clear	37	37	4	12.3	.2	Blenheim	2
	Aug. 28th	(Low level) Clear	35	10	7 and 1 crashed	3.7	.2	Blenheim	2
Ymuiden (Iron and Steel Works)	1941 Aug. 21st	Clear (low level)	12	12		5.4	.2	Blenheim	2

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Boulogne Harbcur	1941 June 4th	Visibility bad	12	6		2.2	-	Blenheim	2
	Aug. 14th	Clear	11	11	-	5.4	.5	Blenheim	2
	Oct. 12th	Clear. Smoke	24	23		11.5		Blenheim	2
Cherbourg	1941 June 15th	No cloud cover	3	-	-			Blenheim	2
	July 10th	Clear (low level)	12	10		4.5	.4	Blenheim	2
	14th	Clear	6	6	-	1.8		Blenheim	2
	24th	Clear	36	34	-	16.3		Blenheim	2
	(diversion)								
	Sept. 4th	Clear	6	6	-	2.4		Blenheim	2
	20th	Clear	6	6	-	2.9		Blenheim	2

APPENDIX "L" 13

TYPE OF TARGET

GERMAN NAVAL UNITS AT SEA

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
"Lutzow"	1941 June 13th	N/A (Aircraft recalled)	4	-	-	-	-	Stirling	3
Scharnhorst Gneisenau Prinz Eugen	1942 Feb. 12th	8 10/10ths. with haze down to 700 feet at times	242	37	15	50.7		Wellington Boston Blenheim Stirling Halifax Hampden Manchester	1, 3, 4 2 2 3 4 5 5

APPENDIX "L" 14

TYPE OF TARGET

DAYLIGHT ATTACKS ON SHIPPING IN GERMAN PORTS

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H. E.	Incy.		
Bremerhaven	1941 June 2nd	N/A	6	-	-			Blenheim	2
	11th	N/A	3	-	-			Blenheim	2
	15th	N/A. No cloud cover	3	-	-			Blenheim	2
	28th	No cloud cover	6	-	1			Stirling	3
	July 1st	N/A	3	-	-			Blenheim	2
	30th	N/A	6	-	-			Blenheim	2
	Aug. 24th	N/A	6	-	-			Blenheim	2
	1941 July 1st	No cloud cover	7	-	-			Blenheim	2
	1941 July 2nd	Moderate visibility in Canal	9	9	-	4.0	.3	Blenheim	2
Kiel	1941 July 1st	No cloud cover	7	-	-			Blenheim	2
Kiel Canal	1941 July 2nd	Moderate visibility in Canal	9	9	-	4.0	.3	Blenheim	2

SECRET

APPENDIX "L" 15

TYPE OF TARGET

DAYLIGHT ATTACKS ON GERMANY

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Aachen	1941 July 18th	No cloud cover	1	-	-			Stirling	3
Aurich	1941 Dec. 10th	N/A	1	-				Hampden	5
	11th	N/A	1	*				Hampden	5
				ø attacked Wittmund with 1.1 tons					
				* attacked Emo-en docks with .9 tons					
Borkum	1941 July 1st	Clear	3	2	-	7.1	-	Stirling	3
	Dec. 11th		1	*				Hampden	5
				* attacked a town on Frisian Islands with .9 tons					
Bremen	1941 June 28th	N/A	18	-	-			Blenheim	2
	30th	Thick fog	21	1		.4		Blenheim	2
	July 4th	(low level - visibility fair)	15	8	4	3.5		Blenheim	2
	Aug. 2nd	No cloud cover	1	*				Fortress	2
	31st.	Cloud	1	1		2.0		Fortress	2
	Sept. 2nd		1	1				Fortress	2
				+ attacked Borkum with 2 tons H.E.					
Cologne	1941 Aug. 12th	N/A Low level	56	52	12	24.6	2.1	Blenheim	2
								Fortress	2
								Hampden	5
	Sept. 15th		1	-				Fortress	2
	16th		1	-				Fortress	2
Cuxhaven	1941 July 1st	No cloud cover	3	-	1			Stirling	3
	Dec. 12th		1	-				Hampden	5
Duisburg	1941 Sept. 2nd		1	-				Fortress	2
Dussel-dorf	1941 Aug. 16th	N/A	2	-				Fortress	2
	19th	N/A	2	-				Fortress	2
	21st	N/A	3	-				Fortress	2
	29th	N/A	1	-				Fortress	2

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Emmerick	1941 Dec. 12th	Clear	1	1		.9		Hampden	5
Enden	1941 June 10th	No cloud cover	2	-				Stirling	3
	Aug. 12th	10/10ths. cloud	1	1	-	2.0		Fortress	2
	Sept. 4th	N/A	1	-	-			Fortress	2
	20th	Clear	1	1	-	2.0		Fortress	2
	25th		1	-				Fortress	2
	Dec. 10th	N/A	1	-	-	-	-	Hampden	5
	11th	N/A	1	-	-	-	-	Hampden	5
Gelsenkirchen	1941 Dec. 12th	N/A	1	1	1	.9		Hampden	5
Hannover	1941 Sept. 4th	N/A	1	-				Fortress	2
Hamburg	1941 July 26th	Bad thunderstorms and icing	2	-				Fortress	2
	Aug. 31st	N/A	1	-				Fortress	2
	Sept. 2nd	N/A	1	-				Fortress	2
	4th	N/A	1	-				Fortress	2
Krefeld (Sidings)	1941 July 10th	N/A	1	-	-	-	-	Stirling	3
Leeuwarden	1941 Dec. 11th		1	1		0.9		Hampden	5
Leyden Aerodrome	1941 June 4th		9	-	-			Blenheim	2
Munster to Wesel Rail Sidings	1941 July 18th		1	-	-			Stirling	3
Munchen Gladbach	1941 July 18th		1	-				Stirling	3
Norderney	1941 July 4th		5	4	1			Blenheim	2
	Dec. 11th		1	-	-			Hampden	5
Nordenham	1941 Dec. 12th	N/A	1	-				Hampden	5

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Oldenburg (Power Station)	1941 July 1st		5	3	-			Blenheim	2
	Dec. 12th	No cloud cover	1	-				Hampden	5
Rheydt (Sidings)	1941 July 18th	No cloud cover	1	-	-			Stirling	3
Wilhelmshaven	1941 July 8th	Clear	3	2	-	2.9		Fortress	2
	Dec. 10th	N/A	1	-				Hampden	5
Westerland (Aerodrome)	1941 June 30th	N/A	7	-				Blenheim	2
Any town between Weser and Emms	1941 June 11th	No cloud cover	22	-	1			Blenheim	3
	July 30th		6	-	-			Blenheim	2
Towns between Weser and Kiel Canal	1941 July 30th		12	-	4			Blenheim	2
Towns in area between Elbe and Emms.	1941 June 2nd		21	2	2			Blenheim	2
Osnabruck Bremen Area	1941 Nov. 24th	No cloud cover	2	-				Stirling	3
Ruhr Area	1941 Ncy. 5th		3	-				Stirling	3
	24th	No cloud cover	2	-				Stirling	3
	25th	No cloud cover	3	-				Stirling	3
Roving Commissions	1941 Dec. 9th	Lack of cloud cover	4	-	-			Stirling	3
	21st	Lack of cloud cover	12	-	1			Hampden	5
	24th	Lack of cloud cover	6	-	-			Hampden	5
	1942 Jan. 2nd	Insufficient cloud cover	12	1*	-			Hampden	5
* attacked Leelvarden aerodrome									
Heligoland	1941 Aug. 26th		6	-	4			Blenheim	2

APPENDIX "L" 16

TYPE OF TARGET

ATTACKS ON SHIPPING AT SEA

Date of Attack	Actual Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
		Desp.	Claimed Attack	Missing	H.E.	Incy.		
1941								
June								
2nd	M/V off Norway	8	1	-	.4		Blenheim	2
4th	M/Vs. off Norway	6	2	-	.9		Blenheim	2
5th	Naval vessel off Gedbrugh; Ship off Norway	9	2	-	.9		Blenheim	2
6th		3	-	-			Blenheim	2
7th	Off Norway, Frisians and Holland	22	7	3	2.4		Blenheim	2
9th	Off Frisians, Holland and Belgium	18	8	4	4.6		Stirling	3
							Blenheim	2
							Wellington	3
10th	Off Norway	8	2	-	.9		Blenheim	2
12th	Off Norway and in English Channel	11	3	-	1.3		Blenheim	2
14th		15	-	-			Blenheim	2
15th	Off Holland and Frisians	14	6	2	2.6		Blenheim	2
16th	Off Holland and Frisians	25	11	3	4.8	.3	Blenheim	2
20th	English Channel and Frisians	11	4	-	1.8		Blenheim	2
21st	Off Holland	11	1	-	.4		Blenheim	2
22nd		5	-	-			Blenheim	2
23rd		10	-	-			Blenheim	2
25th		10	-	-			Blenheim	2
July								
5th	Off Frisians	14	3	-	1.3	.1	Blenheim	2
6th	Frisians, off Holland and Bay of Biscay	21	12	2	4.0		Blenheim	2
7th	Frisians and off Holland	20	17	3	5.2	.3	Blenheim	2
8th	Off Denmark	5	3	-	1.2		Blenheim	2
9th		15	-	-			Blenheim	2
12th	Off Frisians and Holland	38	7	1	3.0		Blenheim	2
14th	Off Holland	11	10	-	4.8		Blenheim	2
16th		4	-	-			Blenheim	2
18th		3	-	3			Blenheim	2
19th	Off Frisians, Holland and Belgium	22	20	1	8.7		Blenheim	2
20th	Straits of Dover	12	12	2	2.7		Blenheim	2
21st	Straits of Dover	7	4	-	1.3		Blenheim	2
22nd		6	-	-			Blenheim	2
23rd	Off Holland	11	4	6	.4		Blenheim	2
30th		7	-	-			Blenheim	2
31st	Off Le Touquet	4	-	-			Blenheim	2
Aug.								
1st	Off Belgium	3	2	2	.9		Blenheim	2
2nd	Off Frisians, Holland and France	24	6	1	2.5		Blenheim	2
4th	Off Frisians	12	3	-	1.1		Blenheim	2
5th	Off Holland and Frisians	20	11	-	5.2	.3	Blenheim	2
6th	Off Holland and Frisians	17	3	-	1.1	.1	Blenheim	2
10th	Straits of Dover	6	3	2	.4		Blenheim	2
14th	Off Holland and Frisians	15	4	-	2.8	.3	Blenheim	2
16th		17	-	-			Blenheim	2
17th	Off Frisians and Straits of Dover	14	6	-	2.0	.1	Blenheim	2
18th	Off Holland	24	13	-	6.2	.5	Blenheim	2
19th	Off Holland	6	-	3			Blenheim	2
20th	Off Frisians	12	10	-	4.4	.2	Blenheim	2
22nd		18	-	-			Blenheim	2
25th		6	-	-			Blenheim	2
26th	Off Frisians, Heligoland and Holland	28	14	3	8.6	.4	Blenheim	2
30th		6	3	-			Blenheim	2

Date of Attack	Actual Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
		Desp.	Claimed Attack	Missing	H.E.	Incy.		
1941								
Sept.								
2nd	Off Belgium	6	3	1			Blenheim	2
7th	Off Holland	12	4	2	1.1	.1	Blenheim	2
8th	Off Cherbourg	10	10	-	4.0		Blenheim	2
10th	Off Frisians	6	2	-	.9	.1	Blenheim	2
11th	Off Norway, Holland and France	23	3	-	1.3		Blenheim	2
12th	Off Holland	11	5	-	1.8	.1	Blenheim	2
14th	Off Holland	12	4	-	1.8	.1	Blenheim	2
15th	Off Frisians	8	6	-	2.7	.1	Blenheim	2
16th	Off Frisians and Holland	18	4	1	1.8		Blenheim	2
17th		3	-	-			Blenheim	2
18th	Off Frisians, Holland and Belgium	9	9	2	3.0	.2	Blenheim	2
20th	Off Holland	24	15	3	4.9	.5	Blenheim	2
28th		3	-	-			Blenheim	2
Oct.								
11th		11	-	-			Blenheim	2
12th	Off Holland	12	12	2	4.0		Blenheim	2
15th	Off Frisians	12	3	5	1.3		Blenheim	2
17th		12	-	-			Blenheim	2
20th	Off Holland	8	1	-	.4		Blenheim	2
21st	Off Holland and Frisians	17	4	3	3.6		Blenheim	2
22nd		3	-	-			Blenheim	2
24th		18	-	-			Blenheim	2
25th		4	-	-			Blenheim	2
26th	Off Holland	8	4	1			Blenheim	2
27th	Off Holland	6	3	2	.4		Blenheim	2
31st	Off Denmark	9	1	-	.4		Blenheim	2
Nov.								
1st		4	-	-			Blenheim	2
2nd		4	-	-			Blenheim	2
Dec.								
27th	Off Norway	6	6	4	2.2		Blenheim	2
1942								
Feb.								
16th	Off Holland	8	-	-			Boston	2
17th	Off Holland	8	-	-			Boston	2
26th	Off Holland	4	2	-			Boston	2

APPENDIX "L" 17

TYPE OF TARGET

DAYLIGHT OPERATIONS OVER NORWAY

Actual Target	Date of Attack	Weather over Target	No. of Aircraft			Bomb Tonnage		Type of a/c	Group No.
			Desp.	Claimed Attack	Missing	H.E.	Incy.		
Vaasgo and neighbouring targets	1941 Dec. 27th	Clear	23	22	3	7.6	.5	Hampden Blenheim	5 2
Haugesund Seaplane Base	1941 Sept. 15th		6*	-				Blenheim	2
* (2 hit M/V with .7 and .1 tons and 4 hit factory with 1.6 and 1 ton									
Floro (Fish Oil Factory)	1941 Sept. 20th	Clear	3	2		.9	.1	Blenheim	2