

Article

'Bumps along "The Berlin Road"'.¹ Bomber Command's forgotten Battle of Hanover, September- October 1943

By Dr Richard Worrall

Biography: Dr. Richard John Worrall studied history at the LSE and received his Masters' in History from King's College London. He undertook his DPhil at the University of Oxford, which was received in 2008. He has taught at the LSE, and currently works at Manchester Metropolitan University. He has recently published a book on the Battle of Berlin and articles on Bomber Command and the Magdeburg operation of early-1944.

Abstract: The many accounts on RAF Bomber Command follow the usual chronology of the 'Main Offensive' against Germany throughout 1943/4, with a linear progression from the Battle of the Ruhr, to the Battle of Hamburg, to the Battle of Berlin. Yet adopting this approach is problematic. The Battle of Berlin was halted by Harris in mid-September only to be recommenced in mid-November, but it therefore begs the simple question: what was Bomber Command doing during the interim ten weeks? Harris' force *was* far from inactive during this time, in which the centrepiece was the 'Battle of Hanover' that comprised four heavy-attacks in twenty-six days. This article identifies what happened during this period of the 'Main Offensive', to suggest why this 'bomber battle' has remained forgotten, highlighting how Bomber Command's experiences over Hanover revealed its limitations at this critical stage of the bombing war.

Disclaimer: The views expressed are those of the authors concerned, not necessarily the MOD.

Apart from the important contribution of its engineering and rubber works to the enemy's war effort, Hannover has another, and unique, responsibility to bear. It was Hannover that gave Hitler, the Austrian, his German citizenship. Thinking to acquire merit in the eyes of a possibly powerful politician, the University of Hannover presented Hitler, *honoris causa*, with a minor professorship which automatically carried with it the German citizenship that Hitler coveted. What he was supposed to profess does not particularly matter. Whatever it was, the University and people of Hannover have certainly learnt their lesson.²

Hannover, Assessment No. 17 by Air Staff Intelligence, HQ Bomber Command, undated

Dirty little target, plenty of fighters up. Thirty-eight lost.³

Trevor Dill, diary entry for 27/28 September 1943

Introduction

In 1947, the former Commander-in-Chief of Bomber Command, Air Chief Marshal Sir Arthur Harris, published his version of the bombing campaign in a book simply named *Bomber Offensive*. Written for wider public consumption, the account presented, according to one historian, was 'straightforward if not overly reflective' that unsurprisingly defended area bombing and its effectiveness.⁴ Yet this volume has been much-quoted, and has shaped the work of successive historians on Bomber Command during the Second World War, especially in the chronology of its 'Main Offensive' against Germany in 1943/4. The other key text, influential for shaping the future historiography, was the British Official History, namely *The Strategic Air Offensive against Germany 1939-1945* (SAOG) by Charles Webster and Noble Frankland, which concluded 'the great air offensive unfolded around three major battles', starting with the Ruhr, although they did concede that 'a path of destruction, initiated by the Battle of Hamburg, was then driven into the centre and south of Germany in preparation for the climax of the campaign', namely the Battle of Berlin.⁵ In so doing, most titles have missed the 'forgotten' bomber battle of 1943, namely the one against Hanover in September and October. This occurred in the weeks between the last attack in the opening of the Battle of Berlin on 3/4 September, and its resumption on 18/19 November. Many authors have glossed over this period altogether or presented it, like Harris did, as a time marked by a number of specific (and note successful) attacks, such as the 'firestorm' raid on Kassel on 22/23 October. But this has meant the history of the British contribution to the combined bomber offensive during autumn 1943 remains incomplete, with the period before the resumption of the Battle of Berlin being largely overlooked.

Examination of documentary evidence does reveal some hints that another 'battle' took place during the autumn of 1943. In November 1943, Lord Trenchard issued a pamphlet on air power and wrote that 'this war has admittedly shown the tremendous power of the bomber . . . Surely the writing is plain for all to read, after Hamburg, [and] Hanover . . . [after taking] into

consideration the magnitude of *these great bombing battles* [author's emphasis] and the effect they are having in shortening the war'.⁶ Furthermore, in April 1947, the former Director of Bomber Operations (DBOps), Air Commodore Sydney Bufton, gave a lecture to the RAF Staff College, and spoke of an addition to the bomber battles of 1943/4, namely 'the campaign against the Central German cities'.⁷ This saw several operations against Kassel and Leipzig, but the record shows the major effort was against Hanover, which fulfilled all the criteria of being a 'bomber battle'. As defined by Martin Middlebrook, this saw Bomber Command being:

... sent again and again to the same target in the hope of destroying it completely. Alternative targets had to be raided sometimes both to keep the German's defences guessing and because of weather factors, but the Germans realized what was happening and concentrated their defences at the main target. This resulted in such fierce opposition for the bombers that the conflicts were later classed as 'Battles'.⁸

Given this meaning, which is both an accurate and succinct summary, it is clear that there was indeed a 'Battle of Hanover', which moreover became the centrepiece of the British bombing offensive during autumn 1943. It represented a concentrated effort that comprised four heavy attacks on this city in just over three weeks, and saw a ferocious fight with the German air defences causing high-losses to Bomber Command (see *Chart 11*). As a result, Middlebrook stated that 'there soon took place a little-remembered 'battle' involving another large German city, Hannover'.⁹

Yet the Battle of Berlin has continued to dominate assessments of this period of the British bombing offensive. Designed to bring about Germany's capitulation, it ended up being a bitter campaign that was increasingly in danger of breaking Bomber Command itself. In his *Despatch on War Operations*, Harris opined that his Command's subsequent difficulty over the German capital was because:

... it entailed many more hours flying over heavily-defended regions, whatever the direction of approach – flying four hours at the very minimum. It was the target which above all the Luftwaffe was bound to defend, and no chances would be taken with it.¹⁰

Sustaining higher losses for arguably less-and-less gain, Harris would come under greater scrutiny and censure from the Air Ministry during winter 1943/4. But what if the outcome, as Harris had depicted, had a precedent? More pointedly, had the Battle of Hanover revealed Bomber Command's limitations, which were ignored at the time but meant the subsequent failure over Berlin had in fact a tragic inevitability? This article will consider these issues.

On 16 June 1943, Harris outlined his thinking about Bomber Command's operations during the rest of 1943. Famously, he stated that:

As the nights lengthen . . . we will then go progressively further into Germany in I hope sufficient strength to be able to leave behind us, as we progress, a state of devastation similar to that now obtaining in the Ruhr; if the Boche waits for it.¹¹

Containing no direct reference to Hanover, the intended objectives were 'the complete destruction of Hamburg' and 'a really hearty hammering of Berlin', with raids on Nuremberg and Munich because of their symbolism for the Nazi movement.¹² By summer 1943 this plan seemed on the brink of fulfilment. Hamburg had been damaged severely by fire and, pressed by Churchill, Harris turned to Berlin. Justifiably optimistic, on 12 August Harris told the Chief of the Air Staff (CAS) Sir Charles Portal that 'it is my firm belief we are on the verge of a final showdown in the bombing war and that the next few months will be vital'.¹³ The latter part of this statement was undoubtedly true, though not in the way Harris intended. Opening the campaign against Berlin eleven-days later, Harris halted it after just three attacks because his force was not yet capable of bombing this target with sufficient concentration or without incurring unmanageable losses. Moving 'further into Germany' had proven easier said than done.

Notwithstanding this setback, it remained essential for HQ Bomber Command to find another city in order to maintain the area bombing offensive, especially as the Air Staff were increasingly pressing for operations against specific industrial targets, namely Schweinfurt's ball-bearing plants and Leipzig and Brunswick's aircraft factories. To forestall having to do this, Harris cast around for an 'easier' and larger city to destroy, and settled on Hanover. Just as the area bombing of Hamburg had severely damaged both the urban area and shipbuilding industries so the same method was to be used in a bid to destroy Hanover's city centre along with the rubber and heavy-engineering factories.

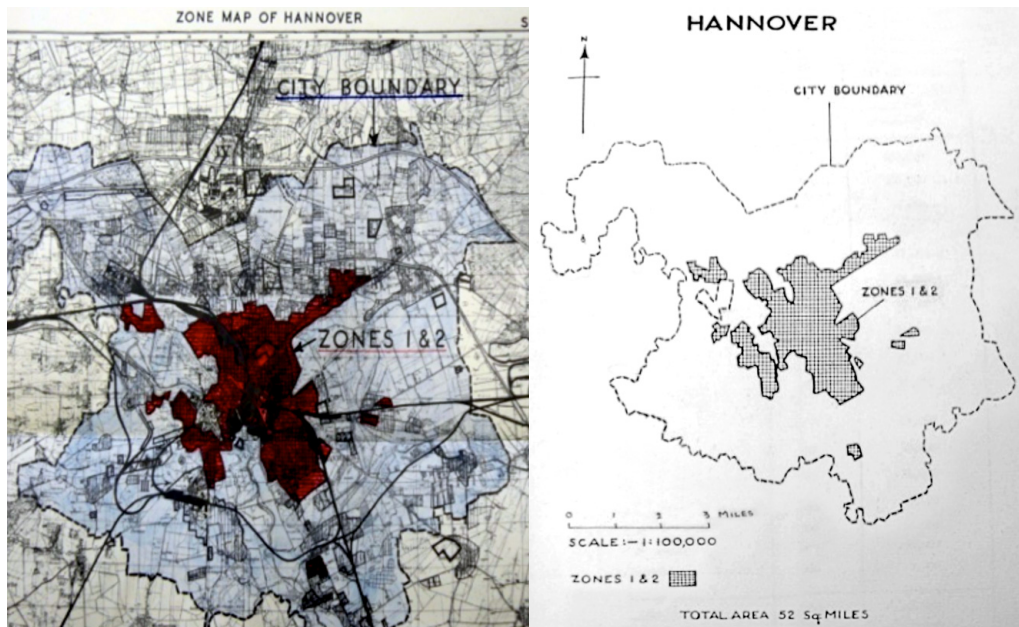
Bombing Hanover had first been considered under Operation *Abigail-Rachel* – a plan for a large-scale incendiary raid on a German city in response to the Luftwaffe's attack on Coventry in November 1940. Yet, at this time, the use of incendiaries on Hanover attracted 'a good deal of criticism' because the War Cabinet perceived the city as 'the centre of the old German aristocracy', 'strongly anti-Nazi', and having long-standing '[Royal and military] associations with this country'. Attacking this city, they feared, 'might well lead to reprisals against, say, Oxford or Winchester', and therefore for 'political reasons' it was decided on 12 December to not bomb this target.¹⁴ Yet the Luftwaffe's incendiary attack against the City of London seventeen days later saw Air Chief Marshal Sir Richard Peirse, then Commander-in-Chief Bomber Command, tell Portal that 'I hardly think the [War] Cabinet need longer feel soft-hearted towards Hanover'.¹⁵ They agreed, and on 10 January 1941 Peirse was informed of 'the inclusion of Hanover as a suitable objection for a concentration attack when a favourable opportunity occurs'.¹⁶

The day before the Ministry of Economic Warfare (MEW) had examined Hanover, and described it as 'the economic and communications centre of North Western Germany', with a population of 450,000 and many industries, which offered 'good prospect[s] of obtaining the

greatest moral and material effect' particularly as the city centre's old buildings meant 'the fire risk was great'.¹⁷ Indeed, throughout 1941 Hanover's vulnerability to area and incendiary attack underwent a considerable amount of investigation. By December, the Air Ministry's Directorate of Bomber Operations, in a report titled 'Notes on Compact Built-Up Areas that are Especially Vulnerable to Bombing', described Hanover as 'compact' comprising:

- (1) Central City Area (old town well preserved); (2) 3 Industrial Areas, 2 in the city and 1 on its SW outskirts; (3) About 2/3 of the area consists of congested 3-5 storey tenements with over 100 persons to the acre.¹⁸ (see *Maps I & II*)

Consequently, Hanover's inner area was perceived as being 'much more vulnerable' than that at Lübeck – which had itself suffered a devastating fire attack in March 1942 – and the Directorate of Bomber Operations therefore felt 'a case has been made' for undertaking an incendiary attack on Hanover.¹⁹ Moreover, Hanover's industries were an important part of Germany's war economy. Located roughly between the Ruhr and Berlin, and connected by major rail-lines and waterways, Hanover contained numerous factories. Two major sites, the *Continental Gummiwerke* and *Hanomag*, had been identified by HQ Bomber Command's intelligence staff as located 'in and around the main town [and] ... sufficiently close to be embraced in a general [area] attack ... [that] would react on the industrial output of the whole area'.²⁰ Beyond these, Nazi rearmament policy in the 1930s had led to the establishment of major armament plants in the city's northern districts to assist with the dispersal of war production from the already overcrowded Ruhr.²¹



Maps I & II: Zones 1 and 2 and city boundaries of Hanover.²²

Hanover's industrial significance lay in four areas: oil, textiles, heavy-armaments, and rubber/Buna (synthetic rubber) production. At Misburg, on the eastern outskirts, lay the *Gewerkschaft Deutsche Erdöl Raffinerie (Deurag)* oil refinery, a priority target that produced 240,000 tons of petroleum products every year, including 15,000 tons of aviation fuel. With regards to the textile industry, Hanover had one of the largest wool combers in Germany, a factory at Döhren, employing 2,500 workers. By autumn 1943, HQ Bomber Command's intelligence staff had noted that the German authorities were worried by a textile shortage because of the 'wholesale destruction' of Mönchengladbach's cloth factories on 30/31 August.²³

But Hanover's most important industrial activities in German war production were its heavy-engineering plants and rubber factories. In the former category, the most famous concern was *Hannoversche Maschinenbau A.G. (Hanomag)* – a Class 1+ target – comprising two large factories, one in the city centre (Linden) and another in Brink, north of the Mittelland Canal. Originally, both sites made locomotives but were switched to producing heavy military equipment, such as tanks, military transport, artillery tractors, gun carriages, and aircraft components. Later, the British believed *Hanomag* was producing components for Germany's V-weapons.²⁴ Beyond heavy-engineering, the city was also synonymous with the centre of Germany's rubber industry. *Continental Gummiwerke A.G.* owned a number of factories in Hanover, which, according to MEW's assessments in mid-1943, manufactured about 80% of the aircraft tyres made in Germany.²⁵ In addition, at Nordhafen, the *Continental* company had established a plant that produced synthetic-rubber (*Buna*).²⁶ On 13 April 1943, the importance of Hanover's rubber industry was brought to Harris' attention by none other than Viscount Trenchard. Yet the C-in-C Bomber Command was less keen, telling the RAF's 'founding father' that attacks on 'panaceas', such as rubber, should be rejected. In a precursor to later arguments with the Air Ministry over ball-bearings, Harris opined that 'specialising on one . . . [means] nothing else in Germany including morale, and housing, is likely to suffer. If the 'Panacea' fails all is lost.'²⁷ Harris' message was clear: Hanover as a city and its civilian population, not as a centre of specific industrial activity, mattered most at HQ Bomber Command.

Yet, by this time, those responsible for shaping the combined bombing offensive (CBO) did recognise Hanover for its particular industrial importance. On 14 May 1943, the Combined Chiefs of Staff (CCOS) decided to modify the mission and objectives of both the RAF's and United States Army Air Force's (USAAF's) strategic air forces. This showed the CCOS were in agreement with American Operational Analysts that paralysis of the German war-machine would be achieved by destroying certain target-systems, namely submarine construction yards, the aircraft industry, ball-bearings, oil production, synthetic-rubber and tyres, and military vehicles, all of which became enshrined in the unofficially titled 'Eaker Plan'. In describing the fifth category, the US analysts had noted that rubber products 'are vital to all phases of German Military strength on land and in the air . . . [and its] destruction will have a crippling effect'.²⁸ For the CCOS, American target-analysts and the British Air Staff the destruction of Hanover's rubber industry therefore fully conformed with the 'intermediate objective' of the *Pointblank* Directive of 10 June 1943, namely the destruction of German aircraft production and its

associated industries. The US Eighth Air Force was quick to begin, sending sizeable forces to bomb the rubber plants at Hülse (near Krefeld) on 22 June and targeting Hanover on 17 and 26 July. The combined attacks led to the MEW diary to assess Germany's rubber supply as being 'highly vulnerable'.²⁹ But over the next few months, Harris instead continued to attack the Ruhr, burned down Hamburg and bombed Italy out of the war. By autumn pressure from the Air Staff to attack aircraft production and ball-bearings had intensified, but in Harris' view these specific targets were best left to the Americans. Consequently, Hanover rose up his bombing priorities because it meant destroying a relevant target through area attack. In so doing, this city conformed to the Air Ministry's latest instructions, for on 3 September, Bottomley issued to Harris a reminder about fulfilling his *Pointblank* obligations. This stated that alongside the broader goal of 'the progressive destruction and dislocation of the German military, industrial and economic system' was the need to reduce German air strength as 'a prerequisite' to *Overlord*;³⁰ handily, Hanover seemed to fulfil both objectives, a sort of 'happy medium' between *Pointblank* targets and Harris' objectives of Germany's major industrial cities. Though seemingly just a basic reiteration of the overall aim, Bottomley's letter was representative of Air Staff concern about the direction and costs of the CBO; that after three raids in ten days, Berlin had seemingly become the major (and costly) focus of Bomber Command, whilst the Americans had endured heavy-losses over Schweinfurt in August and had continued to sustain significant casualties through September. Indeed, on 6 September, Coryton told Bottomley about having spoken to the Deputy-C-in-C Bomber Command, Air Vice-Marshal Robert Saundby, who had told him that 'Schweinfurt was still well up on their list of priority of targets but that Berlin had the full focus of the limelight at the present'³¹ – though Harris would pull back from the German capital within days. For these reasons, the Air Staff increasingly pressed HQ Bomber Command to make a direct contribution to *Pointblank* by attacking German Air Force (GAF) targets. Moreover, the Air Staff had examined the CBO's progress up to 31 August and drawn some negative conclusions. Bufton wrote 'no priority target, e.g. towns associated with fighter production, has been attacked', yet 'now that operations involving deeper penetration are being carried out there would seem to be every reason for adhering to the plan' by attacking cities connected to German aircraft production.³² Given this context, in Harris' mind Hanover seemed to fit the bill perfectly. It had a large urban area, an old city centre (*Altstadt*), relevant GAF targets, and other war industries – in other words a perfect target for the 'catch-all' technique of area bombing.

Moreover, it did so because MEW's experts at that precise moment had been analysing the entire Axis tyre industry. The focus was not just on *Continental* in Hanover, but also included the *Dunlop* factory at Montluçon (France), whose output constituted 'about 9%' of the tyre production available to Germany.³³ With the Axis rubber industry being championed by the Air Staff as a primary target-system, it was little surprise Harris soon targeted Hanover following an attack on the French target on 15/16 September. Hanover was a target whereby area bombing coincided with fulfilment of Air Staff wishes for attacks on GAF targets, or so it seemed to HQ Bomber Command at the time. Indeed, to secure Harris' cooperation urgently – the Air Ministry having produced estimates that German air strength stood at 780 single-engined fighters and

740 twin-engined nightfighters – Bottomley on 26 September placed less emphasis on the smaller and more specialist targets of Schweinfurt and Gotha and instead promoted attacks on the larger industrial cities concerned with aircraft production, namely Brunswick, Stuttgart, Kassel, and Hanover.³⁴ Therefore, both the Air Staff and HQ Bomber Command had, in late-summer 1943, seen the need to bomb Hanover but both had taken different paths to arrive at this conclusion.

Harris later described this period of the bombing offensive in which 'towns were now being chosen for attack because they were centres of German aircraft production'.³⁵ He did not refer to Hanover by name, for good reason as highlighted later, but the city would be an example in Harris' defence of area bombing, in which he claimed quite correctly had caused damage to Germany's war industry, including its aircraft production. The Air Staff became increasingly sceptical and, as shown below, a schism between the two sides would open up during the Battle of Hanover's duration.

On 22 September, Harris made the decision to attack *Eel* (Hanover's codename)³⁶ that night, with the aim being 'to cause maximum damage in target area'.³⁷ The Battle of Hanover thus commenced and lasted from 22/23 September to 18/19 October. The opening attack saw a sizeable force of 711 bombers sent,³⁸ and although twenty six aircraft (3.7%) were lost, in itself below the 5% threshold, this attack would prove to be the least expensive of the Hanover operations. Indeed, the subsequent attacks revealed all too clearly the dangers of returning to the same target on a regular basis. The opening attack was conducted in good weather yet most of the bombs missed the town centre and had fallen on the southern suburbs or surrounding countryside, and it was considered by HQ Bomber Command a failure. For Harris, well into the city centre 'groove', this performance was viewed with considerable alarm and, as will be shown, it also caused some soul-searching throughout the Command over what had gone wrong.

In between 23/24 and 26/27 September, Hanover was considered for attack on two occasions. The first time saw Harris, concerned by the poor performance of the Pathfinders and *H2S* the previous night, select Mannheim instead – the scene of an impressive *H2S*-led attack some 2½ weeks before. Three nights later, Hanover or Bochum was earmarked for attack, but both were cancelled late in the afternoon. Air Vice-Marshal George Brookes, AOC-in-C (RCAF) 6 Group, recorded this was because 'the weather turned dud in target area'.³⁹ This suggested HQ Bomber Command at this time maintained little faith in its blind-bombing technique – a method that became both all too familiar and all too predictable during the forthcoming campaign against Berlin. The second raid on Hanover was instead made in clear weather on 27/28 September by 687 aircraft. This attack was even more costly, with 38 aircraft missing (5.6%), and losses were especially high for the non-Lancaster operators, with ten Stirlings, seventeen Halifax Mk.II/V, and one USAAF B17 lost. The bombers missed the aiming-point in the city centre by between one to five miles, but some bombs fell on Hanover's new industrial area north of the Weser-Elbe causing considerable damage to factories, especially *Hanomag's*

modern plant.⁴⁰ Branded another failure, however, it showed all too clearly that HQ Bomber Command's yardstick of success remained damage to a city centre, not its industrial suburbs.⁴¹ Yet few could deny that the bombing accuracy, in terms of where it was *intended* to have fallen, had not been good.

Date:	Possible targets:	Time target confirmed:
22/23 September	Target Area I: Hanover & spoof raid on Oldenburg Area II: Bochum	1450: Target confirmed as Area I
23/24 September	Target Area I: Mannheim & spoof raid on Darmstadt Target Area II: Hanover	1305: Target confirmed as Area I
26/27 September	Target Area I: Hanover Target Area II: Bochum	1700: both operations cancelled
27/28 September	Target Area I: Hanover & spoof raid on Brunswick Target Area II: Kiel & spoof raid on Wismar	1320: Target confirmed as Area I
29/30 September	Target Area I: Baltic Gardening & Hanover Target Area II: Bochum	n/a: weather conditions scrubbed gardeners & Hanover. Lancasters detailed to attack Bochum
8/9 October	Target: Hanover & diversionary raid on Bremen	n/a
18/19 October	Target Area I: Hanover Target Area II: Gelsenkirchen	1620: Target confirmed as Area I

Chart I: Battle of Hanover: attacks and cancelled operations.⁴²

Given the high-losses suffered, few aircrew welcomed a return to this city on 8/9 October. One bomb-aimer on 158 Squadron, Flt Lt G P Dawson, recorded 'none of us were very keen on this trip. Hanover was a costly place to visit'.⁴³ And so it proved again, as 27 aircraft (5.4%) failed to return – 13 being Halifaxes – from the 504 aircraft despatched (which included the venerable Wellington on its last German operation). The bombers had been sent in poor weather, with Brookes describing it as 'much haze and smoke all day. Smoke terrible & increased by sundown. Aerodromes yellow by 2100 [and] . . . weather looked quite dud for us, poor vis., with possibility of fog later, however, the operation stood & away they went'.⁴⁴ In truth, 6 Group should probably not have operated that night, but Harris no doubt wanted to slay the Hanover bogey at the earliest opportunity. Ultimately, it was a gamble that paid off, for the attack caused widespread devastation in central Hanover. One account by a local citizen described this as '*Der schwarze Tag*',⁴⁵ whilst a more official German record implied a 'firestorm' raged throughout the city centre:

0440 hrs. Gauleiter Hannover reports to Bormann and Goebbels: 3/4 Quadrat [sic] kilometre is on fire. The blaze is so fierce that it is in many cases almost impossible to rescue people who have been surrounded by it. Number of homeless tentatively reckoned at 150,000 to 200,000. *Katastrophen*.⁴⁶

As HQ Bomber Command noted, the fires 'spread over an elliptical area 2 miles long by a mile wide' and in total destroyed 'about 54% of the fully built-up area of the town'. Within this lay damage to the main railway station, tracks, engine sheds and rolling-stock, alongside 'exceptionally severe' destruction to the city's industries, particularly to *Continental's* old works at Hainholz (Priority 1+) and *Hanomag's* main site at Linden (Priority 1)⁴⁷ – a reminder of just how damaging area bombing could be to industrial plants and factories. Given this terribly destructive outcome, which followed the two previous unsuccessful attacks, it was little wonder Harris dispatched a personal message to aircrews stating:

The last attack on Hanover was an outstanding success for us and another major catastrophe for Germany. Good show. A few more like this and the Boche will break.⁴⁸

Elsewhere, the War Cabinet had been informed that 'damage on the Hamburg scale was inflicted at Hanover',⁴⁹ an observation that only served to add credibility to Harris' promise to Churchill, namely that Bomber Command would be able to destroy Berlin to win the war.

After a pause due to the phases of the moon, Harris launched the final attack on 18/19 October. The Operations Record Book (ORB) of 83 Squadron recorded this decision 'came as a slight surprise in view of the pounding this town has received, but the devastation is not as complete as that at Hamburg, so our warriors set out to complete the write off'.⁵⁰ An all-Lancaster force of 360 aircraft was dispatched, but it proved a most unsatisfactory encore, with 5% (18 Lancasters) lost; 103 Squadron itself losing three. These losses had come at the hands of an enemy who had been hampered by the weather, but had not been fooled by the Mosquito 'spoof' raid on Berlin. Moreover, thick cloud over Hanover had led to scattered bombing, though once again HQ Bomber Command showed its particular way of defining what constituted success in its attacks, for the Command's Digest stated '[s]everal important factories, including Continental Gummi Werke (rubber and tyres) and Hanomag ... have been hit as well as railway buildings and gas works, but no further extensive housing devastation has been caused'.⁵¹

In sum, while the Battle of Hamburg had comprised four attacks to complete that city's destruction, the Battle of Hanover represented four *attempts* at destroying this city. But in his letter to Churchill on 3 November 1943, Harris chose to say Hanover, listed as being within the geographical target-system of 'The Berlin Road', had been 'Virtually Destroyed'.⁵² Based on HQ Bomber Command's own definition of this term, namely 'devastation to a degree which makes the objective a liability to the total German war effort vastly in excess of any assets remaining',⁵³ it was an over-inflated claim. At best, damage to Hanover's industrial production saw only a

temporary decline, which lasted about two months. Yet making such a case was vital for Harris given that he was ready to embark on the Berlin offensive, knowing that the Air Staff's support of the city bombing programme was wavering. In so doing, the C-in-C Bomber Command succeeded in achieving a short-term victory against the Air Ministry, for on 12 November he received from Churchill the War Cabinet's congratulations on 'the recent successes of Bomber Command, whose deeds in the first week of October mark yet another stage in the offensive against Germany'.⁵⁴ Sensing this amounted to encouragement, if not an actual 'green light', to commence the Battle of Berlin, Harris wrote back immediately:

All ranks of Bomber Command are greatly heartened by the message conveyed by you from the War Cabinet. With *your* [author's emphasis] unfailing encouragement which armed and supported us through our darkest hours . . . [means] every bomb which leaves the racks makes smoother the path [to final victory].⁵⁵

Yet for all the flowery rhetoric and grandiose promises, the issue of whether Bomber Command could do so represents the central focus of this article. For a case can be made that owing to several reasons, Bomber Command's indifferent performance against Hanover meant the prospect of success against Berlin hung in the balance even before the campaign began. Notwithstanding his statement to Churchill in early-November that this could be achieved, only weeks earlier Harris himself had complained to Portal that 'we are having far too many shows of the Hanover and Kassel variety which partially miss the boat'.⁵⁶ This comment was attributable to continued weaknesses of Bomber Command, namely its ability to mark the target and the continual inconsistencies of *H2S* when used as a bombing-aid. Added to this was a third factor, which centred on the growing ineffectiveness of British tactics and technical devices to protect against German nightfighters.

Certainly, Harris had every right to be concerned about 'missing the boat' over Hanover. For two out of the four Hanover attacks revealed the continual difficulties of target-marking, whilst a third showed all the uncertainties of the blind-bombing technique. Worryingly, the 22/23 September raid had occurred in good visibility, with little cloud over the target, and should have allowed the attack's colour-coded procedure – Red (target area colour), Yellow (aiming-point colour) and then Green (bombing colour) to have been successful. But instead the initial target indicators were dropped all over the place. This was due to a 60mph wind at altitude near Hanover that caused the 'blind-markers' to approach the city on the wrong track, and rendered inaccurate their calculations based on a dead-reckoning run from the Steinhuder Meer.⁵⁷ Consequently, the red Target Indicators (TIs) were dropped some 3-4 miles south-east of the aiming-point, with the limitations of *H2S* on this target unable to rectify the error, although the 'visual-markers' nearly saved the situation by releasing their yellows accurately on the aiming-point. But the real problem lay with the 'backers-up' who simply dropped their greens on the greatest concentration of TIs first found, which were the reds, rather than reinforcing the yellows. The ORB of one Pathfinder squadron recorded:

[this] was one of the worst PFF raids ever, and TIs were scattered, most of the bombing being south of the target. The main force did not undershoot, and we know now the attack was a decided failure. The fault lay with PFF who were not meticulous in this timed run.⁵⁸

Indeed the Main Force, aiming at the misplaced greens, dropped its 2,500 tons of bombs some 2-9 miles south-south-east of the aiming-point, missing the city centre and Hanover's main industrial area completely, and falling instead on the southern suburb of Döhren-Wülfel and in open country.⁵⁹

In an attempt to achieve greater bombing accuracy, Bomber Command used the technique of making a timed-run from a recognizable landmark on 27/28 September. But this method did not lead to improved results. 'The reason for the inaccuracy is not known', HQ Bomber Command noted later, 'but errors in the run from the Steinhuder Meer may have caused the selection of the wrong part of the straggling built-up area of Hannover and its suburbs',⁶⁰ which once again *H2S* had frustratingly done little to help correct. Consequently, central Hanover was insufficiently illuminated to enable the visual-markers to identify the aiming-point as the red TIs were dropped some 1½-4 miles north or north-east of the aiming-point. The backers-up, though achieving a good concentration in the placement of their green target-markers, would be drawn north of Hanover, and so was the main bombing.⁶¹ This showed that target-marking, on a sprawling city located inland, was a difficult prospect which *H2S* had done little to assist. One pilot from the Halifax Pathfinder squadron (35 Squadron), the Norwegian J K Christie, who later rose to Major General, described his crew's performance as 'very bad indeed (Dropped Everything)'. Initially believing they 'had done very well', the following morning it was revealed they had dropped their markers 4½ miles from the aiming-point. 'This sort of mistake is just about the worst one can do in PFF, and a very dim view was taken by all concerned',⁶² he lamented. It certainly was, and condemnation came right from the top. 'The attack on Hanover was a complete flop; Harris' message to 8 Group aircrews began, because:

... the great majority of PFF crews must have discarded their own navigational reckoning and the indications of their aids and following blindly, if not lightheartedly, on to misleading markers and incendiaries ... I cannot too strongly impress upon every Pathfinder crew their individual responsibility for making as sure as possible by their own reckoning and aids that they are on target before blindly joining in and thus making confusion worse ... What happened at Hanover is a lesson which you no doubt will take to heart in future.⁶³

Nonetheless, having made what Harris described as 'the worst failure we have had yet'⁶⁴ it was hardly an encouraging sign of the ability to accurately bomb particular areas of Berlin. The Main Force did not escape criticism either, as night photographs had shown the headings of many aircraft to have been 'all over the compass'. This, Harris complained bitterly, was because:

Not the slightest attempt appears to have been made by the majority of crews to approach Hanover on the heading laid down. Many were in fact on the reciprocal. The added collision risk is serious enough but all chances of successful concentration are also nullified by such wholesale disregard of orders by captains. It is obvious that navigation has been largely abandoned by lost crews in favour of a rough system of running a course until they see someone bombing somewhere and joining in regardless of reckonings. Unless AOCs take a firm grip now and put this deplorable state of affairs right we are faced by a prospect of wasted effort, futile casualties and consequent failures, which cannot be.⁶⁵

Such a critical assessment, incisive and to-the-point, about the Main Force's standard of navigation showed considerable improvement had to be made before the Battle of Berlin restarted within weeks.

Concerned by the criticism, Bennett responded to Harris' complaints, thus sparking a series of letters between the two about the PFF. Believing the Hanover failure had made 'it advisable for me to do a "stock-taking" of the state of the Path Finder Force', it developed into a lengthy complaint about the quality of the personnel being acquired by 8 Group. The selection policy of 'nothing but the best' was not being adhered to, Bennett complained, because a third of crews posted to the PFF were rookies, not seasoned veterans. That this was occurring was because some Groups, especially Cochrane's 5 Group, had developed a habit of retaining their best/most experienced crews, an accusation which contained some truth. The AOC 8 Group ended by suggesting a number of remedies: that the original PFF recruitment policy should stand; all second and third tour aircrew should be made available; there should be no direct intake of new crews; and on a technical note the 3-cm version of *H2S* had to be operational urgently.⁶⁶ Harris responded six days later, and dealt with Bennett's points in turn. The tone was cordial enough but the message was clear: the PFF's training and marking performance had to improve. Yet on the complaint about other Groups retaining their best crews, Harris' response was surprisingly glib, telling Bennett to 'not take too seriously the remarks of anyone in Main Force Groups who says that he can find crews which can beat the Pathfinders at their own game. This sort of thing arises from a spirit of rivalry, which, up to a point, is no bad thing'.⁶⁷

But such a view was complacent. Behind-the-scenes, the Directorate of Bomber Operations took more seriously Bennett's complaints about crews being 'not as good as they used to be and that he is unable to train them sufficiently'. 'With the advent of winter', Bufton was informed, 'this will become worse unless a solution be found'.⁶⁸ This no doubt reflected the Directorate's increasing anxiousness for Bomber Command to target specific industries, such as Schweinfurt's ball-bearing factories. Moreover, Bennett and Cochrane were becoming increasingly bitter rivals from this time, which was detrimentally affecting operational performances. One author writes that the 22/23 September attack had seen 8 Group test 5 Group's idea of time-and-distance runs – a technique that had led to poor results. The fact

this method was again tried two days after Harris' letter on 25 September, and had led to 'a worse error' being committed 'on the same town was an impossibly bitter pill for Bennett'.⁶⁹ Yet behind the personal aggravation lay the harsh fact that Bomber Command had not the technical capability to carry out the method Cochrane advocated. For without a Ground Position Indicator (GPI), timed-runs from particular landmarks were extremely difficult to do. All concerned were no doubt relieved when on 8/9 October a better performance by the PFF saw accurate ground-marking, and a better performance by the Main Force saw flight paths correctly maintained, bringing them over the well-placed TI's on time. It was little wonder Harris sent two congratulatory messages to his crews on 10 and 12 October respectively, with the latter stating 'the whole of the centre of Hanover and much else besides has been burnt out. Some of it is still burning. Well done'⁷⁰ (see *Map III*).



Map III: Extensive fire damage to Hanover's city centre on 8/9 October (shaded area)⁷¹

Yet the relief was premature, for the 'Hanover problem' soon came back to haunt the Command. The 18/19 October operation revealed another difficulty with target-marking, namely doing so in thick cloud. On this night, only 50 Lancasters from 360 despatched had bombed within three miles of the aiming-point – a statistic that showed all too clearly the problem encountered. Indeed, the performance was sufficiently bad that there was an inadequacy of night-photographs, which the Bomber Command Raid report noted 'makes it impossible to reconstruct the raid in detail'; moreover no bomb-plot chart could be issued either. The disappointing outcome had occurred because half the 'blind-markers' had dropped *both* yellow TIs and sky-marker flares, which caused mounting confusion among the aircraft following over exactly which to bomb, and the 'visual-markers' could not offer any clarification because of the cloud up to 22,000 ft, thus retaining their red TIs.⁷² In the scathing, if somewhat witty, remark of 83 Squadron's scribe 'there was a popular song called "It's getting to be a habit with me" which might well be adopted as the Squadron's theme song . . . [Y]et another shambles'.⁷³ Consequently the Main Force arrived to find no concentration of red TIs could be seen, and they simply dropped their bombs on any cluster of markers they came across or by the uncertain method of the ETA.⁷⁴ This attack highlighted the question of what precisely the Main Force should do if a concentration of sky-markers could not be seen? It was a scenario that needed addressing quickly, for it was inevitable that it would become the primary method for Berlin operations during the winter. Skymarking allowed some damage to be inflicted on German cities on nights of poor weather, which was itself something of an achievement, but unless the technique saw dramatic improvement to bring about a more concentrated attack it would not deliver the devastation Harris hoped, or required, to completely destroy Berlin's urban areas.⁷⁵

Of course, *H2S* had been perceived to assist with bombing accuracy on these longer-distance operations into Germany. Back in June 1943 Harris had claimed optimistically that 'when we begin to work outwards from the Ruhr again that *H2S* will really come into its own',⁷⁶ but therein lay the problem. Against some targets it performed well, such as over a small city having a river flowing through it (e.g. Mannheim) or on a port where the contrast between the land and sea (e.g. Hamburg) was identifiable. Less successful was its performance over Berlin during August and September, whose sheer size meant it was difficult for *H2S* to identify specific parts of the 'Big City' and the screen simply became 'fogged' by the sheer vastness of the built-up area. 'Until we got the new types of *H2S*', Harris later wrote, 'I considered it better to attack other cities which we had a much greater chance of destroying'.⁷⁷ But Hanover was hardly an easier target for *H2S* because it revealed additional limitations. First, the Raid Report for the 22/23 September operation described Hanover as 'a straggling town', and consequently crews chose the wrong *H2S* image to interpret as the town centre.⁷⁸ All this showed that, in autumn 1943, *H2S* was a temperamental instrument on which to rest the fortunes of the British bombing offensive (see *Appendix*). Indeed, on 29 October, Harris informed Street about his Command's operational experience of *H2S*; the record, the C-in-C described, was mixed, and 'in some instances it has resulted in the main concentration of the attack falling outside the built-up area'.⁷⁹ Second, the attacks on

Hanover, with its heavy air defences and particularly stiff fighter opposition, had exposed another problem of *H2S*, which was a lesson for Berlin, namely 'the difficulties of interpreting *H2S* responses under operational conditions, i.e. during evasive action'. Quite simply, this caused the ground image to become considerably distorted. Third, the most salient operation for the weather likely to be encountered (and was) over Berlin was the last Hanover operation of 18/19 October but *H2S*, Harris stated, had proven 'insufficiently accurate' to mark the aiming-point. Yet despite its shortcomings, the C-in-C maintained that 'for long range targets, *H2S* is the only suitable device available for marking or blind bombing purposes'. The key word here is 'only', as opposed to 'suitable', for although it was an inconsistent tool *H2S* could still be useful, especially if 3 cm sets could be provided 'without delay' and in substantial numbers.⁸⁰ Nonetheless, doubt remained as to how effective Bomber Command could be in the forthcoming Battle of Berlin. After all, as Webster and Frankland noted that 'area bombing was not, as is often supposed, simply a question of spilling bombs at random over large towns, though even that had been difficult enough in the past. If they were to be effective, area attacks had to be not merely heavy, but also accurate and concentrated', which, in turn, required high-standards of bomb aiming.⁸¹ Harris was not unaware of this and, a day before writing to Churchill about the forthcoming Battle of Berlin, he told Portal that from four attacks two were 'likely to be partial successes', one 'a complete failure' and the other 'an outstanding success'.⁸² This perception, applied to the Battle of Hanover, was an over-generous evaluation with the 'partial successes' being in fact 'total failures'. Harris was therefore left to place faith in 3 cm *H2S* making two out of four attacks 'highly successful',⁸³ although in reality it proved of little value in the forthcoming winter offensive.

The Battle of Berlin became synonymous with heavy losses, but the costs of attacking cities deeper inland, in the face of not having air superiority, had been all too apparent during the Battle of Hanover only weeks before. As F H Hinsley stated, 'Bomber Command's casualties began to return to the disturbing level reached during the Battle of the Ruhr', despite the lengthening hours of darkness and extensive use of counter-measures. The 'immediate explanation', wrote the author, was the continuing increase in German nightfighter strength.⁸⁴ This was true, but so too was the fact that the Luftwaffe's capabilities were increasingly strengthening during this time, all of which meant Hanover – located about 140 miles west of Berlin – proved a beastly target for Bomber Command. *Chart II* shows the campaign against this city cost 109 bombers (4.8%), which compared to the missing rate of the Battle of Hamburg – also comprising four attacks – of 87 heavy-bombers (2.85%) and the opening three raids of the Battle of Berlin in August/September 1943 that saw 125 bombers (7.4%) missing. Raids on Hanover were more costly than attacks on heavily-defended Essen, which during the Battle of the Ruhr had seen 92 aircraft missing from 2,070 sorties (4.4%) against 'the home of Krupps';⁸⁵ this clearly demonstrated the increased risk of making attacks deeper into Germany even before Bomber Command commenced its campaign against Berlin.

Bomber battle:	Raid 1:	Raid 2:	Raid 3:	Raid 4:	Total a/c dispatched, lost & final average % lost:
Battle of Hamburg	24/25 July	27/28 July	29/30 July	2/3 August	
(a/c dispatched):	791 (347 Lancasters; 246 Halifaxes; 125 Stirlings; 73 Wellingtons)	787 (353 Lancasters; 244 Halifaxes; 116 Stirlings; 74 Wellingtons)	777 (340 Lancasters; 244 Halifaxes; 119 Stirlings; 70 Wellingtons; 4 Mosquitoes)	740 (329 Lancasters; 235 Halifaxes; 105 Stirlings; 66 Wellingtons; 5 Mosquitoes)	3095
(a/c lost):	12	17	28	30	87
(% lost of a/c dispatched):	1.5%	2.2%	3.6%	4.1%	2.8%
Opening Phase of Battle of Berlin	23/24 August	31 August/ 1 September	3/4 September	<i>n/a</i>	
(a/c dispatched):	727 (335 Lancasters; 251 Halifaxes; 124 Stirlings; 17 Mosquitoes)	622 (331 Lancasters; 176 Halifaxes; 106 Stirlings; 9 Mosquitoes)	320 (316 Lancasters; 4 Mosquitoes)	<i>n/a</i>	1669
(a/c lost):	56	47	22	<i>n/a</i>	125
(% lost of a/c dispatched):	7.7%	7.6%	6.9%	<i>n/a</i>	7.5%
Battle of Hanover	22/23 September	27/28 September	8/9 October	18/19 October	
(a/c dispatched):	716 (322 Lancasters; 226 Halifaxes; 137 Stirlings; 26 Wellingtons; 5 B-17s (US))	683 (312 Lancasters; 231 Halifaxes; 111 Stirlings; 24 Wellingtons; 5 B-17s (US))	504 (282 Lancasters; 188 Halifaxes; 26 Wellingtons; 8 Mosquitoes)	360 (360 Lancasters)	2263
(a/c lost):	26	38	27	18	109
(% lost of a/c dispatched):	3.6%	5.6%	5.4%	5.0%	4.8%

Chart II: Losses incurred during Bomber Command's battles of summer and autumn 1943 ⁸⁶

As *Chart III* shows, particularly gruesome were the Halifax and Stirling losses, which mostly were above the 5% threshold, and these statistics revealed clearly the vulnerability of Harris' force by autumn 1943. It was no coincidence that, on 26 October, Harris requested that factories producing Stirlings and Halifaxes be switched over to producing Lancasters, but this was refused.⁸⁷ Nevertheless, it was clear that one month before the Battle of Berlin re-started, Bomber Command contained a considerable number of sub-standard aircraft, whilst the Lancaster force, about 360 strong, was hardly sufficient to destroy the German capital on its

Battle of Hanover	22/23 September	27/28 September	8/9 October	18/19 October	Total of type dispatched; lost; (% dispatched)
Number of Halifaxes dispatched: lost: (% dispatched):	226 12 (5.3%)	231 17 (7.6%)	188 13 (6.9%)	N.O.	645 42 (6.5%)
Number of Lancasters dispatched: lost: (% dispatched):	322 7 (2.2%)	312 10 (3.2%)	282 14 (5%)	360 18 (5%)	1276 49 (3.85%)
Number of Stirlings dispatched: lost: (% dispatched):	137 5 (3.6%)	111 10 (9%)	0 (operating against Bremen)	N.O.	248 15 (6%)
Number of Wellingtons dispatched: lost: % dispatched):	26 2 (7.7%)	24 1 (4.2%)	26 0 0	N.O.	76 3 (3.95%)
Number of Mosquitoes dispatched: lost: % dispatched):	N.O.	N.O.	8 0 0	N.O.	8 0 0
Number of US B.17 dispatched: lost: % dispatched):	5 0 0	5 1 (20%)	N.O.	N.O.	10 1 (10%)

Chart III: Losses by aircraft type (Note: N.O. = not operating)

own. Harris recognised this, and authorised a search throughout the Command to find more Lancasters, whose low number was a consequence not just of operational losses but also because of sluggish production by Avro's factories during the summer and autumn.

The immediate solution, as Harris told Air Vice-Marshal E A B Rice on 21 October, was for 1 Group to train aircrews on Stirlings and Halifaxes at HCUs before attending a Lancaster Conversion Unit for a final course on landing and take-off procedures. It was far from an ideal solution, as it involved training on one type and operations on another. But it was the best compromise available for quickly releasing the 150-odd Lancasters tied-up in training units, though it overlooked the fact that some of these aircraft would have been old, worn-out examples, already cast-off by front-line squadrons. Nonetheless, Harris was desperate to

railroad through this measure, telling Rice ‘to accept this decision as a matter of force majeure against which no arguments can be allowed to prevail’.⁸⁸ This stemmed from the C-in-C’s logic that as ‘the Stirling drops approximately 26 tons of bombs for the loss of a crew, the Halifax 30 tons and the Lancaster 130 tons’, every example of the latter type needed to be employed on operations, not training. Doing so achieved not just the ‘direct gain’ of a greater bomb tonnage on the target, but also the ‘negative gain’ of saving the vulnerable Stirling and Halifax from the further casualties that the Battle of Hanover had showed were likely to be incurred on longer-distance operations.

Yet given the future direction of operations, which involved deeper penetrations into Germany, it must be asked, why did the Battle of Hanover prove so costly? *Chart IV* shows the number of guns defending certain areas, which not surprisingly were formidable in the Ruhr, Hamburg and Berlin. Yet calculated another way, although Hanover had three times fewer guns than Berlin, it was seven times smaller than the German capital. This meant Hanover had a ratio of about 7.2 gun-batteries every square mile, whilst Berlin’s figure comes out at 2.4 gun-batteries for every one square mile. Put this way Hanover comes out as a heavily-defended target, and therefore it must be asked as to how the city’s flak defences performed?

<i>Target</i>	<i>Heavy A.A.</i>	<i>Light A.A.</i>	<i>Searchlights</i>	<i>City Area (sq. miles)</i>	<i>Approx. Ratio of guns to sq. miles</i>
Berlin	440	400	245	345	2.4 : 1
Hamburg	260	320	130	89	6.5 : 1
Hanover	154	220	120	52	7.2 : 1
Ruhr Area	750	1000	400	1,000	1.75 : 1

Chart IV: Air Staff figures on German flak defences ⁸⁹

The first attack saw considerable searchlight activity alongside moderately intense heavy-flak fired in barrage form, but these ground defences lessened once the bombing began. Consequently, only five aircraft were lost to flak although a further 18 were damaged.⁹⁰ By the time of the next attack, the air defences had been strengthened by railway-mounted AA batteries quickly dispatched to the city. A greater number of guns allowed the flak to be fired in barrage form up to 19,000 ft, complemented by the many active searchlights. But notwithstanding this, no bombers were shot down although 22 bombers were damaged. Once again, the flak had decreased during the attack, and the aircraft coned during the later stages were hardly fired on. This occurred not just because the flak-gunners took cover but also due to German tactics that saw nightfighters orbiting searchlight beams.⁹¹ This trend of Hanover’s AA defences transitioning during the attack to aid the Luftwaffe’s nightfighters was again seen on 8/9 October when ‘towards the close of the attack, small cones were formed in a line across the target, presumably to help [the] fighters’.⁹² With only eleven aircraft damaged on the final operation,⁹³ clearly the Germans believed their nightfighters remained the most

effective means of downing British bombers and, as a result, Hanover's flak defences, though strong, were not responsible for Bomber Command's substantial losses in this bomber battle.

Instead, an overwhelming proportion of the 109 bombers lost were caused by nightfighters, for the Battle of Hanover showed the Luftwaffe had quickly recovered from its summer 1943 slump through tactical innovations that made Bomber Command's operations ever more costly. As Hinsley noted, autumn 1943 saw 'new methods of interception which, circumventing the counter-measures which the British had introduced against its previous methods of interception, enabled it to inflict increasing casualties on the bombers'.⁹⁴ This meant, Hinsley continued, 'the British were disappointed in their hope that the Germans would take between six months and a year to overcome *Window*', and the Battle of Hanover in fact came at the start of its lessening effectiveness. For the Luftwaffe had switched all single-engined aircraft and increasing numbers of twin-engined nightfighters on to free-lancing tactics (*Wilde Sau*). This method was first tried on the Cologne operation of 3 July 1943, but had developed over the summer to become impressively effective by the time of the Hanover operations. It had been adopted precisely because it freed the Luftwaffe's nightfighters from reliance on those elements that *Window* had affected most, namely ground-radars. Now, German aircraft gathered at radio beacons to await information broadcast on a 'running commentary' on the whereabouts of the bomber-stream and its likely destination. Moreover, the beacons allowed nightfighters from all over the Reich to be airborne, ready to swoop on the bomber-stream. Once the bombers' target was ascertained, the German nightfighters were released to attack and consequently this turned the target area into the main place for interceptions and combats. To counter this, Bomber Command adopted a new tactic on this night, designed to *confuse* the enemy air defences, namely the large decoy operation (as opposed to the usual small-scale Mosquito 'spoof' attack), which in this case saw eight Mosquitoes and 21 Lancasters sent to Oldenburg, a target just beyond the route followed by the Main Force. This counter-measure had been discovered by accident on the Mannheim operation of 5 September when the British, monitoring the Luftwaffe's radio commentary, saw that their losses had been minimised because the German controller had made the mistake of sending the nightfighters to Nuremberg.⁹⁵ Thus, HQ Bomber Command concluded *Wilde Sau* fighters could be assisted in flying in the wrong direction by diversionary attacks. So, on this night, had the Oldenburg diversion worked? The answer was not really, as the post-raid report presented the picture of what transpired:

At one point all fighters were ordered to Berlin, and this probably reduced the number of attacks reported in the target area. A total of 102 interceptions were reported, the majority being near or over the target itself. Of the 38 attacks, 22 occurred within 20 miles from the target on the return.⁹⁶

Reading between the lines the message here was concerning. For it showed the defenders possessed a tremendous ability to recover quickly and make the target area extremely active, where 'most of our losses' occurred.⁹⁷

But HQ Bomber Command did not draw this conclusion, and the next Hanover operation on 27/28 September saw the main bombing force adopt a 'straight-in' approach with a diversion on Brunswick. But as the post-raid report dryly admitted, 39 aircraft failing to return indicated Bomber Command's tactics had been somewhat short of 'partially successful', for the Germans had detected the bomber stream over the Zuider Zee, and although the Brunswick feint had succeeded in pulling away a substantial number of fighters during part of the attack, Hanover was considered as 'the possible objective very early'.⁹⁸ Therefore, as with the previous attack, it showed how speedily the nightfighters could leave the wrong area to intercept the British bombers. Moreover, in both operations, the Germans' speedy recovery was inadvertently helped by the diversionary target and main objective being too close to one another. This was shown by Wireless Intelligence that revealed the nightfighters had been ordered to Brunswick at 2154 hrs and, despite bombs dropping on Hanover at 2200 hrs, Brunswick was still believed to be the main target until 2208 when Hanover was finally identified. But the distance between the two cities was only about 35 miles – sufficiently close for the nightfighters to reach Hanover and intercept the later waves of bombers. Indeed, the British recorded 54 combats and 145 sightings of German aircraft around the target area⁹⁹ – these being of Ju.88s, Me.110s, Me.210s, Do.217s, Me.109s and Fw.190s, which clearly showed how all German nightfighter types had been switched to Wilde Sau tactics by this time.

On 8/9 October operation there was a much larger diversionary raid by 119 aircraft, mostly 3 Group Stirlings, to Bremen. The target made sense for this tactic because earlier that day the Americans had bombed the city's shipyards and Focke-Wulf factory, and Harris therefore hoped to mislead the defenders into believing the major effort was a follow-up attack. Initially, the Germans were fooled and all nightfighters were ordered to Bremen. But the problem was that Bremen lay near to the route of the main force going to Hanover (about 60 miles) – indeed the entire force had followed a similar track before splitting to head to their designated targets. Consequently the Luftwaffe ran into the bomber-stream near Hoya, roughly in between the diversionary target and main objective, and followed it to the main target. This meant the Luftwaffe possessed reliable information on the bombers' progress, and other nightfighters could be directed to intercept in the Hanover area where, the British noted, 'there were many observations of aircraft shot down'.¹⁰⁰ As a result, 27 aircraft were lost (5.4%), with tellingly the flak 'not expected to play a great part in actually destroying our aircraft' but designed 'to keep the bombers above a certain height, about which the fighters were warned'.¹⁰¹

Owing to the weather, the fourth Hanover operation would only be supported by small-scale Mosquito 'spoofs' on Duisburg and Berlin.¹⁰² Harris instead hoped that the tactic of sending an all-Lancaster force, unhindered by the 'weaker brethren' aircraft, would be effective in getting the bomber force to quickly sneak in and out of Germany. But the post-raid analysis showed how the Luftwaffe's tactics had evolved to counter this:

The running commentary picked out aircraft up in the neighbourhood of Groningen at 19.16 hours, and directed the fighters along the route in readiness to announce the

target as soon as it should be identified. At 2007 Hannover was announced after the first bombs had been dropped there. Combats and sightings of enemy aircraft were virtually confined to within 40 miles of the target area [on both journeys]. A very large, possibly a record number of fighters was active, but weather conditions subdued their efforts.¹⁰³

This suggested the Germans were transitioning to a new method, namely *Zahme Sau*. Central to this technique was early detection of the bomber-stream to nullify the British counter-measure of diversionary raids. At this time, Luftwaffe tactics were a hybrid of both methods, in which the bombers' destination was ascertained so single-engined aircraft could be utilised around the target, yet the desire to infiltrate the bomber-stream early meant the bombers' journeys through Germany could also be used for attacking purposes. The latter showed that technologically the Luftwaffe was not standing still, for its twin-engined nightfighters were now using a device called Benito and the SN-2 airborne radar to aid interception in the darkness found away from the brightly lit target area (owing to searchlights, target-markers and fires).¹⁰⁴ In essence, Bomber Command confronted an ever-more innovative enemy, one that in less than favourable weather conditions had still caused the loss of 18 bombers. Stephen Harris' observation that 'raids featuring smaller, all-Lancaster main forces and taking a short time to complete usually suffered relatively low casualties',¹⁰⁵ remains open to debate when applied to Hanover, for this target was an altogether tougher proposition compared to those places that all-Lancaster forces had been sent to in early-October, namely Hagen, Munich and Stuttgart.¹⁰⁶ On 18/19 October, the 5.0% loss rate showed Harris had got away with it – but only just. Even the impressive RV Jones overlooked the losses against Hanover and continued to over-state *Window's* effectiveness and the British ability to influence the 'running commentary' broadcast by the German controllers to the Luftwaffe's nightfighters.¹⁰⁷ Within weeks, Bomber Command was at the end of the 'Berlin Road' by concentrating its effort against the German capital, but it would encounter a Luftwaffe that had increasingly perfected its nightfighting techniques.

Overall, as *Chart I* shows, the losses on the first Hanover operation were manageable but the Germans soon got the upper-hand over the counter-measures the British could offer. This was shown by three operations, including two at Hanover, costing 5% or more, yet worryingly these high-losses had occurred on nights when, as the British themselves acknowledged, the Luftwaffe's efforts had been far from perfect. Nonetheless, it showed all too clearly the costs incurred when Bomber Command was undertaking medium-distance attacks without any kind of air supremacy, and had revealed the air war favoured the defenders, before long-distance trips to Berlin were resumed. It was hardly an optimistic outlook; indeed, it was little wonder that Harris, in that famous and oft-quoted line, warned Churchill that attacking Berlin would cost Bomber Command 400 – 500 aircraft. This figure came from the harsh operational experience of the Battle of Hanover only weeks before, with the 109 bombers lost on the four operations. Berlin, whose larger size required at least four times more operations to destroy, was clearly expected to incur about quadruple the losses.

If such attrition would, as Harris claimed, ultimately 'cost Germany the War' then the Battle of Hanover showed that attempting so might cost Harris Bomber Command.¹⁰⁸

The SAOG concluded that November 1943 was 'the time at which the chances of decisive success for the general area offensive had acquired their most promising aspect', which led Harris 'to intervene with a vigorous demand' for continuing this bombing policy to achieve final victory,¹⁰⁹ the Battle of Hanover showed the reality was, in fact, quite the reverse. Bombing using *H2S* remained an uncertain proposition, the Luftwaffe's nightfighter force was becoming stronger, and British bomber losses were mounting. Though the *Pointblank* Directive had been designed to help kickstart the American daylight bombing offensive to achieve air superiority as a prelude to *Overlord*, the costly British performance over Hanover, even before Bomber Command's considerable haemorrhaging of aircraft during the Battle of Berlin, showed that *Pointblank's* 'intermediate objective' was 'not only a general but also a Bomber Command interest'.¹¹⁰

Conclusion

The chronology of Bomber Command's campaign during 1943/4 was set of course by Harris himself in his *Despatch on War Operations* and postwar account *Bomber Offensive*, in which the 'Main Offensive' against Germany comprised a number of battles that went from the Ruhr, to Hamburg, to Berlin. But the former account was an official one designed to disabuse the doubters still existing in the Air Ministry about the efficacy of area bombing, in which successive failures like Hanover could hardly be elaborated on, if mentioned at all. Similarly, *Bomber Offensive*, published only two years after the end of the war, also saw the omission of the Battle of Hanover. Both accounts therefore left a lot unsaid. Consequently this meant Harris' chronology stuck and acted as the natural guide for many subsequent publications on the British bombing offensive.

Yet, the other key text, influential for shaping the future historiography was *The Strategic Air Offensive against Germany*. Webster and Frankland correctly, if briefly, examined the bombing offensive during autumn 1943 labelling it 'The Campaign on the Road to Berlin'. In so doing, they tantalisingly expressed some pertinent observations about Bomber Command during this time, but failed to relate them more pointedly to Hanover. Instead, they offered the general, if correct, assertion that 'anything beyond the range of *Oboe* remained for Bomber Command as a zone of relative inefficiency', which meant 'the outlook for the campaign which was now about to begin on the road to Berlin was, therefore, unpromising'.¹¹¹ Went unsaid was how this was shown all too clearly during the Battle of Hanover. Second, the SAOG's authors described the deceptive measures that Bomber Command deployed, which had been relatively successful during the Battle of the Ruhr. But, as they pointed out, 'the verdict' upon Bomber Command's tactical effectiveness lay in the subsequent phases of the campaign: Hamburg, 'the campaign on the road to Berlin', and over Berlin itself.¹¹² The reality was more specific, with the Battle of Hanover being the first clear sign of the problems of attacking targets that lay further inland, closer to the German capital. Finally, in showing how the

bomber battle examined in this article was overlooked, the official history concluded that '[not] until the Battle of Berlin opened in the middle of November [was] . . . Bomber Command again concentrated upon a single target as it had done in the Battle of Hamburg'.¹¹³ But as shown by the four attacks on Hanover over three weeks it was not for the want of trying. If not fully intended, it became a battle owing to Harris' determination to destroy this city. For the two September failures, which placed question marks against Bomber Command's capabilities – could not be allowed to go unanswered, especially as they had occurred immediately after the postponed Berlin campaign. Harris had to convince the doubters that he could indeed devastate the German capital, which in turn meant showing Hanover was not indicative of his force's limitations but simply an aberration. As a result, he placed great emphasis on the Hanover operation of 8/9 October, and also the destructive 'firestorm' raid on Kassel on 22/23 October, precisely because these attacks served an agenda in demonstrating that Bomber Command would be successful over Berlin. Yet the reality, taken from the evidence of all the Hanover operations, suggested otherwise.

Other authors on Bomber Command have not mentioned Hanover either, apart from two exceptions namely Martin Middlebrook and Max Hastings. As highlighted in the introduction, the former stated Hanover was a battle but added no further detail to strengthen this observation. Hastings meanwhile offered the valuable perception that high-losses meant 'Hanover now inspired almost as deep a fear as Berlin',¹¹⁴ but likewise provided no elaboration. Beyond these authors, Stephen Harris – in the majestic official history of the Royal Canadian Air Force – impressively analyses several of the Hanover raids and the tactical shortcomings of Bomber Command, including the problem of placing the primary and diversionary targets too close to one another. '[I]f the main force attacking Hanover on 22/23 September had not been so large and had done its business more quickly', the Canadian historian writes, 'there would have been no one left there for the fighters from Oldenburg to intercept'.¹¹⁵ In a more recent work, Richard Overy observed that 'the first 'Battle of Berlin' petered out until November in favour of less dangerous targets',¹¹⁶ which was certainly true, although Hanover was hardly a 'less dangerous' target as the statistics in *Chart II* shows.

Therefore, despite the occasional references to Hanover, this battle has remained forgotten. But Hanover resembled Hamburg, both battles involved a series of raids on the same target over a short space of time. Yet Bomber Command's mixed performance – at a critical moment in the British bombing offensive – meant it was little wonder Harris never depicted Hanover in this way. Instead, he (and many other writers) portrayed this period as being marked by a collection of successful 'one-off' attacks – Hagen (1/2 October), Hanover (8/9 October), and Kassel (22/23 October). Harris could not have done otherwise, for portraying Hanover as a battle told an altogether different story about his Command's capabilities on the eve of resuming the Berlin offensive, and might even put a serious question mark next to his judgement of having done so. Nonetheless, the Battle of Hanover is important to study; indeed it represents a valuable window into assessing Bomber Command immediately prior to the supreme test of all.

In his *Despatch*, Harris did precisely this, with an assessment of his force on two levels, namely the aircraft he had available and the effectiveness of *H2S*. On the first consideration, he wrote that by early November 1943 the Lancaster was the 'mainstay' of operations to Germany because the Wellington had become obsolete and the Halifax Mk's II/V and Stirling 'continued to be unsatisfactory'. The evidence from Hanover showed clearly just how Bomber Command's ranks remained swelled by vulnerable aircraft, which would still have to be used against Berlin. The C-in-C had little choice; to have operated only Lancasters would have meant sending a force of about 400 aircraft, which was hardly sufficient to 'wreck Berlin from end to end'.¹¹⁷ With regards to *H2S*' performance, Harris wrote it 'was incapable of really precise marking under any conditions'.¹¹⁸ It will be remembered the Berlin campaign had itself been halted to improve Bomber Command's capabilities at delivering a more accurate attack. Yet the evidence from the Battle of Hanover showed just how fickle *H2S* remained, and at least on two occasions being of little use in correcting errors made by the PFF target-markers. And that, worse still, target-marking on these occasions had been fatally undermined by an indifferent performance. Moreover, the device found it difficult to pinpoint the city centre of this sprawling city. Perhaps most critically, the device had shown itself to be of limited use for the marking-technique that ultimately would prove so critical over the German capital, namely blind-bombing. Notwithstanding all this, the AHB's narrative labelled the period from September to November 1943 as one of 'Improving Technique', but such a description can only be sustained so far.¹¹⁹

What then of Bomber Command's tactical and technical innovations for protecting the bomber-stream, which are important given that high losses had influenced the earlier decision to suspend the Battle of Berlin? Certainly, Hanover revealed all too starkly that *Window*, which had brought Bomber Command reduced losses over Hamburg, was in fact a very temporary triumph over the Reich's air defences. Consequently, autumn 1943 saw new tactics tried, such as diversionary raids and all-Lancaster operations, but losses mostly above the 5% threshold of acceptable casualties told its own story about the effects of British techniques when going further inland and encountering the Germans' increasingly effective methods of detection and interception. This period, in fact, saw the Luftwaffe not just recovering from the Hamburg setback, but also pioneering counter-measures that made mid-distance targets expensive, let alone the further one of the German capital. Initially, this came in the form of *Wilde Sau* whose impact reached its zenith during the Battle of Hanover, inflicting heavy-losses during the first three attacks. But as the fourth raid showed, the Luftwaffe's nightfighting tactics were far from stationary, as they clearly had begun using *Zahme Sau* against Bomber Command that involved detecting and intercepting the bomber-stream early owing to such devices as *Benito* and the new AI set, *SN-2*. This method would become ever more lethal during the forthcoming winter campaign. Thus, enhancing German capabilities and the corresponding high British losses inflicted during autumn 1943 fed back into British bombing strategy. As identified 'the crux was whether, as Sir Arthur Harris claimed, the Battles of the Ruhr, Hamburg and Berlin were parts of a decisive campaign which required only reinforcement and persistence or whether, as Air Marshal Bottomley now suggested, the German fighter force had interposed

itself between the heavy bombers and any decisive action'.¹²⁰ The Battle of Hanover gave a clear answer, namely the clear need to reduce the strength of the Luftwaffe; the Air Staff went into winter 1943 firmly convinced that attacking such targets was the right way ahead.

Overall, it is difficult to make the case that Bomber Command's technical and tactical capabilities improved during autumn 1943. The official historians concluded that:

'these issues were about to be put to a further and much more drastic test in the great Battle of Berlin which was now impending, but a consideration of the evidence arising from the three attacks in August and September scarcely provided the grounds for an optimistic expectation as to the outcome'.¹²¹

The 'drastic test' had been set, and failed, over Hanover. Consequently, the Battle of Hanover during autumn 1943 contained all the warning signs of the later difficulties encountered over Berlin. It was a time not of improving capabilities but instead saw the accumulation of more evidence that suggested ending the war through the progressive destruction of Berlin was in fact beyond Bomber Command's capabilities.

Harris was aware of his force's limitations; indeed, the correspondence with Bennett and other Group commanders over the bombing performance on 22/23 September, and his statement to Churchill about the losses likely to be incurred against Berlin, demonstrated this recognition. But Harris was playing for high-stakes, and showed a 'gambler's instinct' by proceeding. But others were less pleased at the prospect of sustaining a campaign against Berlin in the face of a revitalised Luftwaffe nightfighter force. Throughout the autumn, the Air Staff became increasingly unhappy with Harris' bombing programme; indeed, Portal wanted to have a conference with Harris to ascertain 'what is preventing the execution of the [Pointblank] plan, especially our B.Cd's part in it', in which the agenda would be 'specifically designed to show how far performance has fallen short'.¹²² Notwithstanding the success on 8/9 October the Hanover operations spanned a period that was increasingly less conducive to Harris' version of the bombing offensive. On 19 October, Bufton wrote that Harris must undertake an 'all out air effort in an all-out offensive against the GAF' by attacking such cities as Leipzig, Augsburg and Gotha, and 'keep[ing] them out of action'.¹²³ All this was quite a change from earlier in the year. Back in June, as Probert writes, 'Harris had been in a strong position' because the height of the Battle of the Ruhr saw him 'delivering the goods and everyone knew it'.¹²⁴ Five months later, the ground was weaker as Bomber Command had suffered two tactical defeats, namely the pullback from Berlin in mid-September and the Battle of Hanover during the following month. The latter showed the clear warning signs of likely failure of the Berlin offensive; the repercussions of ignoring these would prove both enormously frustrating and costly for Bomber Command. Webster and Frankland state that, in casualties and bombing efficiency, 'the Battle of Berlin compared unfavourably with the preceding Battles of the Ruhr and Hamburg and the campaign on the road to Berlin'.¹²⁵ But the evidence, highlighted in this paper, showed this assertion to be much less convincing when

measured against Bomber Command's performance over Hanover. In early November 1943, when Harris told Churchill that wrecking Berlin would 'cost Germany the war',¹²⁶ the failure to absorb the lessons of the Battle of Hanover saw hubris triumph over clear thinking.

Notes

¹ The National Archives [hereafter TNA], Kew, PREM3/14/1, Harris-Churchill, 3/11/43.

² TNA, AIR14/3766, HQ Bomber Command-HQ Groups, Hannover, Assessment No. 17 by Air Staff Intelligence, HQBC, undated.

³ Quoted from M. Lambert, *Night after Night: New Zealanders in Bomber Command* (Auckland, 2007), p. 335.

⁴ A.T. Harris, *Bomber Offensive* (Barnsley, 2005ed.); T. Davis-Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing* (Princeton, 2002), p. 281.

⁵ C. Webster/N. Frankland, *The Strategic Air Offensive against Germany 1939-1945, vol. II: Endeavour*, (London, 1961), p. 95.

⁶ RAF Museum, Hendon, Harris Papers [hereafter HP], H50, *The Effect of the Rise of Air Power on War* by Marshal of the Royal Air Force The Viscount Trenchard.

⁷ Churchill College Archives, Bufton Papers [hereafter BP], Cambridge, BUFT 4/3, RAF Staff College (3rd Course), The History and Development of the Bomber Offensive 1939/45, 3/04/47.

⁸ M. Middlebrook, *The Nuremberg Raid 30-31 March 1944* (London, 2000ed.), p. 17;

⁹ M. Middlebrook, *The Battle of Hamburg: The Firestorm Raid* (London, 2000ed.), p. 361.

¹⁰ A.T. Harris, *Despatch on War Operations 23rd February 1942, to 8th May 1945*, with introductions by S. Cox and H. Boog (London, 1995), p. 20.

¹¹ TNA, AIR14/779, Harris-Portal, 16/06/43.

¹² Ibid.

¹³ HP, H82, Harris-Portal, 12/08/43.

¹⁴ Kings College London, Liddell Hart Centre [hereafter LHC], WM (40) 305th Conclusions, Confidential Annex, 12/12/40; TNA, AIR20/5195, Air Ministry-HQ Bomber Command, Operation Abigail, 13/12/40.

¹⁵ Christ Church Library and Archives, Oxford, Portal Papers [hereafter PP], File 9, Peirse-Portal, 30/12/40.

¹⁶ TNA, AIR8/865, Air Vice-Marshal D.F. Stevenson-Peirse, 10/01/41.

¹⁷ TNA, AIR20/5195, Hanover, Details as an Industrial Target, 09/01/41.

¹⁸ BP, 3/50, R. Dickinson-A. Morley, 15/12/41.

¹⁹ HP, H16, D.A.C. Dewdney-A.P. Morley, 07/05/42. Hanover had escaped relatively lightly hitherto. Notwithstanding the Air Ministry's Directive on 15 January 1941, which instructed Bomber Command to focus on Germany's oil, Peirse was allowed to launch one large area raid per month. He did so against Hanover on 10/11 February (sending 222 aircraft), but apart from minor operations in 1941 and a raid by 71 aircraft on 26/27 January 1942, when 71 aircraft attacked the city, there was no major attack on Hanover for the next 20 months. It was recommended by Air Vice-Marshal Donald Bennett, the AOC-in-C of the Pathfinder Force (PFF), as a target for Operation Millennium, the 1,000-bomber attacks on selected German cities, but

ultimately rejected. See HP, H57, Saundby-Harris, 08/09/42 [and Enclosure] Proposed Attack on Hannover by G/C Bennett, 06/09/42.

²⁰ TNA, AIR 14/1205, Briefing Note on Hanover, Prepared by Air Staff Intelligence, HQBC, 13/09/42.

²¹ Ibid.

²² TNA, AIR 20/1732, Zone Maps of Hanover, undated.

²³ TNA, AIR14/3766, Assessment No. 17 by Air Staff Intelligence, HQBC, undated. In a style characteristic of Harris, it was stated this 'may well send shivers down the back of the ill-clad German, particularly one who has been bombed out'.

²⁴ TNA, AIR14/3435, Coryton-Harris, 5/10/43.

²⁵ TNA, AIR41/43, AHB Historical Narrative, Ch. 14, The Autumn Offensive, pp. 114-17.

²⁶ TNA, AIR14/2662, Bombers' Baedeker Part I (A-K), Hannover.

²⁷ HP, H50, Harris-Trenchard, 14/04/43; RAF Museum, Trenchard Papers, MFC76/1/495, Trenchard-Harris, 13/04/43.

²⁸ TNA, AIR41/43, pp. 114-17.

²⁹ Ibid, pp.114-17. See also R. Freeman, *Mighty Eighth War Diary* (New York, 1981), pp. 68; 77; & 79.

³⁰ TNA, AIR14/779, Bottomley-Harris, 3/09/43. See also BP, 3/64, Report of Committee of Operational Analysts, 5/04/43.

³¹ TNA, AIR20/3239, Coryton-Bottomley, 6/09/43.

³² TNA, AIR20/4832, Bufton-Coryton, 16/09/43.

³³ TNA, AIR 20/8142, Collier-Bufton, 09/09/43.

³⁴ B. Greenhous/S.J. Harris/W. C. Johnston/W.G.P. Rawling, *The Crucible of War: The Official History of the Royal Canadian Air Force Volume III* (Ottawa, 1994), pp. 706-713.

³⁵ Harris, *Bomber Offensive*, p. 185.

³⁶ TNA, AIR40/1517. Fish Code-Names, undated. Bomber Command gave fish-based codenames to all German cities, e.g. Berlin (WHITEBAIT), Essen (BULLHEAD), Hamburg (DACE), etc.

³⁷ TNA, AIR27/815, 103Sq ORB, 1943.

³⁸ This included five B17s from the US Eighth under the command of 3 Group. Though experimental, the fact the Americans were doing so gives an insight into the thinking that pervaded the Eighth Air Force headquarters by autumn 1943, namely the rising cost of daylight attacks meant the night-time alternative at least had to be explored. General Ira Eaker would send small number of bombers twice to Hanover (and Munich and Frankfurt) but these experiments did not convince the Americans to disregard their daylight method.

³⁹ George Metcalf Collection [hereafter GMC], Canadian War Museum, Ottawa, Brookes Diary, Sunday 26 September 1943.

⁴⁰ TNA, AIR14/3411, Bomber Command Report on Night Operations, 27/28rd September 1943, HANNOVER: Brunswick, 17/11/43.

⁴¹ PP, File 13, Bomber Command Digest No. 76, 26/09/43.

⁴² TNA, AIR25/152, No. 8 Group ORB, 1 August 1942-31 December 1943; AIR25/1, No. 1 Group ORB, 1 May 1936-31 December 1943.

⁴³ IWM, 08/140/1, Private Papers of Flt Lt G.P. Dawson.

⁴⁴ GMC, Brookes Diary, Friday 8th October 1943. The following day he recorded 'thick fog at 0400 . . . & we only got about 60% of them back again due to weather conditions & 34 are still away'.

⁴⁵ IWM, 11540 01/28/1 (German civilian Ilse Lange).

⁴⁶ TNA, HW16/58, Decrypts of German Police Communications during Second World War, 1 Nov. 1942-30 Nov. 1943, Appendix A, Log of Police Decodes concerning the raid on Hannover, 9 Oct. 43.

⁴⁷ TNA, AIR14/3411, Bomber Command Report on Night Operations, 8th/9th October 1943, HANNOVER: BREMEN, 13/11/43.

⁴⁸ HP, H49, Harris-AOCs Groups, 10/10/43.

⁴⁹ LHC, WM (43) 143rd Conclusions, 11/10/43.

⁵⁰ TNA, AIR27/687, 83 Squadron ORB, 1943.

⁵¹ PP, File 13, Bomber Command Digest No.80, 24/10/43.

⁵² TNA, PREM3/14/1, Harris-Churchill, 3/11/43.

⁵³ Ibid.

⁵⁴ HP, H65, Churchill-Harris, 12/11/43.

⁵⁵ HP, H65, Harris-Churchill, 12/11/43.

⁵⁶ PP, File 10, Harris-Portal, 04/10/43.

⁵⁷ TNA, AIR14/3411, Bomber Command Report on Night Operations, 22/23rd September 1943, HANNOVER: Oldenburg, 16/11/43.

⁵⁸ TNA, AIR27/687, 83 Squadron ORB, 1943.

⁵⁹ TNA, AIR14/3411, Bomber Command Report on Night Operations, 22/23rd September 1943; TNA, AIR41/43, pp. 110-16.

⁶⁰ TNA, AIR14/3411, Bomber Command Report on Night Operations, 27/28th September 1943.

⁶¹ Ibid.

⁶² RAF Museum, MF10016/5, Diary of Maj. J. K. Christie. For another account on the Pathfinder's performance see W.R. Thompson, *Lancaster to Berlin* (Manchester, 1997 ed.), pp. 161-2.

⁶³ HP, H57, Harris-Bennett, 23/09/43.

⁶⁴ Ibid.

⁶⁵ HP, H49, Harris-AOCs Bomber Groups, 24/09/43.

⁶⁶ HP, H57, Bennett-Harris, 25/09/43.

⁶⁷ HP, H57, Harris-Bennett, 01/10/43.

⁶⁸ TNA, AIR20/6232, BOps2(a)-DBOps., 2/10/43.

⁶⁹ J. Maynard, *Bennett and the Pathfinders* (London, 1996), pp. 133-4. Maynard concludes 'it was said that the name Hanover was never again willingly mentioned in his presence'.

⁷⁰ HP, H49, Harris-AOCs Bomber Groups, 12/10/43.

⁷¹ TNA, AIR14/3766, map to Assessment No. 17 by Air Staff Intelligence, HQBC, undated.

⁷² TNA, AIR14/3411, Bomber Command Report on Night Operations, 18/19th October 1943, HANNOVER, 13/12/43.

⁷³ TNA, AIR27/687, 83 Sq ORB, 1943.

⁷⁴ TNA, AIR25/152, No. 8 Group ORB, 1943.

⁷⁵ The PFF would adopt the rather desperate *ad hoc* measure of the 'Berlin Method' that involved 'flooding' the target with every kind of marker.

⁷⁶ TNA, AIR14/779, Harris-Portal, 16/06/43.

⁷⁷ Harris, *Bomber Offensive*, pp. 185-6.

⁷⁸ TNA, AIR14/3411, Bomber Command Report on Night Operations, 22/23rd September 1943.

⁷⁹ TNA, AIR20/5803, Harris-Under Secretary of State for Air, 29/10/43.

⁸⁰ Ibid.

⁸¹ Webster/Frankland, *SAOG, vol. II*, p. 96.

⁸² HP, H82, Harris-Portal, 2/11/43.

⁸³ Ibid.

⁸⁴ F.H. Hinsley, *British Intelligence in the Second World War*, Vol. 3, (London, 1984), p. 294.

⁸⁵ Webster/Frankland, *SAOG, vol. II*, p. 129.

⁸⁶ Quoted from R. Worrall, *Battle of Berlin: Bomber Harris' gamble to end the war* (Oxford, 2019), p. 90; M. Middlebrook, *The Bomber Command War Diaries: An Operational Reference Book 1939-1945* (Leicester, 1996 ed.) pp. 411-439.

⁸⁷ HP, H82, Harris-Portal, 26/10/43.

⁸⁸ TNA, AIR 14/3542, Harris-Rice, 21/10/43

⁸⁹ Worrall, *Battle of Berlin*, p. 32.

⁹⁰ TNA, AIR14/3411, Bomber Command Report on Night Operations, 22/23rd September 1943; AIR24/259, Interceptions/Tactics No. 197/43, Night 22/23 Sept. 43.

⁹¹ TNA, AIR14/3411, Bomber Command Report on Night Operations, 27/28rd September 1943; AIR24/259, Interceptions/Tactics No. 202/43, Night 27/28 Sept. 43.

⁹² TNA, AIR14/3411, Bomber Command Report on Night Operations, 8th/9th October 1943; AIR24/260, Interceptions/Tactics No. 210/43, Night 8/9 Oct. 43.

⁹³ TNA, AIR14/3411, Bomber Command Report on Night Operations, 18/19th October 1943; AIR24/260, Interceptions/Tactics No. 215/43, Night 18/19 Oct. 43.

⁹⁴ Hinsley, *British Intelligence*, Vol. 3, pp. 308-11.

⁹⁵ Ibid, pp. 308-11.

⁹⁶ TNA, AIR14/3411, Bomber Command Report on Night Operations, 22/23rd September 1943.

⁹⁷ TNA, AIR24/259, Interceptions/Tactics No. 197/43, Night 22/23 Sept. 43.

⁹⁸ TNA, AIR14/3411, Bomber Command Report on Night Operations, 27/28rd September 1943.

⁹⁹ TNA, AIR24/259, Interceptions/Tactics No. 202/43, Night 27/28 Sept. 43.

¹⁰⁰ TNA, AIR14/3411, Bomber Command Report on Night Operations, 8th/9th October 1943.

¹⁰¹ TNA, AIR24/260, Interceptions/Tactics No. 210/43, Night 8/9 Oct. 43.

¹⁰² TNA, AIR24/260, Interceptions/Tactics No. 215/43, Night 18/19 Oct. 43.

¹⁰³ TNA, AIR14/3411, Bomber Command Report on Night Operations, 18/19th October 1943.

¹⁰⁴ Hinsley, *British Intelligence*, pp. 313-4. The former device would be carried by an aircraft that was then inserted into the bomber-stream and 'enabled the [German] controller to direct other fighters to the stream, either by emitting a DF note for other fighters to home on to or by announcing that it in contact so that the controller, knowing its position from *Benito*, could inform the waiting fighters by R/T'.

¹⁰⁵ Greenhous et al, *Crucible of War*, p. 719.

¹⁰⁶ Ibid, p. 719.

¹⁰⁷ R.V. Jones, *Most Secret War: British Scientific Intelligence 1939-1945* (London, 2009 ed.), pp. 387-88.

¹⁰⁸ TNA, PREM3/14/1, Harris-Churchill, 3/11/43.

¹⁰⁹ Webster/Frankland, *SAOG*, vol. II, p. 47

¹¹⁰ Ibid, p. 139.

¹¹¹ Ibid, pp. 135-7.

¹¹² Ibid, p. 146.

¹¹³ Ibid, p. 158.

¹¹⁴ M. Hastings, *Bomber Command* (London, 1999 ed.), p. 210.

¹¹⁵ Greenhous et al, *Crucible of War*, p. 719.

¹¹⁶ R. Overy, *The Bombing War: Europe 1939-1945* (London, 2013), p. 342.

¹¹⁷ TNA, PREM3/14/1, Harris-Churchill, 3/11/43.

¹¹⁸ Harris, *Despatch on War Operations*, p. 20.

¹¹⁹ AIR41/43, pp. 114-17.

¹²⁰ Webster/Frankland, *SAOG*, vol. II, p. 36.

¹²¹ Ibid, p. 165.

¹²² TNA, AIR20/780, Portal-Bottomley, 27/09/43. This was held on 12 October.

¹²³ TNA, AIR20/780, Bufton-Coryton, 19/10/43.

¹²⁴ H. Probert, *Bomber Harris: His Life and Times* (London, 2006 ed.), p. 257.

¹²⁵ Webster/Frankland, *SAOG*, vol. II, p. 194.

¹²⁶ PREM3/14/1, Harris-Churchill, 3/11/43.

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