

On to Berlin, November–December 1943

In the four weeks following the 22/23 October raid on Kassel, Bomber Command attempted only one large operation, when 577 Lancasters and Halifaxes were sent to Düsseldorf on 3/4 November 1943. Although not included in the Casablanca or Pointblank lists,^{*} Düsseldorf was home to several aircraft components plants and, in the view of MEW, was 'as important as Essen and Duisburg ... so far as the production of armaments and general engineering is concerned.' A raid on the city could, therefore, be justified and defended as meeting the spirit, if not the letter, of the two most recent Allied bombing directives.¹

Target indicators were easily seen through the ground haze, and No 6 Group crews left the target area convinced that the raid had been a success. 'During the early stages ... fires appear to have been somewhat scattered but as the attack progressed a large concentration was observed around the markers and smoke could be seen rising up to 8/10,000 ft. Several large explosions are reported notably at 1947 hrs, 1950 hrs, 1955 hrs, 2003 hrs. Flames were observed rising to 8/900 ft from this last explosion and the glow of fires could be seen for a considerable distance on the return journey.'² Photographic reconnaissance missions mounted after the operation confirmed their opinion, as considerable damage was caused to both industrial and residential areas. Equally encouraging, while some German fighters intervened energetically, the overall 3.1 per cent and No 6 Group's 3.47 per cent loss rates were low for operations over this part of Germany, and were attributed to the successful feint attack mounted over Cologne.³

The most interesting feature of the night's operation, however, was the precision attack mounted concurrently with the larger area raid. Thirty-eight Lancasters, including twenty-five from Nos 408 and 426 Squadrons, were directed to bomb the Mannesmann-Rohrwerke tubular steel plant on the northern fringes of Düsseldorf, using G-H as their sole navigation aid and

^{*} The twenty-two cities included in the Pointblank directive were Augsburg, Berlin, Bernburg, Bremen, Brunswick, Dessau, Eisenach, Frankfurt, Friedrichshafen, Gotha, Hamburg, Hanover, Kassel, Leipzig, Munich, Oschersleben, Paris, Regensburg, Schweinfurt, Stuttgart, Warnemünde, and Wiener-Neustadt, all of which had either aircraft components and assembly plants or were centres of ball-bearing production.

blind-bombing device. Although the failure rate of the new equipment was high (almost one-third of the G-H sets becoming unserviceable), all photographs taken by crews whose equipment was working were plotted within one mile of the aiming point. That was much better than the results commonly achieved with H2S or Oboe sky-marking, and the ORS at High Wycombe predicted that, with practice, the bombing accuracy achievable with G-H would eventually surpass Oboe ground-marking as well.⁴

The impact of the bombing on Mannesmann-Rohrwerke's output was negligible. Although it had been accurate enough, damage to the plant's vital machine tools was estimated at less than 1 per cent, due largely to 'the loftiness of the buildings which caused the bombs to explode in mid air.' Moreover, despite the destruction of their houses, 'there was no lack of initiative in the workers ... food was good and this was a very important stiffener to morale,' but these details were not known in London, and both the area raid and the precision attack were marked down as notable accomplishments which would bear repeating.⁵

Because of moon and weather conditions, the main force undertook only three bombing missions in the next three weeks and all three involved relatively small raids against precision targets, with mixed results. However, these precision raids were not a prelude of things to come so far as Bomber Command's principal effort was concerned. With the return of winter's long nights, made to order for deep penetrations, and the bad weather which was known to inhibit the Luftwaffe's night-fighter effort, Sir Arthur Harris had once again set his sights on launching an area offensive against Berlin. The force of Lancasters and Halifaxes available on a daily basis had climbed above seven hundred machines; H2S was being introduced into main-force squadrons at a steady rate (twenty-three would have Mark II H2S in April); and the impending formation of No 100 (Bomber Support) Group, with its Serrate-equipped night-fighters and specialized electronic warfare capabilities, promised (along with improved Monica, Fishpond, and Boozer warning devices as well as Corona and other forms of jamming) to keep casualties to about 5 per cent, even in a sustained offensive.⁶

In other words, or so Harris thought, Bomber Command had arrived at the point where it could make a decisive contribution to the war effort and, in a campaign lasting about five months – he expected to be finished by 1 April 1944 – it could add the German capital to the list of nineteen cities considered already to have been 'virtually destroyed.' 'If the USAAF will come in on it,' he told Winston Churchill on 3 November, 'We can wreck Berlin from end to end. It will cost between us 400–500 aircraft. It will cost Germany the war.' Implicit in his claim was the idea that a cross-Channel invasion scheduled for May or June 1944 might yet be unnecessary.⁷

⁴ Hamburg, Cologne, Essen, Dortmund, Düsseldorf, Hanover, Mannheim, Bochum, Mülheim, Köln Deutz, Barmen, Elberfeld, München-Gladbach/Rheydt, Krefeld, Aachen, Rostock, Remscheid, Kassel, and Emden. 'Seriously damaged' were Frankfurt, Stuttgart, Duisburg, Bremen, Hagen, Munich, Nuremberg, Stettin, Kiel, Karlsruhe, Mainz, Wilhelmshaven, Lübeck, Saarbrücken, Osnabrück, Münster, Rüsselsheim, Oberhausen, and Berlin.

The morale of Berliners was the primary objective of the proposed campaign, but the German capital was also an economic target of considerable significance. It accounted for almost 8 per cent of Germany's total industrial output, and, although not all of Berlin's production was vital to the Wehrmacht, there were twelve aircraft and aero-engine manufacturing and assembly plants as well as twenty-five major engineering and armaments facilities. The city was also home to 40 per cent of the German electronics industry and deserved its place in the Pointblank list for that reason alone.⁸

The trouble, however, was that the factories in and around Berlin were not the easiest to find or destroy. A number of important establishments, particularly those associated with the electronics industry, were housed in relatively small, unremarkable facilities that did not stand out as did, for example, the Krupp complex in Essen; because they were of reasonably modern construction, these buildings were not as susceptible to fire as the timbered structures found in cities such as Rostock and Lübeck. Indeed, Berlin in general was less vulnerable to fire and the threat of firestorms because of its many broad avenues and parks, and following the disastrous raids on Hamburg attempts had been made to fire-proof the capital's more vulnerable old buildings.⁹

No matter what the goal, since Berlin lay far beyond best Gee, Oboe, and G-H range, Harris had no choice but to rely on H2S as his principal navigation and bombing aid; and because he needed the protection afforded by cloud and moonless nights, most bombing would be done blind, by H2S alone or on sky-markers which were themselves dropped according to what was displayed on the Pathfinders' H2S screens. That was asking a lot not only of the equipment, in terms of both its serviceability and its effectiveness in highlighting aiming and other reference points, but also of its operators, who had to fiddle constantly with their sets to obtain and hold a useful image. 'The operation of the H2S was an art,' one navigator has recalled. 'When the operator put on too much power, the screen was all white.' Even when tuned properly, 'it was necessary to remember which blob was which city. This required almost continuous monitoring,' and, once lost, crews did not gain much help from H2S because the 'blobs had no real shape or form' and looked alike.¹⁰

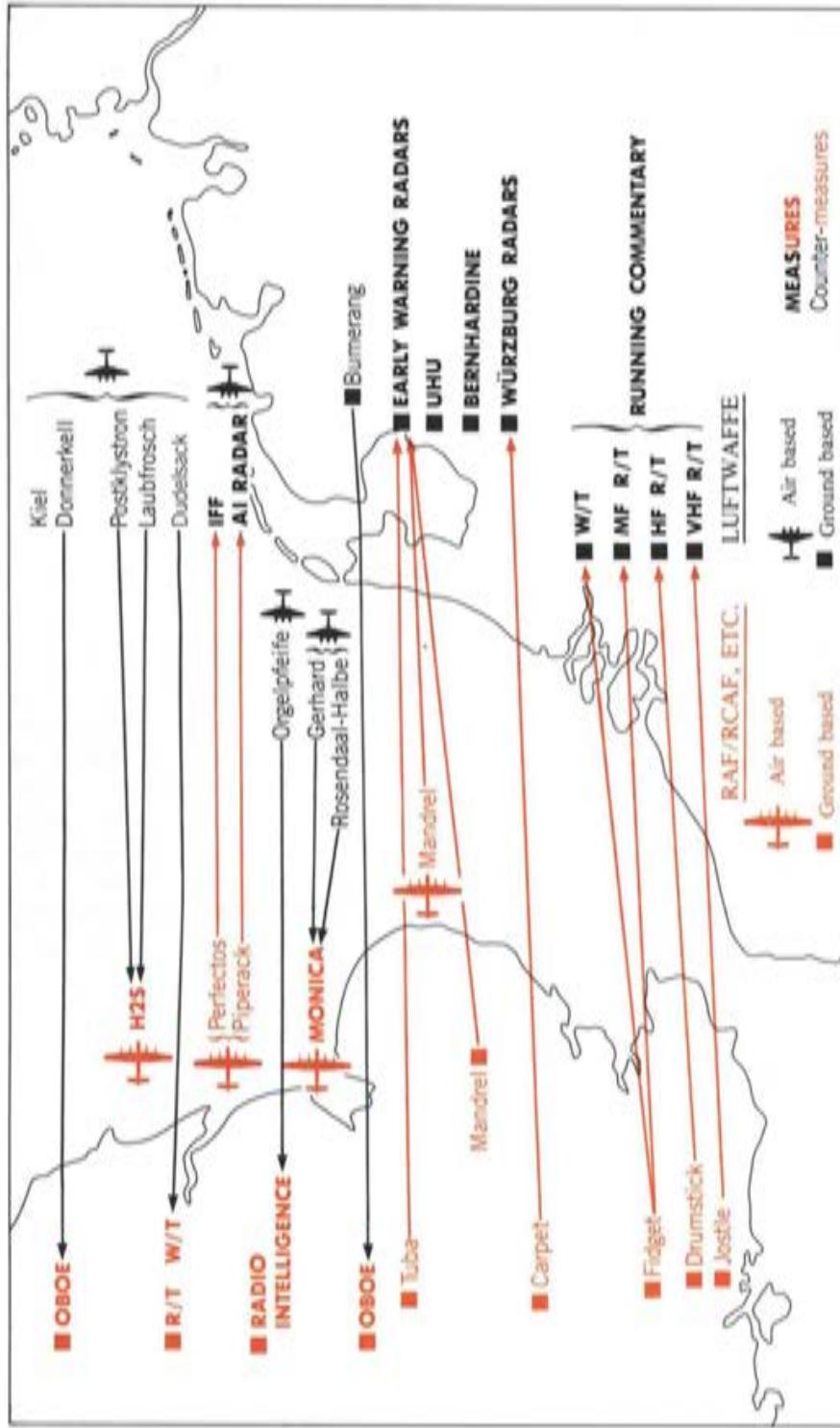
The idea of savaging Berlin had been close to Churchill's heart since August 1940. The same could not be said of the secretary of state for air or, indeed, most members of the air staff. For them, it was a matter of inconsequential results at far too great a cost, especially when, as the DCAS observed, the Luftwaffe fighter force had not yet been neutralized and Berlin was the best defended of all German cities. Sir Charles Portal needed no tutoring on that issue. He had already agreed that the defeat of the Luftwaffe in the west was a cardinal objective in Allied strategy, and at Teheran in late November he would agree to commit 'the whole of the available air power in the United Kingdom, tactical and strategic ... to create the conditions essential' to launching Operation Overlord. A long offensive against Berlin which drew Bomber Command away from other targets would be of little use unless it achieved everything Harris expected of it.¹¹

Furthermore, as he knew, the attempt to knock out the Luftwaffe and its industrial base was not going well. Harris had done very little so far, while the Americans had been losing heavily in recent weeks, the disastrous mission to Schweinfurt on 14 October having, in fact, reduced both the number and weight of their attacks against German targets. More disquieting still, on 4 November (the day after Harris addressed Churchill), the CAS received new intelligence estimates of enemy fighter production and strength that were, to put it simply, altogether staggering. Where Pointblank aimed at reducing the number of machines available in the west to less than seven hundred, it now appeared that the Luftwaffe would have 1500 in operational units there in December and as many as 1700 at the end of April 1944, just before Overlord was scheduled to take place.¹²

Despite the weight of opinion against opening a campaign against Berlin – Harris was supported only by Air Vice-Marshal F.F. Inglis, his chief of intelligence, who seems to have been a prisoner of his hopes and what some of his sources were telling him about the state of German morale – Portal chose not to heed the warnings proffered by his staff. Having sided with Churchill and Harris before on the question of Berlin, he did so again, but his endorsement was not open-ended. High Wycombe was told firmly that operations against the German capital would be stopped if they began to involve heavy casualties – and when it was time for Harris to turn his attention more directly to Overlord some time in the spring. For the moment, however, losses would be the determining factor.¹³

When, in his effort to support Harris, Inglis had observed that a prolonged and tightly focused offensive against Berlin was a good way for Bomber Command to outwit the enemy and avoid the casualties which worried his colleagues, he was uttering nonsense bordering on lunacy. True, there was evidence that the Germans had not fully recovered from all the effects of Window, although Harris was fully aware that the 'relief' it provided was 'very incomplete,' especially for those crews flying in the upper echelons of the bomber stream. It was known that the enemy had done very little to improve the all-weather capability of its night-fighter force, a welcome oversight on the eve of a winter campaign. And electronic jamming continued to pay off. If Corona was not preventing the German controllers from passing on information, it was clearly annoying and frustrating them, buying time in the process, while Airborne Cigar seemed to be working well enough against VHF radio broadcasts. Dartboard, a new jammer, would soon be introduced against the MF band. Finally, knowing nothing about SN2 radar, Inglis still believed that skilled crews using Monica and Boozer stood a good chance of avoiding interception.¹⁴

What he did not seem to understand, however, was that there were limits to what the current electronic warfare campaign could achieve. By late March 1944 the Germans were using nine speech and two Morse channels for their running commentary, and to blot out all eleven at the same time proved impossible.¹⁵ He also failed to see that diversions were less effective – and



THE ELECTRONIC WAR: MAJOR 1944-1945 ADDITIONS (EXCLUDING WINDOW)

losses rose two-fold, on average – whenever the bombing lasted more than half an hour, something that was all too likely on raids to distant targets like Berlin unless time- and track-keeping were near perfect. Nevertheless, the greatest intelligence failure was the degree to which the air staff and Bomber Command underestimated German progress in finding tactical and technological counter-measures to British initiatives in the radio and radar war.

Generalleutnant Schmid had already strengthened the reconnaissance elements within his Jagddivisionen – both shadowers and route-markers – to help ease some of the confusion caused by diversions and jamming, while Laus equipment based on the Doppler principle was being added to fighter and Flak-control Würzburgs to penetrate Window. Beyond that, Bernhardine and Uhu – direct data-link systems employing, respectively, a coded ticker-tape and visual display on the AI screen to give the position of the bomber stream – were past the experimental stage and, when brought forward, promised to neutralize Corona altogether. Tinsel, the jammer aimed at the enemy's high-frequency commentary, had been neutralized by the simple introduction of more powerful radio transmitters, and that could be done across the entire radio band. These were in addition to Bumerang, Flamme, Flensburg, Naxos, Naxburg, Rosendaal, and Korfu equipment – which began to appear during the winter of 1943–4 and enabled the Luftwaffe signals intelligence and air-defence organizations to detect, plot, and in some instances home on to Bomber Command's Oboe, IFF, Monica, and H2S emissions, thereby decreasing the effectiveness of Window and the diversions and deception associated with it. Because of sheer volume, the electronic signature of a large main force using all its equipment could not be concealed. By the same token, the volume of H2S and other such emissions from only twenty or thirty would never approach that of a large main force. Little wonder, therefore, that as he probed his enemy's weaknesses, Schmid was consistently amazed by the way in which Bomber Command allowed its crews to switch on their electronic equipment for prolonged periods – oblivious, it seemed, to the fact that every minute's use increased the vulnerability of the bomber stream as a whole.¹⁶

In addition, no one at senior levels in the Air Ministry or at High Wycombe suspected the existence of *Schräge Musik*, the lethal upward-firing cannon that was now 'universally common in the night-fighter formations.' And while the expanding Flak defences were carefully recorded (the number of heavy guns in the west increased from 5500 in December 1942 to 8000 a year later), High Wycombe seized upon reports that the enemy was firing so-called Scarecrow flares to simulate aircraft blowing up, 'for deterrent effect,' rather than concede the possibility that German anti-aircraft artillery might have become more effective.* That was a terrifying prospect now that

* Crews were warned constantly not to 'play into the enemy's hands by allowing either a Scarecrow or an actual aircraft in trouble to affect their determination to carry out their task.' In fact, the Germans never used pyrotechnic devices for this purpose, and all alleged Scarecrows were genuine mid-air explosions: aircraft blowing up after being attacked by fighters equipped with *Schräge Musik*, bombs going off prematurely because of faulty or improperly set fuses, or bombs colliding in mid-air. (In December 1944 it was discovered that some 500-

Bomber Command was about to take on the most heavily defended city in Germany.¹⁷

So much for Inglis's bizarre expectation that the enemy could be outwitted, tactically or technologically, in a sustained effort against its capital.¹⁸ Indeed, convinced since October that Bomber Command would soon focus its attention 'especially on Berlin,' Luftwaffe commanders had made its defence their 'point of main effort. [Air defence] would only be a problem if [Bomber Command] attacks small targets, as has been the case recently, and practises deception. If he does that, we can get very badly burned, as we have seen. As opposed to that, we're not going to let ourselves be fooled in his attacks on Berlin' There, Kammhuber had concluded (before his departure for Norway), apart from the weather, 'we have no great worries.'¹⁹

The battle of Berlin began on 18/19 November, and the plan of attack adopted at High Wycombe reflected much that had been learned (or surmised) about the enemy's defences over the past two months. Along with whatever electronic interference could be generated, spoofs and diversions would be mounted to draw enemy fighters as far away as possible from the target, and, whenever possible, depending on wind and weather, the route would be selected to avoid the beacons around which fighters gathered, waiting for the target to be identified and broadcast to them. In addition, as evidenced by the first night of the battle, Harris hoped to catch the Germans off guard from time to time by sending out two main forces of roughly the same size to attack two different targets. The larger, made up of 440 Lancasters (including twenty-nine from Nos 408 and 426 Squadrons) and assisted by four Mosquitoes, would attack Berlin, while the other, comprising 395 Lancasters, Halifaxes, and Stirlings, would make for Ludwigshafen, three hundred miles away to the south-west. Both streams were to cross the enemy coast at the same time, and they were to be concentrated as never before, the raid on Berlin being scheduled to last only sixteen minutes. To add to the confusion, the southern force was to fly north and east of its target, towards Frankfurt (where Mosquitos would conduct a feint attack), before doubling back to Ludwigshafen.²⁰

The enemy controllers saw and reacted to both incursions, and split their defence in two. At Berlin, where the weather was bad and many fighters were ordered to land, only nine bombers were lost, 2 per cent of those dispatched, and the two Canadian squadrons emerged unscathed. The weather was better over Ludwigshafen, however, and twenty-three failed to return, 5.8 per cent of those sent. Seven of those lost were from No 6 Group, 7.4 per cent of its effort, and an eighth ditched in the Channel. The early return rate was uniform-

lb bombs released from the rear centre section of the Lancaster bomb bay had hit 2000- and 4000-lb bombs dropped from further forward and had exploded on impact.) However, it is not difficult to understand why the existence of Scarecrows was given credence at all levels within Bomber Command. It was convenient, even comforting, for everyone from Sir Arthur Harris down to have such a congenial and non-threatening explanation for otherwise terrifying and demoralizing occurrences.

ly high, largely because of the heavy cloud, fog, and icing encountered en route, and for some crews the intense cold was also a problem. The RCAF base at Middleton St George reported three men suffering frostbite as a result of temperatures as low as -40° Celsius: one was a rear gunner who had cut out a clear-vision panel in his turret, while the other two were navigators whose photo-flash camera hatches were exceedingly draughty. The Germans recorded only seventy-five high-explosive bombs falling on Berlin, of which eleven were duds or delayed-action, and no industrial buildings were destroyed. At Ludwigshafen, the bombing was 'widely scattered,' and, in No 6 Group's view, the raid was a failure.²¹

The chemical plants at Leverkusen were attacked the next night by 266 aircraft. The weather was still bad, grounding most of the target night-fighters, but Himmelbett missions were flown in Holland. Although the overall casualty rate was just under 2 per cent, No 434 Squadron continued its run of misfortune. It had lost two crews at Ludwigshafen, and two more (of the nine dispatched) failed to return from Leverkusen. The attack itself was a flop. The Pathfinders suffered a number of Oboe failures, the marking was not concentrated, and only one high-explosive bomb was reported as having fallen within the town. The return flight was also difficult, the weather having deteriorated, and by the time the bomber stream arrived over England fog had blanketed a number of airfields, forcing crews to find and land at alternate bases. Three machines crashed, including one from No 428 Squadron, but – after months of effort – a way had been found to reduce the dangers associated with landing in poor visibility. FIDO (Fog Investigation Dispersal Operation), which used pots of burning oil as a dispersant, was tried out at Gravelly, and following its success was installed at other bases shortly thereafter.²²

After a three-day break because of weather, more than 750 aircraft were dispatched to Berlin on 22/23 November, the largest number yet directed to the capital and, in terms of the tonnage of bombs dropped, the second heaviest attack so far – the heaviest being the Hanover raid of 22/23 September. No 6 Group contributed 110 crews. No diversions or feints were attempted, it being anticipated that the persistent fog and low cloud over northern Germany would continue to keep most fighters on the ground, and High Wycombe selected a direct route in order to facilitate an even greater degree of concentration than on the first raid. Bombing was to last just twenty-two minutes. In the event that fighters could get off the ground, Mosquitoes would be dropping decoy fighter flares to draw them away.²³

The Germans were not fooled at all. Through electronic eavesdropping the bomber stream was picked up in good time, the controllers deduced that Berlin would be the target, and their appreciation was good enough to identify the five separate waves into which Harris had divided the main force. But the night-fighters were helpless because of the weather, and it was Flak that accounted for most of the twenty-six bombers shot down. No 434 Squadron had another bad night, losing two more crews – its tenth and eleventh in exactly one month – but there appears to have been no good or logical reason for the squadron's heavy casualties. It had been assigned to different waves in

each of the raids mounted so far in November; it was never among the first over the target; and it had been in the last wave only over Ludwigshafen. Yet that was not a particularly dangerous place to be on 18/19 November, as No 428 and 429 Squadrons, also in the last wave, lost only one crew between them. Similarly, No 434 Squadron's 'wave-mates' at Leverkusen, again Nos 428 and 429, had lost only one crew. At Berlin, all the Halifax squadrons were in the same, middle wave, sandwiched between the Lancasters.²⁴

The bombing was concentrated and accurate despite the cloud and fog. The Pathfinders had found the aiming point with H2S and their sky-markers were concentrated, well-placed, and visible. No 6 Group reported as well that a few had managed 'to see and bomb on the green ground markers cascading in the gaps' through the clouds they found over the capital. Over 1750 civilians were killed (including five hundred in one large shelter that received a direct hit), nearly 7000 injured, and 180,000 made homeless. With Telefunken, Blaupunkt, Siemens, and Daimler-Benz factories all severely damaged, Josef Goebbels was appalled by what he saw the next morning: 'Blazing fires everywhere ... Transportation conditions are ... quite hopeless ... Devastation is ... appalling in the government sector as well as in the Western and northern suburbs ... Hell itself seems to have broken loose over us.' Just as important, it was annoying, he observed, that 'the English fly in bad weather ... all the way to Berlin; but the German pursuit planes can't rise from the ground in Berlin because weather prevents!'²⁵

Hans-Georg von Studnitz, who worked in the Foreign Ministry, was equally shattered.

We have lived through an indescribable experience and survived what seems like the end of the world ... The road leading to [the subway station in Rosenthalerplatz] consisted of nothing but a row of smouldering shops and offices ... Hundreds of people had taken refuge on the subterranean platforms, with such of their possessions as they had been able to salvage. Wounded, bandaged and their faces smothered in dust they hunched apathetically on their bedding or whatever else they had been able to bring with them ... All around the destroyed station in the Alexanderplatz the great warehouses were burning fiercely ... The *Zeughaus*, the university, the *Hedwigskirche* and the National Library had all been reduced to ashes ... In the Pariser Platz the headquarters of IG Farben was burning ... On the other side of the [Brandenburg] Gate the Tiergarten looked like some forest battle-scene from the First World War. Between whole battalions of fallen trees stood ... jagged stumps of oak and beech ... bereft of the crowning glory of their foliage ... Of the thirty-three houses in [our] street only three had survived the night. In the dim light of the dawning day we found, at the corner of the Tiergarten, some linen and a few clothes which our cook, Klara, had been able to rescue ... Everything else was irretrievably lost – our supplies of food, which we had built up over the years, three hundred bottles of wine, our furniture, everything.²⁶

Similar accounts appeared in the neutral press, the Swiss *Gazette de Lausanne* commenting that Berliners were 'completely stunned by the catastrophe'

and everywhere were saying that their city 'will become a second Hamburg.'²⁷ Stockholm's *Svenska Dag-bladet* meanwhile confirmed that the government districts had been hard hit. 'Hitler's residence near the Reich Chancellery received a direct hit and burnt fiercely, and so did the Foreign Office. The French Embassy received a direct hit and was set on fire. It was useless to try to extinguish it. The [former] British Embassy was hit and a fire broke out ... The Armament Ministry ... was burned down to the first storey. The whole of the Tiergartenstrasse looked like a curtain of fire even several hours after the raid.'²⁸

Bomber Command conducted a smaller raid the next night, yet despite heavy jamming, the dropping of decoy fighter flares, and the imaginative use of Corona to order the night-fighters to land (by a German-speaking woman who had been standing by in case the enemy employed a female voice to give the running commentary), the loss rate was higher than before. Twenty of the 382 sorties dispatched were lost, 5.2 per cent. No 6 Group committed only nineteen, from Nos 408 and 426 Squadrons, of which one failed to return, but No 405 Squadron also lost one crew whose pilot had quite clearly exercised bad judgment. 'We were experimenting with Fishpond [fitted to H2S to warn of approaching fighters],' recalled Flight Lieutenant C.W. Cole, a navigator with forty-three operations to his credit, when the wireless operator 'reported that he thought there was an A/C approaching from [the] rear.' Since the gunners saw nothing, however, the pilot decided against taking evasive action. Several minutes later there were 'loud crumps' which the pilot took to be Flak, but as the bomber was near Groningen, away from all known anti-aircraft batteries, Cole protested this could not be. Still the pilot did not listen, left the automatic pilot switched on, and shortly thereafter a night-fighter attacked from the rear, causing an explosion that killed everyone except Cole, who became a prisoner of war.²⁹

The damage to Berlin was considerable, adding to the sense of chaos in the German capital. The Felsch aero-engine works and the Siemens and BMW plants in Charlottenburg were destroyed; another 1315 civilians were killed, 6383 injured, and an additional 300,000 left homeless.³⁰ As the zoo had also been hit, 'fantastic rumours' were soon circulating. 'Crocodiles and giant snakes are supposed to be lurking in the hedgerows of the Landwehr canal. An escaped tiger made its way into the ruins of the Café Josty, gobbled up a piece of ... pastry it found there – and promptly died. Some wag, who drew uncomplimentary conclusions regarding the quality of Josty's cake-making, was sued for libel ... The Court ordered a post-mortem of the dead animal which found, much to the satisfaction of the confectioner, that the tiger's death had been caused by glass splinters found in its stomach.'³¹

Forty-eight hours later, on the morning of 26 November, there were signs that Berlin was beginning to recover. 'The Wilhelmplatz has already undergone quite a change,' Goebbels noted. 'The fires are out, the atmosphere is clear, smoke has disappeared. There is no blaze left to extinguish. In short, although one sees the bare ruins of buildings ... the most serious catastrophe has already been overcome. It is remarkable how fast everything goes. I thought it would

take weeks; in reality, only two days were needed to get back to some semblance of order.³²

The city might still have been burning if a raid scheduled for 25/26 November had not been cancelled at the last moment because of weather. The supporting diversion to Frankfurt, however, proceeded as planned. It was not a good effort. Heavy cloud covered both the route and the objective, obscuring not only the target but also the Pathfinder flares and markers, and damage to the city was slight. There were also strong winds, which may have pushed a few off course, but on the whole they probably worked to Bomber Command's advantage by delaying the arrival of some fighters and persuading others to land in accordance with Corona instructions. Twelve bombers were lost (4.6 per cent), but for once No 434 Squadron had no concerns on that score. 'It was really something,' the unit's diarist exclaimed, 'to have all our a/c and crews return safely from a trip after the bad luck of the past few weeks.' Instead it was the turn of Nos 429 and 431 to suffer. Both had experienced very few casualties over the previous three months, but this night the former lost three, and the latter two, of the six No 6 Group crews missing from the eighty-eight sent.³³

A new tactical wrinkle was introduced the next night. Two main forces were involved, one making for Stuttgart (regarded as second in importance only to Schweinfurt as a centre of German ball-bearing production)³⁴ and the other for Berlin. Instead of being widely separated, however, they were to fly the same route until just northwest of Frankfurt, where they would make their respective turns to the south and north. That, the planners hoped, would initially persuade the Germans that Frankfurt was again the target and lead them to concentrate their fighters there; but if the ruse failed, it was hoped that one or the other of the two bomber streams might yet escape notice altogether as it turned on to the last leg of its route.

The manoeuvre worked wonderfully well and the bombers sent to Stuttgart met very little opposition. Only six of 178 went missing, and all these losses occurred in the vicinity of Frankfurt, before the two streams went their separate ways. The bombing was considered to be 'highly successful,' with fires well established on both sides of the Neckar River, although the actual damage to the city was less than that caused by the 7/8 October raid and the only industrial plant knocked out was a Daimler-Benz factory which produced speedboats. Moreover, Hermann Göring happened to be in Generaloberst Weise's command centre as the night's drama unfolded and, taking charge, the Reichsmarschall ordered all available fighters to Frankfurt. By the time the real situation became clear – even to Göring – it was too late to send many of the target interceptors to Berlin, although there were some night-fighters over the capital. About twenty SN2-equipped machines had been infiltrated into the bomber stream long before it reached Frankfurt by Himmelbett crews under Ypsilon (Benito) control in Holland, and these Zahme Sauen stayed with the bombers all the way, accounting for most of the twenty-eight Lancasters missing from the force committed to the capital. That represented a 6.3 per cent loss rate, much too high for a night when Bomber Command's deception plan had

worked better than anticipated. (No 6 Group lost only two of thirty-nine sorties, although four returned early, including three from No 426 Squadron.) The operation nevertheless appeared to have been a success, RCAF crews reporting a 'fierce conflagration burning in a solid mass around the markers over a large area in the centre of the target' and 'another large fire' to the south-west. They were probably right. Officials in Berlin recorded 981 houses destroyed, 25,000 homeless civilians, and about fifty industry facilities severely damaged or destroyed.³⁵

For many, the greatest danger experienced this night came on their return to England. Fog and mist blanketed almost all the airfields in the south, and as many as thirty bombers crashed or were crash-landed as pilots tried desperately to land. For once, No 6 Group's location in the northern part of Yorkshire was to its advantage, most of its stations enjoying relatively clear skies, and only one crew crashed on landing because of the weather. Another did so because of battle damage. Lancaster G of No 408 Squadron, piloted by Flight Sergeant R. Lloyd, temporarily lost one engine just before reaching Berlin, was hit by Flak, and then attacked by a Ju 88 which knocked out a second engine – this one permanently – and the mid-upper turret. Lloyd made it back to England, but another engine failed, the aircraft went into a spiral dive, and he eventually crash-landed in a sewage disposal site near Lincoln. The navigator, shattered by the experience, suffered a nervous breakdown and had to be invalided home to Canada.³⁶

There were no major raids for the next four nights. The need to regroup after so many had landed away from their home stations caused one night's delay, and bad weather over England added three more. It was a welcome break, particularly for the Lancaster squadrons who had carried the main burden against Berlin so far (and would continue to do so for the rest of the campaign). Indeed, when operations resumed on 2/3 December Harris again dispatched a predominantly Lancaster main force to the German capital, supported by a Mosquito diversion to Bochum. High winds drove the stream north, scattering it en route, and the attack broke down almost from the beginning. The overall early return rate was 9 per cent, about normal for the kind of weather encountered, but No 6 Group's 22 per cent was very high. No 426 Squadron led the way again, with four crews coming back early, but No 432's three were not far behind.³⁷

The Luftwaffe had no trouble handling this raid. Bomber Command had selected a direct route to Berlin, and the city was identified as the probable target nineteen minutes before the bombing began. The feint at Bochum, meanwhile, failed miserably. The Mosquitoes there were seen for what they were, while the shadow aircraft Schmid had inserted into the main bomber stream confirmed that it had flown past the Ruhr.³⁸ Altogether, forty bombers were shot down, 8.7 per cent of those dispatched. No 6 Group again fared better than average, losing just two of thirty-five machines, perhaps in part because the Canadians were gaining in experience. One crew from No 426 Squadron, for example, was singled out for the exemplary cooperation between pilot and mid-upper gunner in warding off multiple fighter attacks. 'While

flying over the target, aircraft was coned by 50-70 searchlights ... during which time they were attacked five times by enemy aircraft and damaged by *Flak*.'

The M[id-U]pper G[unner] first sighted a Ju 88 on the port quarter down at 400 yards ... and gave combat manoeuvre corkscrew port and the fighter immediately broke off his attack. No exchange of fire ... The second attack developed from starboard quarter down and the MUG ... gave combat manoeuvre corkscrew starboard and again fighter immediately discontinued his attack and broke off ... No exchange of fire. The third attack came from the port quarter down. Again MUG gave combat manoeuvre ... and enemy aircraft broke off ... Fourth attack developed from starboard quarter down ... and MUG once again gave combat manoeuvre ... and again fighter immediately discontinued his attack ... The fifth and last attack developed from port quarter down ... Enemy aircraft came in to 60 yards range and broke away to port beam above giving MUG sitting target ... sparks and tracer were seen to ricochet off fighter and enemy aircraft dived steeply ... The rear gunner was completely blinded throughout these five attacks by the blue master ... and other searchlights.³⁹

The next night the Halifax squadrons were committed in strength after nearly a week's layoff. Although nine Mosquitoes carried out a feint attack on Berlin, the main deception was once more included in the tactical plan developed for the main force. It drove straight for the capital and then turned south just fifty miles short of it – just as the Mosquitoes reached their objective. With their attention fixed firmly on Berlin, the German controllers did not notice the change of course at first, and realized that Leipzig was the actual target only when the city's *Flak* detachments reported bombs falling there. Weather also hindered the *Luftwaffe*'s effort. High-altitude fog and dangerous icing conditions limited its response to about seventy sorties, all by experienced crews, and mostly confined to *Himmelbett* operations over Holland. Still, twenty-four bombers were lost, 4.5 per cent of those dispatched, of which twelve seem to have fallen to *Flak* over Frankfurt, where many had strayed on the way home. The same icing that thwarted the Germans also led to some early returns, but No 6 Group's 19 per cent rate was once more higher than average. No 432 Squadron had five crews return early, making eight in two nights, while No 429 recorded four.⁴⁰

As Leipzig registered well on H2S, the cloud sitting over the city had little effect on No 8 Group's marking. The town centre, filled with crowded tenements, was also extremely vulnerable to fire, and suffered heavy damage as a result. An actor interviewed by the Swiss *Tribune de Genève* reported that 'the arrival of waves of bombers over Leipzig was so unexpected and rapid that the AA batteries did not go into action until a quarter of an hour after the first wave had passed over. Hundreds of houses were burning. The Opera House, the Dresdener Bank, the Reichsbank, the University, the central Post Office and the Exhibition Hall were all in flames and were later completely destroyed. All the principal hotels ... and all the fashionable coffee houses in the centre of the city were also destroyed. It could be said without exaggeration that the whole of Leipzig had ceased to exist ... On 5th December at

midday it was still dark ... The whole city was covered by black smoke which stung and made it impossible to breathe. A London fog was nothing compared with it.' Almost 200,000 people were left homeless. More important, however, a seventeen-building assembly plant used for the construction of Ju 88s was destroyed.⁴¹

This was the last large raid for twelve nights. All else being equal, and allowing for the weather, bomber operations ebbed and flowed with the lunar cycle, and Harris decided to stand his command down almost entirely during the December moon period. Apart from a large Gardening effort to the Frisians in which No 6 Group was not involved, until 16/17 December only Mosquitoes from No 8 (Pathfinder) Group and Whitleys and Wellingtons dropping leaflets and conducting radio counter-measures training were on operations over the continent.⁴²

As it happened, the mid-December stand-down coincided with the week or two it usually took for High Wycombe and the six bomber groups to prepare and circulate their customary month-end reviews of operations, and those produced at this time gave the various staffs their first opportunity to make formal assessments of the progress of the battle of Berlin to date. The ORS at High Wycombe was unequivocally optimistic. Although no photographic reconnaissance flights had yet been made over the city, it seemed even from the 'usual sensational stories from neutral sources' that Berlin was being hit hard, sometimes very hard, and perhaps hard enough to cause morale to deteriorate. H2S, especially the Mark III variant, had proved satisfactory enough for area raids, and a solution had been found to the main cause of its 23 per cent failure rate in November – freezing in the scanner motor. Moreover, although navigators' wind-finding still left much to be desired, help would soon be available when specially selected and experienced crews from each group would begin to broadcast corrections to the predicted wind velocity and direction given to crews at their briefing.⁴³

Just as important, losses over Berlin were holding at about 5 per cent, precisely as Harris had foreseen, and although they had risen above that figure on the last two raids there was no reason to suspect that this marked the beginning of an unwelcome trend. It was even assumed that some of the German successes could be written off as accidents, pure and simple. Twice, in fact, Schmid's controllers had guessed wrong about the target, but their error led them quite by accident to direct fighters to the bomber stream's turning point. Although the play of fortune obviously could not be predicted, High Wycombe felt reasonably confident that jamming, Intruders, and the escorts of No 100 Group would eventually gain ascendancy over both Himmelbett and freelance fighters. In particular, Serrate, which homed on to Lichtenstein B/C radar, was now in quantity production, and it had taken only five weeks to develop Dartboard to jam the 100-kilowatt radio station in Stuttgart which was first used for night-fighter control in early November. When, however, the Germans began incorporating a musical code into shows broadcast over their domestic radio network – playing waltzes to signify raids on Berlin and accor-

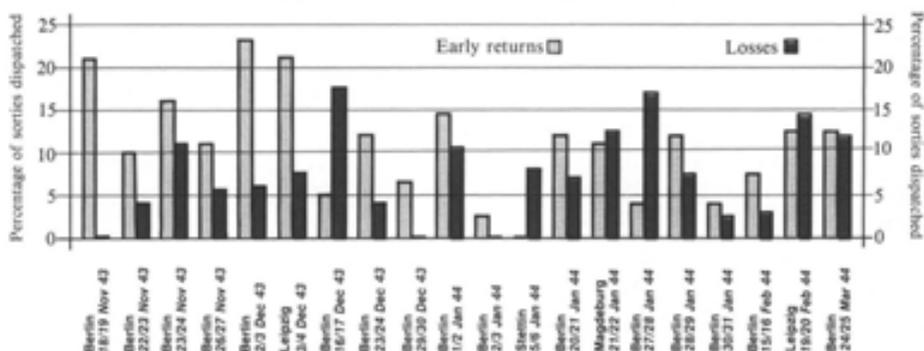
dion music to denote attacks on Leipzig, for example – 'legal objections were raised against the jamming of this kind of programme' for fear that the enemy would retaliate by jamming the domestic service of the BBC. Accordingly, the Germans were left free to use their code 'with little or no interference from the middle of December 1943 until it was superseded in the middle of February.'⁴⁴

Although SN2 remained a mystery, hidden in the witches' brew of radio waves that now flowed freely over northern Europe, British intelligence had done reasonably well in figuring out how to attack the enemy's command and control organization and in identifying other 'active' systems. That the Germans would also use passive homing and eavesdropping equipment seems not to have been taken as seriously as it should have been, however, and at this stage the fact that H2S could be homed on to had not raised concern. Even when there was evidence that the Germans were reading IFF transmissions, Harris initially did nothing to limit its use, knowing that his crews took comfort from its alleged jamming properties. Eventually persuaded that it was costing him twenty crews a month, the AOC-in-C issued the appropriate warning in February 1944, but not everyone listened and IFF transmissions emanating from deep inside Germany could still be monitored in Britain well into 1944. However, Harris's phlegmatic reaction to the first warnings about the vulnerability of IFF so angered the assistant director of intelligence (science) that he was persuaded to use very strong words to condemn the AOC-in-C. High Wycombe, R.V. Jones charged, was guilty of an 'immoral practice' for the way in which it encouraged 'brave men to clutch at false straws in their hour of greatest danger.'⁴⁵ But perhaps false straws were important from time to time, so long as the overall cost was not counter-productive.

No 6 Group was reasonably pleased with November's statistics. Its overall loss rate was only marginally higher than Bomber Command's as a whole, a welcome change from just a few months before. As a result of better course- and time-keeping, the number of Canadian crews credited with bombing the primary target was now higher on average than in Nos 3 and 4 Groups. Only the early return rate was not altogether satisfactory. Too many times equipment that had purportedly malfunctioned in the air en route to the target was found to be 'OK on test' after a crew returned early, effectively absolving the ground-crew of any responsibility for the alleged fault; and there were too many borderline cases that stretched the permissible or reasonable limits for returning early. Some crews, for example, had aborted missions because their bombsight had failed, scarcely a fundamental concern in an area offensive conducted exclusively at night, often in thick cloud, with less than perfectly concentrated marking, and in which only half the bombs dropped blindly on H2S fell within a four-mile diameter circle.⁴⁶

In Air Vice-Marshal Brookes's view, either his crews did not know how to use all their equipment or they were exhibiting a 'lack of offensive spirit.' When there was no medical cause for this lack of spirit and disciplinary measures were taken, the worst cases were deemed to lack moral fibre and declared to be 'Waverers.' Determined to deal 'more vigorously and rigorously

NO 6 GROUP RAIDS - WINTER 1943-1944 NORTH-EASTERN GERMANY



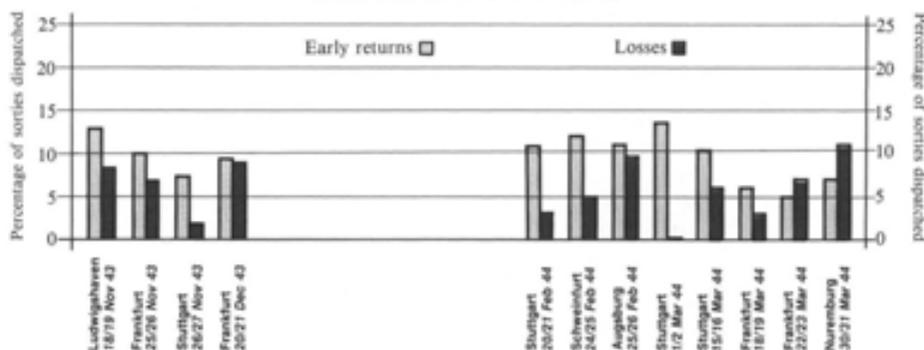
The Battle of Berlin, which lasted from 18/19 November 1943 to 30/31 March 1944, was undoubtedly Bomber Command's greatest test of the war. Although targets other than Berlin were attacked, never before had Sir Arthur Harris's crews flown so many long, fatiguing operations in such strength, in the worst weather of the year, to what was, arguably, the most heavily defended city in Germany. Harris predicted that the battle would cost him 500 machines, but boasted that Germany would lose the war as a direct result. In fact, 1117 aircraft were lost on all night operations during the period. Against Berlin itself, 472 of 8145 sorties dispatched failed to return or crashed in England upon their return, 5.79 per cent of the total. No 6 Group sent 1292 sorties to the German capital, losing eighty-three, 6.42 per cent of the total.

The early return rate was also high. There were, of course, always legitimate reasons for crews to break off their missions, some of which were laid down in Bomber Command's procedures.

The two charts on this page, using figures extracted from No 6 Group's operational record book, show the shifting relationships between loss and early return rates, which (in the north-east, where the battle was generally more intense) were at their closest in January 1944. The early return figures are raw data, and no attempt has been made to determine which were legitimate and which may have reflected crews' manufacturing a reason not to complete a particular operation.

Both charts suggest that early return rates rose and fell in a predictable pattern. When loss rates rose, within a relatively short time early return rates rose too. Even against the less well-defended targets of southern Germany, the overall trend of early returns generally reflected the loss rate – as if it were a reaction to it.

NO 6 GROUP RAIDS - WINTER 1943-1944 SOUTHERN GERMANY



with certain types of early returns,' the AOC laid down the law. Henceforth, in by far the majority of cases, early returns would be sanctioned only if the weather or mechanical and technical malfunctions put a crew at risk. Even then, however, the legitimacy of a crew's decision to turn back would be determined largely by how far it had got into enemy territory, Brookes contending that it was usually safer to go on once the enemy's defences had been penetrated than to return alone. Similarly, although intercom failure between the rear gunner and the pilot was almost always reason to turn back because it impeded the latter's ability to take effective evasive action, a simple turret or gun failure generally was not. 'Shooting down an enemy aircraft is more a luxury,' the AOC observed, than 'a necessity.'⁴⁷

Brookes was so exercised by the problem he saw before him that he wanted to penalize crews found to have returned early without due cause by compelling them to fly additional sorties beyond the current regulation thirty-trip tour – a suggestion High Wycombe turned down cold, on the very reasonable grounds that operations should never be made to look like punishment. Since a penalty of a kind was already built into unjustified early returns – the sortie in question did not count towards the completion of a tour – this was a sensible response, but one which offered nothing new to solve a problem that would shortly get worse throughout Bomber Command.⁴⁸

Despite the blemishes in the record, in mid-December 1943 it was possible to construe the battle of Berlin, and therefore Harris's strategy, as on the way to achieving its objectives. 'This is the Twilight of the Gods,' a foreign diplomat was reported to have said after the second November raid; and since then, Bomber Command's intelligence staff added, playing with the metaphor, 'the twilight has deepened into darkness ... mark[ing] the beginning of the end ... of the reign, "nasty, brutish, and short," of the false gods worshipped by Hitler's Germany.' The enemy capital could apparently be attacked without disruptively heavy losses, and although it was clear that the city would not be crippled in a matter of days, the AOC-in-C had never promised quick results. It would take twenty to twenty-five raids, he had forecast in August, and about 40,000 tons of bombs. But after just five, if the neutral press and diplomatic corps could be believed, large sectors of Berlin's downtown core no longer existed. In addition, significant damage had been done of which no one in Britain was aware. The electronics industry in Berlin had been so severely disrupted (tube and condenser production having already fallen by 20 per cent and the manufacture of AI radars significantly delayed) that plans were being considered to disperse production, notwithstanding the additional inconvenience that such a major strategem would entail.⁴⁹

Harris hoped that the steady accumulation and skilful presentation of evidence about what Bomber Command was accomplishing would give his Berlin offensive sufficient momentum to quiet any lingering opposition to it.⁵⁰ His critics had not yet been silenced, however, and the AOC-in-C was challenged strongly during the December bombing pause. The issue was ball-bearings. Identified by many as the most vulnerable point in the German war economy, the ball-bearing industry had become a *cause célèbre* among the 'panacea

merchants' on the air staff whom Harris loved to deride. This was especially so since the Americans had suffered such horrendous losses at Schweinfurt in October – heavy enough to ensure they would not be returning there in the near future – and even more so as a result of Sweden's decision in early November to cut back its exports of ball-bearings to Germany. One or two raids, it was felt, might put Schweinfurt out of action for good. As a result, on 30 November the Air Ministry declared the city to be 'the outstanding priority target in Germany' and proposed that Bomber Command take it on.⁵¹

Confident that the Germans had taken the elementary precaution of stockpiling such essential items, Harris had never believed that ball-bearings were a critically important objective and had only reluctantly accepted the task of bombing the plant at Stuttgart in late November. Even less did he want to attack Schweinfurt. It was too small, he said, and too hard to find. Moreover, the whole program of area bombing (including the battle for Berlin) might be at risk if he succumbed to the blandishments of the director of bomber operations and his allies, and he said as much when he answered a second memorandum from the deputy chief of the air staff, sent on 17 December, urging him once again to attack Schweinfurt. Not only was such a raid not a 'reasonable operation of war,' but it was surely clear that 'the destruction of about one-third of Berlin, including large numbers of high priority factories, is of incomparably more value in preparing for OVERLORD than the destruction of the town of Schweinfurt would be.'⁵² As it was, the campaign against the German capital had resumed the night before. It would take considerably more pressure before Harris, against his better judgment, committed his crews to an attack on Schweinfurt.

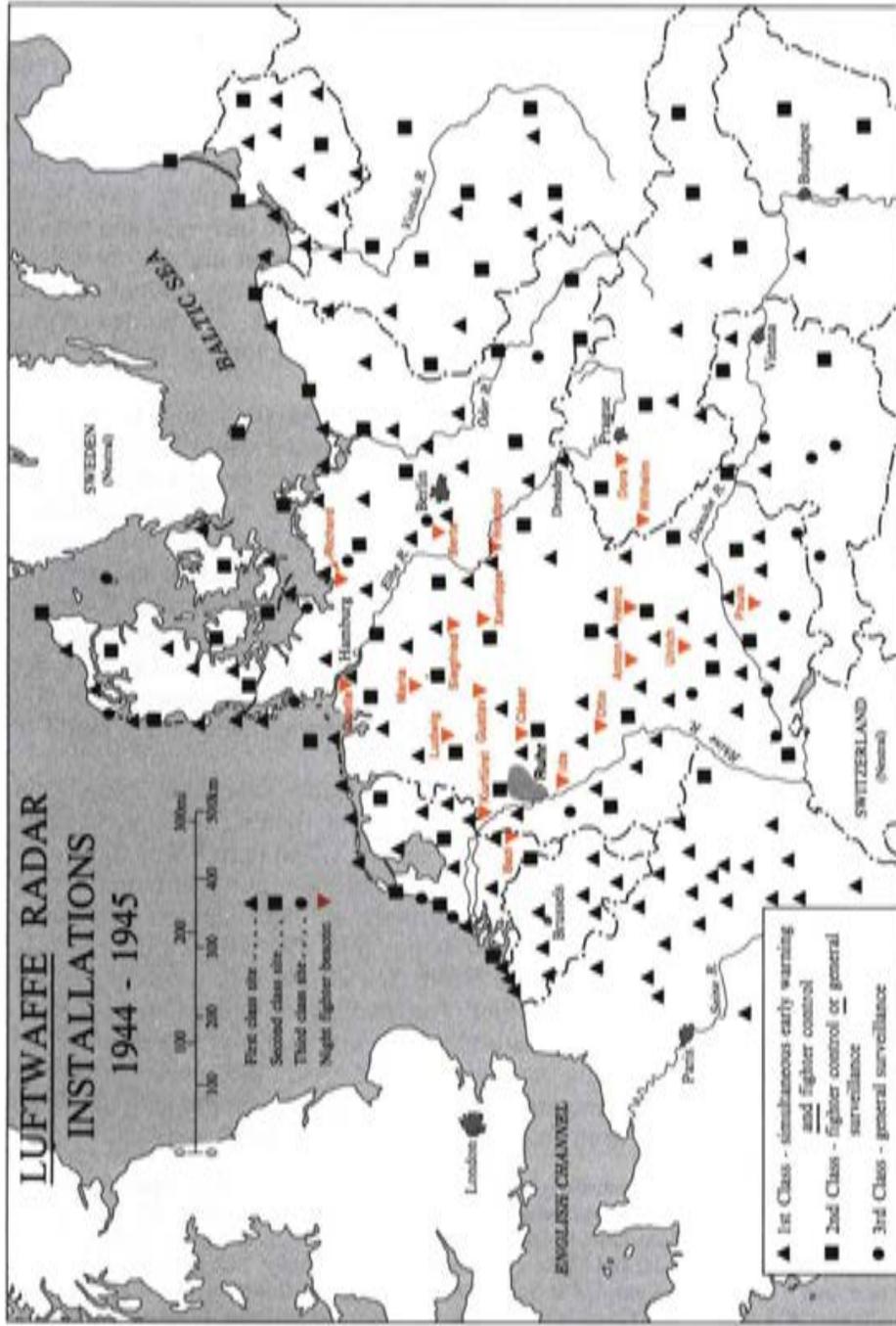
The two-week layoff during which this debate took place was welcomed by the Luftwaffe. Although there was no decline in the confidence displayed by its senior commanders as the battle of Berlin began, night-fighting in winter was a risky and fatiguing business, especially in the absence of the advanced electronic flying aids and navigational equipment enjoyed by the RAF and RCAF. Of the 127 night-fighters destroyed or missing in November and December 1943, only about one in three could be attributed to the direct result of enemy action, the rest being lost in the general course of operations (crashing while trying to land, for example) or on training and maintenance flights. Similarly, of the sixty-nine machines damaged over this period, just fifteen were due to enemy action. Bomber Command was waging an unintended but surprisingly effective war of attrition against the German night-fighter force which would see the latter's overall casualty rate rise to an average of 15 per cent of sorties between January and March 1944.⁵³

Some of the non-operational losses noted above were undoubtedly due to fatigue. In the Luftwaffe there was no such thing as being 'screened' following the completion of an operational tour, so that apart from occasional periods of leave and (for a fortunate few) postings to administrative or other jobs on the ground, aircrew simply kept on flying until they were killed or incapacitated. Major Heinrich Prinz zu Sayn-Wittgenstein, holder of the Knight's Cross with

LUFTWAFFE RADAR INSTALLATIONS 1944 - 1945



- ▲ First class site
- Second class site
- Third class site
- ▼ Night fighter beacon



- ▲ 1st Class - simultaneous early warning and fighter control
- 2nd Class - fighter control or general surveillance
- 3rd Class - general surveillance
- ▼ Night fighter beacon

Oak Leaves and Swords and credited with eighty-three victories before his death on 21/22 January 1944, was a twenty-seven-year-old veteran of twenty-eight months as a night-fighter pilot when he met Georg von Studnitz at the Adlon Hotel in Berlin on 6 December 1943. Von Studnitz found him 'pale and haggard, and, like most young pilots, suffering from nervous strain.' So much so, in fact, that 'he has to take strong sleeping pills to get any sleep at all, and even then he wakes up every half hour.'⁵⁴ All German pilots were being drained, physically and emotionally, and, as the pressure increased and veteran pilots were used up, the need to replace casualties meant not only that there would be no rest for the remaining crews, but also that the amount of basic flying training given to new pilots was steadily cut back. The burden of providing effective defence consequently fell on those who, through weariness and fatigue, were able to give less all the time.⁵⁵

The situation was not yet critical in early December 1943, however, and the Luftwaffe remained convinced that Bomber Command could be beaten. The single, most glaring weakness in Germany's air-defence organization, I Jagdkorps noted,^{*} was the utter lack of offensive action over the United Kingdom, because bombers taking off, fully loaded, or trying to land with nearly empty tanks or battle damage, were in no position to take evasive action and were not protected by Window. Generalleutnant Schmid therefore proposed that intruder operations on a large scale should begin against Bomber Command using Ju 88s and He 219s equipped with the latest electronic equipment, but Steinflug (as this operation was called) was turned down by Hitler because, it was said, he preferred bombers to be shot down over Germany, where they could be seen by civilians.^{56†}

Meanwhile, the increased availability of SN2 radar persuaded Schmid that it was also time to begin pursuit (or route) night fighting on a grand scale. Although Himmelbett would continue in the west, and both Wilde Sauen and some of the twin-engined interceptors would still be sent to the target, henceforth his controllers would endeavour to insert as many fighters as possible into the bomber stream as far forward as possible. The enemy would then be under attack continuously from the North Sea all the way to the target and back – depending on weather and fuel. The choice as to which new equipment should be given priority flowed naturally from this decision: SN3 radar, which could be fitted with Erstling IFF and enjoyed twice the range of SN2; an improved and more discriminating Spanner infra-red detector to help the Wilde Sauen pick up exhausts from four-engined heavy bombers; and Uhu.⁵⁷

* After Kammhuber's dismissal, Fliegerkorps XII was broken up into three separate commands: I Jagdkorps, which covered central and northern Germany and the Low Countries, moved its headquarters from Zeist to Dreierbergen, and comprised three Jagddivisionen headquartered at Döberitz, Stade, and Deelen; II Jagdkorps, at Chantilly, part of Luftflotte 3 in France; and 7 Jagddivision, located at Schleissheim in southern Germany with a subordinate Jagdführer in Austria. I Jagdkorps and 7 Jagddivision were subordinate to the central command in Berlin, initially to Generaloberst Weise in Luftwaffenbefehlshaber Mitte, and subsequently to Generaloberst Stumpff in the renamed Luftflotte Reich.

† Something like Steinflug would be attempted only in February 1945, under the code Gisela, when it was far too late.

Schmid seems to have tried his hand at large-scale route night-fighting when Bomber Command returned to Berlin on 16/17 December.⁵⁸ Having carefully tracked the bomber stream across the North Sea, 1 Jagdkorps directed its crews to Bremen, where they would begin their pursuit. But heavy fog eventually grounded all but the most experienced, and the total effort for the night ultimately amounted to fewer than one hundred sorties, equally divided among Himmelbett, route fighting, and point defence. These were all tormented by very heavy jamming, from England as well as by the fledgling No 100 Group flexing its electronic muscles, and on many fighter control frequencies little could be heard except a bizarre collage of Hitler's speeches and readings of the poetry of Johann Wolfgang Goethe. Nevertheless, twenty-five Lancasters went missing, 5.1 per cent of the 483 dispatched, of which four (10 per cent) were from No 6 Group. The Naxos H2S homing device was immune to all of Bomber Command's electronic countermeasures and the jamming, though intense, was not all-pervasive; frequencies within five kilocycles of Bomber Command's group-control channels were left open to ensure that important signals could get through, and all jamming was suspended every half hour to allow the newly instituted wind-finders to transmit their readings to High Wycombe and for Bomber Command headquarters, in turn, to use these more up-to-date wind values to correct those given at the pre-raid briefing. As the Germans soon discovered, there was always at least one free channel for their fighter commentary, and several more during the winds broadcasts.

Although the attack was scheduled to last only fourteen minutes, in the hope of preventing outlying fighter units from responding in time, that degree of concentration was not achieved. Bombers were over Berlin for ninety minutes, and while more than one hundred large fires were started and 545 civilians were killed, only a handful of industrial facilities were destroyed.⁵⁹ Twenty-five bombers were lost to enemy action, but worse was to come. Low cloud covered all of Britain except Scotland and the West Country, and thirty-four crews, including three from No 405 Squadron, crashed their aircraft as they tried to land. That brought the night's total to fifty-nine machines, 12 per cent of those dispatched.

The weather finally cleared after this raid, making possible the first photographic reconnaissance of Berlin since the battle had begun, and the results added considerably to Harris's credibility.

Damage is widespread and severe. The area in which the greatest havoc is seen, due almost entirely to fire, stretches from the East side of the central district of Berlin to Charlottenburg in the Northwest and Wilmersdorf in the southwest and covers an area of nearly eight square miles. There is also severe damage in the important industrial districts of Reinckendorf and Spandau.

In the Tiergarten district, which has been most heavily hit, whole island blocks can be seen completely gutted. The diplomatic and ministerial quarter adjoining the Tiergarten has suffered severely ... The great War Office building has been damaged, the part used as the secret service headquarters of the three armed services being gutted.

A large building West of the Zoological Gardens, probably the main Income Tax Offices, has been seriously damaged in one wing.

In Mitte, the central area, very important damage is seen along Wilhelmstrasse ... Here part of Hitler's Chancellery has been burned out, but repairs are already in progress. Other damaged buildings include the British Embassy, the old Air Ministry building, the Ministry of Food and Agriculture, the Ministry of Justice, the Foreign Office, the Treasury, the Ministry of Transport with adjoining State Railways Directorate, the old President's Chancellery and buildings known to be the headquarters of the *Gestapo* and official residence of Himmler ... Dr Goebbels's house in Hermann Goering Strasse has had its top floor burned out but roofing repairs are well in hand ...

In Charlottenburg the eighteenth century Palace of Frederick the Great and three large buildings in the Fair and Exhibition Grounds, now probably used as military stores, have all been seriously damaged. There is roof damage to the short-wave broadcasting studios ... Also in this district a number of technical colleges and institutes connected with the University have suffered as a result of fire.

Most important of the industrial works damaged are those situated in Tegel ... Here the great armaments factory of the Rheinmetall Borsig A.G. (priority 1+) producing guns, torpedoes, mines, bombs, fuses, tanks, and armoured fighting vehicles has had many of its buildings severely damaged by fire and high explosive. The Alkett motor transport assembly works is one-third gutted and four large engineering works, manufacturing small arms and other weapons and together covering 129 acres, have had no less than 25 buildings destroyed or damaged. The great Siemens electrical engineering works (priority 1 plus) in West Spandau, severely hit in the August and September raids, shows damage to six more departments, while the Siemens cable works (priority 1 plus) has also been affected, but less seriously. The iron foundry and turbine assembly works of A.E.G. (priority 1) and the radio valve works of Osram G.m.b.H. (priority 2) both previously damaged, show further extensive damage. Fire has destroyed buildings in the important chemical works of Schering A.G. (priority 1) at Wedding, also part of a block shared by Pallas Apparate G.m.b.H. and A.E.G. (priority 1) producing aero-engine carburetors, motors and calibrating machines.

A considerable number of factories engaged in manufacturing aero-engines and aircraft components have been damaged, some severely. Included amongst these must be mentioned B.M.W., Argus, Dornier and Heinkel, priority firms, all of which have important works in Berlin. Of the damaged factories producing electrical and wireless equipment, Bergmann Electricitäts Werke A.G. (priority 1) and Dr. Cassirer A.G. (priority 3) are probably the most vital.

In addition to the priority firms some eighty identified and numerous unidentified or small works, laboratories, storage and repair depots have been damaged, a few being almost completely destroyed. These industries cover a wide range and their products include vehicles of all types, engines, engine components, armaments, machine tools, electrical equipment, precision tools, various metals, chemicals, dyes, plastics, ceramics, fabrics and foodstuffs. Commercial premises listed in the damage summary number over forty but many more have been omitted as being of small importance ...

Four gas works (all priority 2) and two gas storage depots have been damaged, two gas holders ... being burned out. The gas works at Tegel is the largest in the city and here the coal and coke storage depot, a retort house, and two screening houses have

been damaged. Other damaged public utilities, where services must have been considerably affected as a result of the raids, include seven water works and pumping stations, five tramway depots and the main postal depots in the central area. Damage to military property includes, besides the War Ministry buildings, five or six barracks and several military stores and motor transport depots ...

An examination of the statistical analysis of damage shows that over 1250 net acres of business and residential property has been affected in the fully built-up and 50 per cent to 70 per cent built-up areas covered by these sorties and that over 60 per cent of the buildings in the Tiergarten district alone have been destroyed. Very substantial figures are also given for Charlottenburg, Mitte, Schöneberg, Wedding, Wilmersdorf and Reinckendorf.

All told, it was concluded, Berlin had suffered a 'deadly wound' from which it would not recover, and morale there was collapsing. However, as had been found in London, the suffering and hardships endured by Berliners were actually drawing them closer together and may even have strengthened their morale.⁶⁰

The capital was spared further attacks while this photographic reconnaissance program was under way, and on 20/21 December Harris sent a large main force to Frankfurt supported by a small diversion to Mannheim. Forty-one crews were lost from the former, 6.3 per cent of those sent, among which were ten (8.6 per cent) of the 116 sent by No 6 Group. The Mannheim raiders, in contrast, all returned safely. Trying to explain the discrepancy, High Wycombe drew the obvious conclusion that the diversion had failed and, in one sense, it was right – although not for the obvious reason. Bomber Command's flying discipline was so poor that the two formations were identified as belonging to one badly scattered main force making for Frankfurt, and the enemy had simply sent his fighters where the concentration of bombers was heaviest. 1 Jagdkorps had also made another attempt at pursuit night-fighting, and in mainly clear skies the technique worked wonderfully well. Returning bomber crews reported combats all along the route to the target, and some described lanes of fighter flares at least a hundred miles long.⁶¹

Bomber Command returned to Berlin twice before the end of the year. Because of poor weather in northern Yorkshire, the only RCAF squadron involved in the 23/24 December raid was the Pathfinder Force's No 405 which, along with the rest of No 8 Group, had a difficult time trying to find the aiming point through heavy cloud. The bombing was therefore scattered, but even so some worthwhile damage was done, including the Erkner Vereinigten Kugellager ball-bearing works at Niederbarnim, outside the city limits in Mark Brandenburg.⁶² Four nights later, however, the Canadians were out in strength, contributing 143 sorties to a 712-strong main force. This was the second largest raid on Berlin to date, and the largest single effort by No 6 Group. Losses were light, just twenty overall (2.8 per cent) and five (3.5 per cent) among the Canadian crews. Always eager to ascribe that kind of result to its own efforts, High Wycombe was inclined to credit the imaginative routing scheme adopted for the raid for the unusually low casualties. Supported by

small groups of Mosquitoes, the main force conducted feints against both Magdeburg and Leipzig before turning northwest, and this, it was felt, had confused the enemy. In fact, it was the weather which kept the Luftwaffe at bay.⁶³

Four Canadian crews who returned safely had been attacked by fighters. In three cases Monica provided little or no warning of the fighter's approach, illustrating its limitations, and only the vigilance of rear and mid-upper gunners enabled their pilots to take evasive manoeuvres in time. In the other, Monica did provide ample warning, but it was the mid-under gunner who first saw the fighter 'silhouetted against cloud, below, passing from Starboard to Port.'⁶⁴

This 'mid-under' position was a recent modification adopted by No 419 and other non-H2S squadrons to address the threat of fighters approaching from below. It also reflected the fact that despite Harris's persistent and powerful pleading, little had been done to improve bomber armaments since 1939. Bomber crews consequently remained prisoners of decisions taken, reversed, and sometimes reversed again as High Wycombe constantly re-evaluated what constituted the greatest threat and how it might be countered. Indeed, in June 1943 Harris himself had gone so far as to suggest that his bombers should be stripped of all their armament in order to increase their speed and altitude, but shortly afterwards he was asking the turret designers and aircraft manufacturers to meet his essentially conflicting demands for more guns, heavier guns, and better vision, all without adding significantly to the aircraft's gross weight or altering its centre of gravity.⁶⁵

In fact, by the autumn of 1943 there were as many as seven designs under active consideration for an improved rear turret as well as two proposals for belly mountings. Each had the support of one or another agency within the RAF and MAP, and each in its own way was something of a disappointment. The .5-inch under-mounting for non-H2S aircraft, for example, could not be produced on schedule because components from the United States failed to arrive.⁶⁶ At about the same time, a two-gun tail blister designed for the Lancaster and giving a good view behind and below was found to be 'crude and, with its almost complete lack of protection for the tail gunner ... quite unacceptable,' while the Frazer Nash FN82, once championed by Harris for its heavier .5-inch armament and because it would take the radar-assisted gun-laying device (AGLT, code-named Village Inn) then under development by the Telecommunications Research Establishment (TRE), would not be available until 1945. But that no longer concerned the AOC-in-C, who had recently decided that the FN82 did not offer his gunners a good enough view below.⁶⁷

Chaotic would not be an unfair way to describe the situation, and to help sort things out a conference was called for 3 November, the very day that Harris had submitted his Berlin memorandum to the prime minister. However, there were no quick fixes to be had. Work would continue on the Rose turret, Harris's preferred choice because of its tremendous downward view, but these would still be individually handcrafted, and therefore in short supply, until

1945. Overriding the AOC-in-C's objections, the conference also decided to push on with the FN82 and a new .5-inch ventral (or belly) gun, but both projects were already well behind schedule and it was not clear that the gap could ever be closed. In the meantime, it was left to individual squadrons (like No 419) or groups to do what they could to help their gunners.⁶⁸

As things turned out, much of this talk was academic, for as early in 1944 the whole program to improve bomber defences began to unravel. For one thing, the interest of key Air Ministry staff had started to turn to the Pacific war and to the development of the Lancaster IV, with its six .5-inch and two .303-inch guns, so that the RAF could participate in 'full-scale daylight bombing as undertaken by the Americans.' More important, almost none of the projects approved on 3 November 1943 actually worked. The AGLT prototype had so many defects that operational testing had to be put back until August 1944, and after that the supply to Bomber Command was not expected to exceed a miserly six sets a week. Then, quite unexpectedly, the project foundered altogether. Although the technology required for the AGLT was eventually successful, which was in itself an admirable achievement, the weapon system depended on a perfectly discriminating IFF – if it were only 99 per cent accurate it was estimated that gunners using Village Inn would shoot down four times as many bombers as night-fighters – and that proved to be beyond TRE's capabilities.⁶⁹

The Rose turret, meanwhile, vibrated so badly when the gunners opened fire that they could not take accurate aim unless the rate of fire of their guns was reduced from 750 to 400 rounds a minute. Work on the FN82 was simply falling further behind schedule, leading one staff officer to lament that the Americans could 'develop, produce, and operate more progressive defence armament in six months than we can do in two years.' Even the relatively simple task of coming up with a .5-inch belly gun for the Halifax had proved difficult. The design tested in No 4 Group over the winter of 1943/4 not only detracted seriously from the aircraft's performance and offered a disappointingly narrow angle of fire, but with temperatures of -21° Celsius being registered around the fitting, the gunners – not surprisingly – complained constantly of the cold.⁷⁰

There was nothing very new about gunners complaining about the cold, however. While efforts were made to improve the delivery of engine heat to the rear turret in Merlin-engined bombers (the goal being to maintain a temperature of 0° Celsius at 25,000 feet), little progress was achieved. The situation was much worse in the Halifax III, which had air-cooled engines. Fitting turrets with space heaters seemed an obvious solution, but the gravity-fed Gallay of British design would not work during evasive manoeuvres while orders for the American-designed Selas had to be abandoned because of production problems in the United States. Experiments with American-designed Flak jackets conducted over the winter of 1943/4 left a number of gunners more uncomfortable still. British turrets were generally too small and cramped for the cumbersome garments, and since it was predicted they would save only one casualty in a thousand, 'the weight of the jacket, its interference with

movement, the additional fatigue induced and the consequent reduction in efficiency' were not considered to be worth the meagre additional protection.⁷¹

As the armament program foundered, Harris became increasingly bitter at the quality and quantity of aircraft supplied to him by an industry which, because of the looming manpower crisis, was scheduled to release half a million workers to the armed forces in 1944–5. As usual, the Halifax bore the brunt of his criticism, particularly the much-vaunted Mark III, which was supposed to correct most of the flaws associated with earlier models, and with which many RCAF squadrons would be supplied beginning in early 1944. Following their first operational flights on the type, however, many crews had complained that their maximum ceiling of 18,000 feet was little better than the Stirling's, and almost all had suffered from the cold, some navigators recording temperatures as low as -27° Celsius around their compartment.⁷² Moreover, its efficiency as a bomb-carrier seemed likely always to be considerably lower than the Lancaster's. Based on recent operations, Harris told MAP on 2 December, 'one Lancaster is to be preferred to four Halifaxes, [which were] an embarrassment now and will be useless for the bomber offensive within 6 months if not before. ... [A]ll attempts to boost up the Halifax to the Lancaster class will fail – if only because the Lancaster will by then be boosted beyond the class at which the Halifax has long aimed and always fallen far short of. I issued the same warning about the Stirling. It is now useless and flooding the market. I cannot too strongly warn you yet again that a continuance on Halifaxes leads us straight and soon for disaster.'⁷³

The Air Ministry and Sir Wilfrid Freeman had heard this all before, but in the past they had usually been able to point to the imminent appearance of yet another new Halifax variant to mitigate the AOC-in-C's concern. During the winter of 1943/4, however, it was difficult to avoid the conclusion that the Halifax was, at best, a mediocrity when compared to the Lancaster. Indeed, when production costs and training time were considered along with payload and loss rates, it could be shown that the Halifax required more than eleven thousand man-hours of labour to deliver one ton of bombs while the Lancaster needed only about four thousand. Or, put another way, while Lancaster squadrons were dropping about 107 tons of bombs per missing aircraft, their Halifax colleagues could do no better than forty-eight.⁷⁴

Sir Archibald Sinclair seems, finally, to have been persuaded that the Halifax was not living up to the claims once made for it, and he indicated his willingness 'to pay a heavy price in Halifaxes ... to see a greater production of Lancasters.' So did the Cabinet War Committee on Supply, which decreed (on 3 January 1944) that while all heavy bomber production remained a top priority, whenever possible preference in the allocation of labour and material resources would go to the Lancaster. Evidence against the Halifax III meanwhile continued to mount. Notwithstanding its improved flame dampeners, thought to have solved one of the main defects of the Mark II and V, at one point the Mark III's loss rates actually exceeded those of its predecessors. As a result, the director of bomber operations argued – and the Cabinet Defence Committee (Supply) agreed – that once Bomber Command was operating in support

TABLE 7
Crew Position and Survivability in Bomber Command Aircraft, January–June 1943⁷⁵

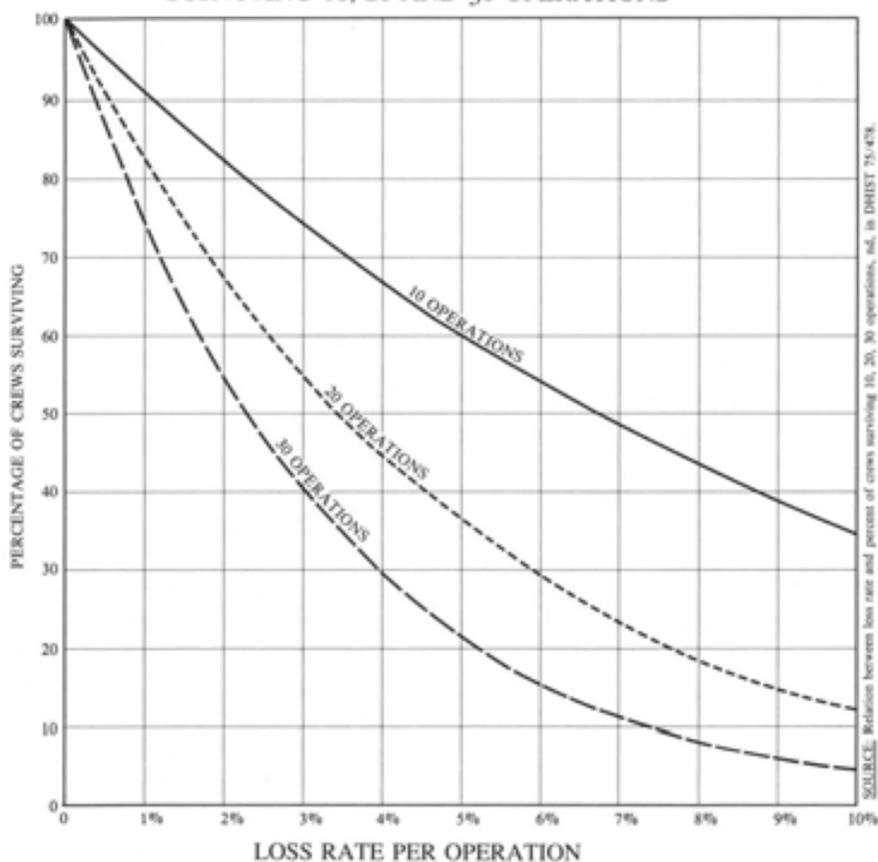
Crew Position	Lancaster	Halifax	Wellington
		per cent	
Pilot	9.6	20.8	14.6
Navigator	13.8	36.2	21.0
Wireless operator	11.9	32.5	18.5
Flight engineer	12.4	34.0	—
Bomber-aimer	13.2	31.4	18.5
Mid-upper gunner	8.5	27.3	—
Rear gunner	8.0	23.4	14.6
Overall	10.9	29.0	17.5

of the army, after the invasion, Halifaxes should be used exclusively 'in conditions of shallow penetrations and [against] lightly defended targets.' Strategic work, in other words, would be reserved for the Lancasters.⁷⁶

In the event, it did not take long for at least some Halifaxes (the Marks II and V) to be withdrawn from operations over Germany. After the disastrous raid on Leipzig on 19/20 February, when their loss rate approached 15 per cent, Harris felt compelled to reassign the seven squadrons (including Nos 419, 428, 431, and 434) equipped with those variants to Gardening or to bombing transportation targets in France.⁷⁷ Damning as the Halifax's loss rate was, however, individual Halifax crew members had a much better chance of escaping from a stricken aircraft than their Lancaster colleagues. The Avro design featured not only a less roomy interior and smaller escape hatches, but it also tended to catch fire and break apart in mid-air more readily than the Handley-Page. Thus, while 29 per cent of Halifax crew members survived being shot down, the corresponding figure for the Lancaster was just 10.9 per cent. Pilots, who usually stayed at the controls while the rest of their crew tried to bale out, generally had the worst survival rate of all (see table 7).⁷⁸

Although it is exceedingly unlikely that air crews in England knew anything at all about these differences in survival rates, they were certainly aware of the higher loss rates on Halifax squadrons. Such unofficial comparisons were discouraged, of course, on the grounds that it served no useful purpose to suggest, let alone confirm, that Halifax crews faced greater risks. The official line, as Flying Officer Reinke discovered in informal briefings during his visit to No 6 Group, was that there was little to choose between the two principal bomber types, although at night, in the pubs, it was clear that 'the boys know the score ... tho' only in a general way' when they declared their 'dislike and fear of the Halifax.' Indeed, Sir Arthur Harris had realized in February 1944 that there would be 'trouble' when it came time to re-equip Canadian Lancaster II squadrons with the Halifax III, such was the feeling against the latter, but he had had no choice in the matter, now that the Lancaster II was obsolescent and Lancaster IIIs were not available in the required quantities.⁷⁹

RELATION BETWEEN LOSS RATE
AND PERCENTAGE OF CREWS
SURVIVING 10, 20 AND 30 OPERATIONS



This graph depicts air crews' chances of survival given a constant loss rate (which never happened) or the average loss rate for the period in which they flew. No. 6 Group's loss rate of 5.5 per cent from March–June 1943, which suggested that only 18 per cent of crews would survive thirty operations, was cause for considerable concern at Bomber Command Headquarters and in Ottawa.

The Germans, too, had learned essentially the same thing. A downed airman from No 426 Squadron told them that there had been considerable resistance (and some refusals to fly) when his unit had converted from Lancaster IIs to Halifax IIIs in April 1944.⁸⁰ The squadron diary makes no mention of anyone's refusing to fly on operations in April or May 1944, but it does not hide the fact that the conversion 'is not looked forward to with very much enthusiasm by our experienced crews who would like to complete their tour of operations on Lancaster II a[ir]c[raft].'⁸¹ To make matters worse, 'It was strongly suspected that the Squadrons turning over their [Halifax IIIs] to this unit had passed on the ones which had given the most trouble from a serviceability standpoint.'⁸¹

No 432 Squadron made the same conversion in February and March 1944, and one pilot recalled that as he looked over the unfamiliar type it seemed he was switching to a machine that had been 'thrown together rather than designed.'⁸² The squadron diarist acknowledged that there was a serviceability 'snag' arising from the change of aircraft in February, but by March things seemed to have sorted themselves out; and, by the end of May, No 426 Squadron's commanding officer was observing that while 'the older crews still tend to heave a sigh for the Lancasters, now that experience is being gained with the Halifaxes everyone seems to be quite happy about the whole thing.'⁸³ That was probably not far from the truth. As squadrons received new crews who had no experience with Lancasters, there would be fewer who had anything with which to compare the Halifax. There is also considerable and persuasive anecdotal evidence that, for their own peace of mind as much as anything else, many aircrew were only too happy and ready to be persuaded that the bomber type they flew was a sturdy and reliable machine as they took seven hours or more to make the return trip to heavily defended targets, listened to the casualty figures broadcast the next day over the BBC, saw the empty chairs in their mess, and then took another trip that night.

As we have seen, No 6 Group was due to become a Lancaster formation once Lancaster Xs began to arrive in England from Victory Aircraft in Toronto. With the Halifax selected as the Canadians' intermediary heavy bomber, the ratio of Lancaster to Halifax squadrons in the group was thus determined largely by the rate of Canadian production – and on that score there was only disappointment.* After the *Ruhr Express* bombed Berlin with No 405 Squadron on 27/28 November 1943, its first operational sortie, no other Lancaster Xs saw active service until No 419 Squadron began converting to the type in March and April 1944. Even though output from Victory Aircraft rose to between twenty and thirty machines a month through the summer, in May 1945 only three additional squadrons, Nos 428, 431, and 434, were flying Xs on operations. Once Lancaster Xs began to be supplied, however (following the logic of the ultimate plan for No 6 Group) Lancaster I/IIIs were made available, and by the end of the war four squadrons were equipped with that type.

Management and labour problems in Toronto were one reason for the delay in the Lancaster X program, but there were others. The Bendix radio equipment originally ordered for Canadian Lancasters proved unpopular in No 6 Group, and by December 1944 it was being replaced by British-designed Marconi equipment.⁸⁴ In addition, Canadian-built Lancasters required over a thousand man-hours of work to bring them up to operational standard after they were

* The Bristol Hercules-powered Lancaster IIIs produced in limited numbers as a hedge against a collapse of Rolls Royce Merlin engine production and supplied to Nos 408, 426, and 436 squadrons were stopgaps, and all three would convert to Halifax IIIs in 1944. The Lancaster IIIs were nevertheless allocated to No 6 Group, an erstwhile Halifax formation, at a time when the Halifax II/V, the obvious alternative, was becoming increasingly suspect after Sir Arthur Harris acknowledged that the Canadians had been promised – and deserved – at least one squadron of Lancasters even before the Lancaster X was operational.

delivered to England because of modifications developed in the United Kingdom and which could not be incorporated quickly into the production lines at Victory Aircraft.⁸⁵ There were also changes in Canadian specifications, including, among other things, 'the substitution of larger skin panels on the fuselage, substitution of self-tapping screws for plug rivets in the skin attachment to spar booms, substituting a metal fin leading edge for the original wooden one, introducing a metal door in place of wood, introducing Acme threads in all trim-tab jacks instead of square threads ... In cases where a modification affected more than one component and/or system, a trial installation was sometimes made before putting it into the production line.'⁸⁶

By far the most important change came with frame KB 783, which was fitted with an American-designed Martin mid-upper turret armed with two .5-inch Browning machine guns. This modification had been cancelled by Avro in Britain because of engineering problems, but went ahead in Canada, where Victory Aircraft had already begun retooling.⁸⁷ At first, the handling characteristics of KB 783 did not seem up to standard because of the new, heavier turret, and it had to be tested at Boscombe Down before the modification could be approved. It passed its flying test, and the Martin turret continued to be fitted, but upon further examination it was found that the Canadian-supplied ailerons were not exactly the same as their British counterparts because of confusion in the supply of drawings, and resolving that problem caused further delays in the provision of Lancaster Xs to RCAF squadrons overseas.⁸⁸ By January 1945, however, there were few causes for complaint except the slow rate of production.⁸⁹

Concerns about tardy delivery of Lancaster Xs were probably put on hold, however, as 1943 turned to 1944 and No 6 Group celebrated both the New Year and its first birthday. In twelve months it had grown from eight squadrons to thirteen, mounted 7355 sorties, and dropped 13,630 tons of bombs. Twice in the past month it had sent more than a hundred crews to Berlin. Although the Canadian loss rate was still higher than most, the gap between it and the Bomber Command average was narrowing. The serviceability rate had climbed from 64 per cent in January 1943 to 78 per cent in December, while the flying accident rate had been almost halved.⁹⁰

Whatever anniversary celebrations were in order were enhanced when a heavy raid scheduled for Frankfurt was cancelled late on the afternoon of New Year's Eve. Happily, New Year's Day was also a holiday for the Halifax squadrons, but there was no rest for many of those flying Lancasters. With a reasonable weather forecast over England - 'Variable strato-cumulus in well-broken layers, base 1,500 feet, tops 6,000 feet ... good to moderate visibility' - and cloudy conditions over Germany, High Wycombe decided to attack Berlin again, with a diversion on Hamburg. The original route was to have passed over Denmark, away from the Dutch Himmelbett sites, but a delay occasioned by changes in the weather forecast forced a more direct approach across the Netherlands. Route-markers would be dropped near Bremen and Brandenburg; Window would be used 'at the rate of one bundle every minute to a point forty miles from the target; two bundles every minute from that

point to the target, and back; and one bundle every minute for the rest of the route home, until the supply was exhausted.' Zero hour was scheduled for 0300, British time. Four hundred and seventy-four aircraft, including thirty-seven Lancasters from No 6 Group, would be equally divided among three waves scheduled to bomb four minutes apart in an operation designed to take no more than twenty minutes over the target. The bombload was set at one 4000-lb high-explosive bomb and clusters of 4-lb incendiaries, and crews were instructed 'if possible to aim ... at the centre of the T1 green; if, however, cloud conditions prevent T1s being seen, main force aircraft should aim their bombs at the centre of all [red] flares with green stars whilst holding an exact heading of 093 degrees.'⁹¹

After making its calculations of the amount of fuel to be carried and deciding upon the altitudes at which crews would operate, No 6 Group Headquarters sent its instructions to the bases and stations concerned at 1:30 P.M. That gave some time for ground crews and the fitters, riggers, and mechanics of the maintenance sections to swing into action.

Many of the ground trades really worked hard and had a hell of a life on a bomber station. The fitters and riggers repaired aircraft and engines night and day in all kinds of weather. They worked out in the open or under a bit of canvas shelter. The armourers hauled and loaded bombs, changed bomb loads, fused and defused bombs, rain or shine, at all hours of the day ... [When a raid was laid on the] armourers would manhandle the [bomb] trolleys under the plane and raise the bombs into the bomb bay. They had a hydraulic powered winch most of the time but on occasion it was powered by hand. The fuel trucks ... loaded the specified amount of fuel to get the plane to the target and back. There was never very much to spare ... Another truck would deliver the type and amount of Window ... While all this was going on members of the ground crew who looked after an aircraft had to check it thoroughly. Engines would be run up and tested; radio men, radar men and instrument men would call at each aircraft and check the various pieces of equipment and instruments. The camera would be checked and loaded with film. Ammunition would be put in the turrets. The many thousands of rounds for the tail turret were carried in canisters near the bomb bay and ammo tracks ... ran along the fuselage to the tail turret.⁹²

Those who had complained of problems on their last operation would almost certainly make a pre-operational test flight of their machine to ensure that the necessary repairs or adjustments had been made. Depending upon how long this test flight took and when the operational order was received at their station, aircrew might have three or four hours to themselves before beginning their pre-operational routine. They drew their flying clothes and made a last inspection of their machine about five hours before takeoff, and then ate supper. Afterwards it was time for the main briefing, when the target and route were identified, the 'met' officer gave his weather and wind forecasts, the intelligence officer provided what was known about enemy defences en route and decoys in the target area, and the navigation and bombing leaders outlined

the Pathfinder procedures (and colours) for the night. Separate, more detailed, and complex briefings were subsequently given to the pilots, navigators, bomb-aimers, and radio operators and then, about an hour or so before takeoff, crews began to head out to their machines again. The raid having been delayed somewhat, on 'New Year's Day' most got off the ground just after midnight on 2 January.⁹³

Berlin, Mining, and Preparations for Overlord, January–April 1944

On the night of 1/2 January 1944 the ninth of what Bomber Command liked to call 'the great winter raids' eventually involved 421 Lancasters, some squadrons (as often happened) finding it impossible to make ready the number of machines Sir Arthur Harris had called for. Berlin was again covered by cloud rising to 18,000 feet, but it was largely because the Pathfinder backers-up failed to exploit 'the good concentration of flares ... achieved by the primary markers' that 'the attack soon became scattered' and bombs fell all over greater Berlin. The main force also did a poor job of time-keeping, only 7 per cent of crews bombing within the four-minute span allocated to them, and the raid consequently lasted an hour instead of the scheduled twenty minutes. That added to No 8 Group's woes, as the markers had to try to keep the target properly illuminated much longer than had been anticipated.

The next day German radio spoke only of 'damage in residential areas.' That was a convenient way of saying nothing likely to benefit the enemy while reiterating the main point of Joseph Goebbels's propaganda campaign, which charged Bomber Command with engaging in a premeditated program of unadulterated terror bombing. In some respects at least these broadcasts were not far off the mark. Surveying the effects of the raid, German officials wrote off only one industrial structure and listed two more as damaged, along with two military installations. So far as the 'damage to residential areas' was concerned, however, on this occasion only twenty-one houses had been destroyed.

The one positive feature of the operation from High Wycombe's perspective was that the enemy's fighters had not been a factor over Berlin. Despite the cloud, however, it was a different story en route to and from the target as twenty-eight bomber crews failed to return, 6.7 per cent of those committed. The Luftwaffe lost fifteen fighters, 9 per cent of those scrambled, most of them due to flying accidents caused by the poor visibility.¹

All thirty-one of No 6 Group's aircraft returned from this raid, but their good fortune did not last. Not counting the Pathfinders of No 405 Squadron, who lost ten crews in January 1944, the RCAF mounted a further 586 heavy-bomber sorties against area targets over the course of the month and forty-eight of them (8.2 per cent) went missing, a figure 1.6 per cent higher than the

Bomber Command average. No 434 Squadron led the way, losing eight crews in just three nights' work, while No 427 Squadron, in the process of converting from Halifax Vs to IIIs, had the highest loss rate, 14 per cent of sorties. Among the Canadian Lancaster squadrons (who flew every raid to Berlin) the missing rate was 5.4 per cent, about half that of the Halifax squadrons who were exempted altogether from five of these missions.²

A number of factors contributed to January's higher overall toll. For one thing, the element of strategic surprise was lacking from Bomber Command's effort as fully half of all sorties were directed against Berlin. Moreover, two of the other targets, Leipzig and Magdeburg, involved equally deep penetrations which relied on H2S for both navigation and target-marking – a situation tailor-made for pursuit night-fighters equipped with SN2 radar and the Naxos H2S homing device – and, indeed, losses among aircraft equipped with H2S were 'unusually high,' illustrating both its vulnerability to detection and the extent to which the Germans relied on its emissions to find the bomber stream. Convinced, however, that the threat from *Himmelbett* was 'too great, even with WINDOW,' to permit dispersion, Harris demanded still greater concentration, further enriching the night-fighter crews' already abundant hunting grounds. With a running commentary now being broadcast over all the bands commonly available to radio, their chances of success had increased many-fold since the autumn.³

For all that, the details of each month's raids were unique. On 2/3 January, for example, a sharp turn to the north, near Bremen, fooled some controllers as well as the fighters already assembled over the Hanover beacon and there was little route interception past that point. Since Berlin was identified as the target forty minutes before bombs began to fall, however, most of the Hanover force arrived over the capital before the last TIs had burnt out. Twenty-seven Lancasters were shot down, including ten Pathfinders from No 8 Group (of which two were from No 405 Squadron). The Luftwaffe lost ten fighters, accidents again being the main culprit.⁴

On 5/6 January, when Stettin was the objective, the operational plan called for the bomber stream to make directly for Berlin and then to turn north, towards the target, at a point seventy miles short of the capital. When the raid was over and only sixteen crews (4.5 per cent, and none from No 6 Group) were missing, Bomber Command happily assumed that the Germans had indeed been 'completely deceived': the fighters' 'aerial flarepath' was 'laid on to Berlin ... in the early stages of the attack,' just as had been anticipated, and it was not until much later that they appeared in the target area.⁵

In fact, the low casualty rate could not be attributed exclusively to Bomber Command's tactics. Radars north and west of the capital had broken down, with the result that the turn to Stettin was not seen on the ground. Additionally, and compounding the failure, fighters already in the bomber stream neglected to report their own change of course northward. The *Wilde Sauen*, meanwhile, remained over Berlin, where they tried to engage the small Mosquito diversion sent to the capital. Although none of this was known at High Wycombe, there was no reason for celebration when a less than sterling per-

formance by the enemy – for whatever reason – still resulted in the loss of sixteen bombers.⁶

After a nine-day moon and weather pause, and following a surprisingly costly (7.6 per cent) raid on Brunswick, Bomber Command returned to Berlin on 20/21 January. Assisted by multiple diversions to Düsseldorf, Kiel, and Hanover, and flying a new route far to the north, the large main force of 759 Halifaxes and Lancasters was nevertheless intercepted over the North Sea, where it had been picked up by the radar picket-ship *Togo* as well as by land-based stations. Although bad weather limited the number of fighters scrambled, thirty-five bombers were shot down, 4.6 per cent of those sent. For its part, No 6 Group lost nine crews, or 6.25 per cent. Three of these came from No 434 Squadron, which should have been safely wrapped up in the middle of the bomber stream, in the third of five waves.⁷

In Berlin, 243 Germans were killed, 465 injured, and another 10,000 rendered homeless; five industrial plants were destroyed and another ten severely damaged.⁸ While the Air Ministry announced, simply, that there had been another heavy and concentrated attack on the German capital, Toronto's *Globe and Mail* was well satisfied. 'Berlin has been blasted again. Nine RCAF squadrons helped carry the 2,300 tons of bombs which smashed the German capital Thursday night. So, Berlin will be destroyed, beaten into the dust, a thing despised. The thrill, the sheer delight, which news of the Canadians' contribution to these raids sends through the nation each time it is repeated comes not from the satisfaction of destroying. It resides in the pride which all the people have in the courage and stern idealism of the young men of the RCAF.'⁹

The object of a number of feints and diversions in recent weeks, and home to important steel, synthetic oil, and aero-engine plants, Magdeburg was the target for 645 crews on 20/21 January, this time in clear weather – the precise conditions the pilots of 1 Jagdkorps had been waiting for. They made the most of them. Altogether 169 fighters were scrambled, many making contact before the bomber stream crossed the Dutch coast, and twenty-two Lancasters were shot down, 5.2 per cent of those taking off. That was bad enough, but the Halifax squadrons lost thirty-five crews, a staggering 15.6 per cent of those dispatched. Perhaps the most chilling news, however, came when a damaged Lancaster from an RAF Squadron struggled back to base and provided the first concrete evidence that the Germans had equipped their fighters with upward-firing guns.¹⁰ The Lancaster in question had been 'homebound from Magdeburg at 23,000 feet when fighter flares were seen and an attack developed. Warning was given by ... MONICA and a Ju 88 was sighted directly below the rear turret at 500 yards. Our rear gunner opened fire and the Lancaster corkscrewed. The enemy aircraft followed for about 45 min[utes], positioning itself below the rear turret so that neither gunner could bring his guns to bear. On several occasions the enemy aircraft opened fire causing damage which was later examined and found to have been caused by 20mm H[igh] E[xplosive] and A[rmour] P[iercing shells] from a direction almost vertically below.'¹¹ Yet this crew had been more than a little lucky. In the forty-five minutes during which they were stalked and attacked, the fighter could not finish the job

while, in the same span of time, the veteran Prinz zu Sayn Wittgenstein accounted for five enemy aircraft before he himself was shot down and killed.

Warrant Officer I.V. Hopkins, pilot of a No 419 Squadron Halifax, also seems to have been subject to *Schräge Musik* in the course of a singularly harrowing mission, but word of his experience had to await the end of the war and his repatriation from a prisoner-of-war camp.

After trying to climb for 50 min[utes], we were at 5,000 feet. A loud bang shook a/c so I had [the] Eng[ineer] check everything but all was O.K. Upon looking out the wheels could be seen so I dropped them & then I put [them] up again but [they were] still visible. We crossed enemy coast at 13,000 feet and couldn't get higher, so had [the] B[omb] A[ir] jettison some incendiaries [and] the aircraft went to 20,000 feet very nicely. We bombed target and trying to get required speed had to put nose down. Just after turning near Leipzig a fighter cut in front from p[ort] to s[tarboard]. I told R[ear]/G[unner] to watch for him but immed[iately] got [instruction to] dive s[tarboard]. The enemy did not fire but stbd. outer [engine] burst into flame as soon as evasive actions started ... engine was feathered & fire put out. Couldn't hold above 10,000 feet and had just got back on course when attacked from below, getting us from stem to stern down stbd. alley-way, mid-under hit. R/G saw enemy go thru' his cone of fire. Put a/c in dive stbd, but were hit before it reacted. Levelled out and had another attack, three of guns u[n]s[erviceable], Eng. had reported the stbd. inner heating up and again upon starting evasive action the stbd. inner burst into flame, cannon-shell hit selection box and shrapnel hit me in leg & shoulder, also wiping out some instruments, not noticeable because I was too busy feathering one engine. A fire was in bomb-bay and somewhere in fuselage back of Eng[ineer.] The a/c was very difficult to hold, Eng. then reported port petrol tanks leaking. I had throttled through the gate, but couldn't maintain height or slow descent and port engines were heating so I ordered crew to bale out at approx. 5,000 feet. I stayed to make sure all got safely out and then made my very difficult exit ... It immed[iately] rolled over and dove onto deck.

All seven crew members jumped safely and were captured, but in a tragic mistake the navigator, Flight Sergeant W.E. Mackenzie, was killed on 19 April 1945 when Typhoons attacked the POW column in which he was being herded east from Stalag 357 at Fallingbommel, near Hanover.¹²

Bomber Command now took a five-day break from area bombing because of poor weather over England which also prevented most practice flying. Ground-crews, who were rarely idle, took advantage of the layoff to give their machines a thorough check.¹³ By 1944 maintenance had been largely centralized at station rather than squadron level in order to increase efficiency, although the new policy was not entirely welcome: aircrew generally believed that squadron loyalties would ensure more careful servicing than that provided by a maintenance pool under base control, and the servicing echelons were encouraged to maintain close affiliation with their parent squadrons.¹⁴ It was, perhaps, an academic argument. 'Whereas Canadian aircrew are as good [as]

but not better than other Empire aircrew,' John Fauquier informed Air Marshal L.S. Breadner, AOC-in-C at Overseas Headquarters since 1 January 1944, 'Canadian groundcrew have been showing themselves to be unquestionably the best in the world.'¹⁵

Some, like Flight Sergeant S.A. McKenzie, No 408 Squadron, were rewarded for their efforts – in his case, with the British Empire Medal. 'This non-commissioned officer,' commented the chief technical officer at Linton-on-Ouse, 'has built A flight up into the best organized and smoothly functioning section on the station. Their record of serviceability and operational failures are second to none.'

A very hard working and conscientious man with a thorough knowledge of his trade, he above all has a vast amount of initiative which he does not hesitate to display... While other flights have complained loudly, and called for help ... whenever they had more than eight aircraft to look after, Flight Sergeant McKenzie has cheerfully prepared as many as twelve for operations quickly and efficiently without a murmur of complaint. This was not an isolated case either, but occurred daily throughout the period that 'B' Flight was converting to Halifax aircraft and 'A' Flight was looking after all the Lancasters.¹⁶

Some lost their lives, and others took extreme risks in trying to save doomed comrades.

Corporal [P.W.] Butler [No 433 Squadron], on the morning of December 19th, 1943, was running the engines of aircraft 'Q' Queenie in conjunction with Leading Aircraftman O'Connor and Leading Aircraftman McEvoy when aircraft 'C' Charlie crashed while taking off and landed on top of the aircraft in which Corporal Butler was working. Both aircraft immediately burst into flame. [LAC] O'Connor was rendered unconscious by the crash and Corporal Butler, despite the intense flames, attempted to remove him through the pilot's escape hatch, but was unable to do so. In his attempt to remove his comrade, he stayed in the cockpit of the aircraft despite intense flames and smoke until almost overcome. It was only then that he thought of self-preservation and ... crawled out of the pilot's escape hatch and jumped from the nose of the aircraft into a pile of flaming debris, thereby breaking both his heels. He proceeded to crawl on his hands and knees through the flaming mass. Corporal Butler showed outstanding courage and determination in his effort to save his fellow worker.

He was Mentioned in Despatches.¹⁷

Controversy, meanwhile, was swirling around High Wycombe and the Air Ministry. Following a late December meeting with Sir Arthur Harris and senior American commanders to determine how Pointblank (and more particularly the offensive against the German aircraft industry, code-named Argument) should proceed in order to support the forthcoming cross-Channel invasion, on 3 January the CAS had issued a genial reminder to Harris. Bomber Command not only had a definite, direct, and significant role to play in Overlord, but 'the

criterion by which bombing [operations] are judged' would soon 'be the extent to which they assist OVERLORD and not as present the extent to which they weaken Germany's ... power to make war.'¹⁸

Harris, however, seemed quite prepared to ignore or challenge Portal's message.* Stettin, attacked two days later, was not even on the Pointblank list, while on 13 January Harris not only misrepresented Allied strategic planning in responding to Portal, but also questioned whether switching Bomber Command's role would serve any worthwhile purpose. If Overlord 'must now presumably be regarded as an inescapable commitment,' he observed with ill-concealed disdain, 'the best, indeed the only effective support which Bomber Command can give ... is the intensification of attacks on suitable industrial areas in German as and when the opportunity offers. If we attempt to substitute for this process attacks on gun emplacements, beach defences, communications or dumps in occupied territory we shall commit the irremediable error of diverting our best weapon from the military function for which it has been equipped and trained ... as an independent strategic weapon.'¹⁹

By now, however, his remonstrations that he be allowed to maintain the purity of strategic bombing as practised by Bomber Command were becoming increasingly unconvincing. As the deputy chief of the air staff pointed out, Harris's definition of 'suitable industrial areas' was so loose that he could probably wriggle out of taking on the enemy's aircraft factories and ball-bearing industry if he wished. And although it was partly true – as Harris had observed, time and again – that technical limitations prevented Bomber Command from isolating precise objectives within the built-up area of cities like Schweinfurt, Sir Norman Bottomley was convinced that it should still be able to 'destroy the town ... and at the same time the ball-bearing factories,' and the AOC-in-C must be told as much.²⁰ Needing little persuasion on this score, on 14 January the CAS instructed Harris more forcefully to 'adhere to the spirit' of the Pointblank directive.²¹

Brunswick, a legitimate Pointblank target, was attacked that night with heavy (7.6 per cent) losses. But as we have seen, on 20/21 January Harris returned to Berlin and then made for Magdeburg the next night – a city which, like Stettin, was not on the Pointblank list and was chosen for attack only to facilitate future deceptions and spoofs when Berlin was again the target. As such the raid may have made good operational sense, but coming so soon after Portal had asked Harris to adhere to the 'spirit' of Pointblank, it moved the CAS to issue even firmer directives. On 27 January the AOC-in-C was told that Schweinfurt, Leipzig, Brunswick, Regensburg, Augsburg, and Gotha were to be Bomber Command's next objectives, and they were to be attacked in that order.²²

Protesting that the weather in the south was not right and, besides, that it took more time than the air staff realized to work out an appropriate plan to bomb small towns, Harris ignored the instruction to take on Schweinfurt.

* 'At certain levels of responsibility,' the French general Maurice Gamelin once observed, 'it is no longer a matter of giving orders but of persuading.'

Rather than waiting until the weather had improved (conserving his strength in the process) or mounting a raid against other cities directly associated with the ball-bearing or aircraft industries, he sent his main force to Berlin three times between 27 January and the end of the month. These operations involved a total of 1710 heavy-bomber sorties (219 from No 6 Group), of which 112 failed to return, an overall loss rate of 6.5 per cent, and 8.2 per cent among the RCAF squadrons. Tactically, those operations mounted on 27/28 and 28/29 January followed the same pattern. Large Gardening efforts and diversions were sent to Heligoland and other areas in the north up to three hours before the main force took off, and they succeeded in provoking a premature reaction from at least some of the German controllers. On the third raid, however, Harris decided not to employ any diversions, choosing instead to send the main force on a route designed to suggest that it was the pre-raid Gardening operation and that the real bomber stream would follow some hours later. This tactic also worked, momentarily at least, as the German controllers held their forces back. No fighters were sent out over the North Sea, and only a handful of Lancasters were seen to have been shot down on the way to the target, but there was nothing in Bomber Command's repertoire of tactics and tricks to impede 1 Jagdkorps' effort on the return route, and thirty-three sorties failed to return.²³

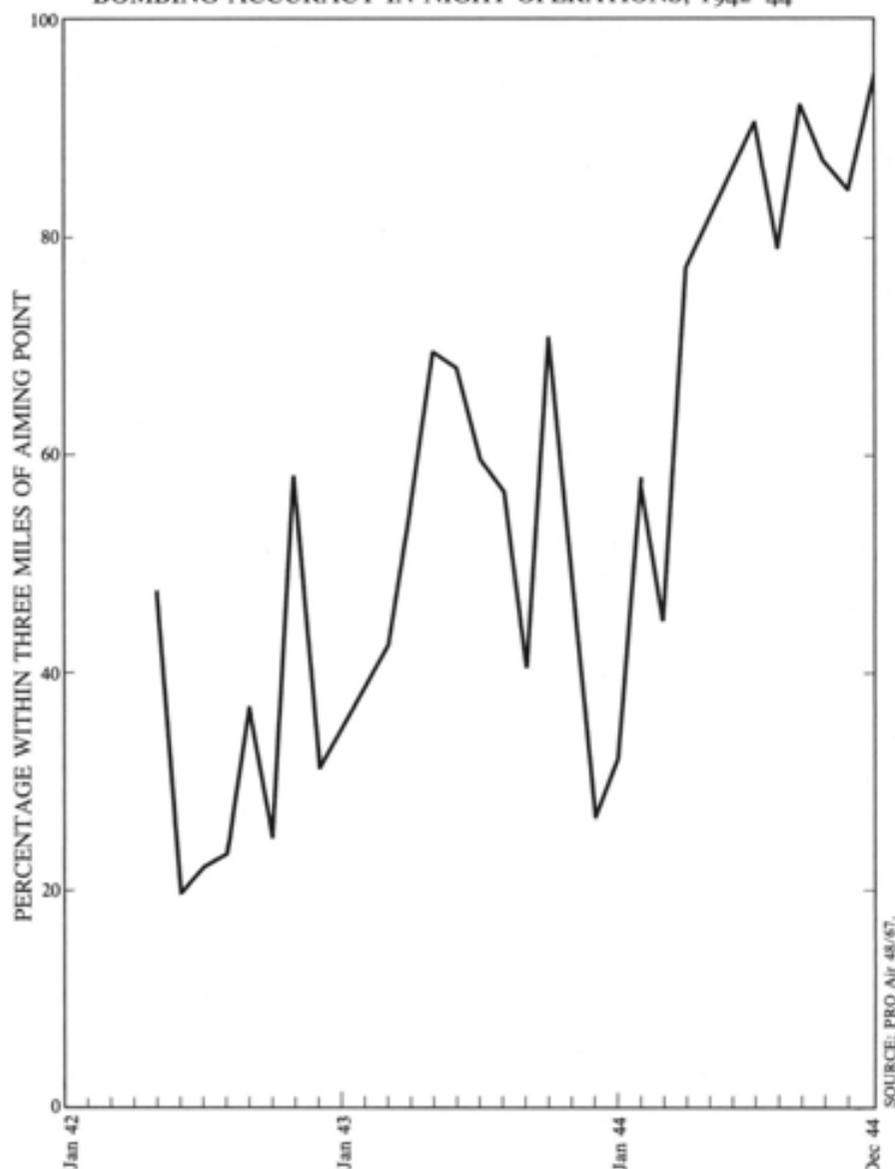
Together, these three raids killed about 450, left 200,000 homeless, and damaged (but did not destroy) some plants and facilities owned by Siemens, Askania, Telefunken, Agfa, Kodak, Zeiss-Ikon, Daimler-Benz, and Rheinmetall-Borsig, among others.²⁴ Since photographic reconnaissance flights over Berlin were not possible because of cloud cover, High Wycombe had no idea what had actually been accomplished – and nothing to deduce from the bombing photographs plotted at Stettin and Magdeburg: while two-thirds of crews were estimated to have been within three miles of the aiming point at the former, only one in ten at the latter managed to do as well.²⁵ Stories in the Swedish press which were picked up and quoted extensively by *The Times*, however, suggested that the blows against Berlin had been quite hard.

There is no longer any block of buildings in Berlin that has escaped damage, says the Berlin correspondent of *Dagens Nyheter* ... after three days virtual suspension of communications ...

Fires so large and numerous that it takes several days to put them out, and many persons are buried in cellars; but life still goes on, although in a very primitive form ...

Describing his walk home [the Berlin correspondent of *Allehandra*] says he spent a full hour wandering past blocks where the fires were still burning and through streets where the pavements were encumbered with mountains of furniture and household goods ... Even for those who lived through the catastrophic Berlin days around November 23rd, the impressions of the bomb-storm then pale before what we have experienced in these days.²⁶

BOMBING ACCURACY IN NIGHT OPERATIONS, 1942-44



Percentage of sorties against primary targets bombing within three miles of the aiming point on raids for which photographic evidence was obtainable – excluding precision attacks against marshalling yards and coast defences in France.

Although this graph is correct in showing a general improvement in bombing accuracy from 1942 to 1944, it probably exaggerates Bomber Command's overall performance. The bombing on raids for which no photographic evidence was available (usually those conducted in the worst weather), and which are therefore not plotted here, tended to be less accurate.

Perfect for public consumption, such reports were certainly welcome ammunition in Harris's struggle with the panacea mongers. Aware, perhaps, that the time for decisions concerning the use of air power and the inauguration of a Second Front were approaching, and that it was necessary to build up the positive features of his offensive against Berlin, his own intelligence staff soon proclaimed that 'the morale of Berliners has sunk even further into the "Slough of Despond."' At the same time, however, they had to admit that, since German citizens had no real freedom to oppose their government, whatever despondency Bomber Command might be causing was unlikely to produce direct action helpful to the Allied cause. Moreover, when photographic reconnaissance flights over Berlin were at last possible, they revealed much less damage than had been anticipated; but, reflecting the primacy of hope over experience so prevalent at High Wycombe, everyone was cautioned against 'taking too gloomy a view' of the disappointing results.²⁷ The enemy had at least been bloodied, if not bowed, and if left alone Bomber Command might yet compel Germany to submit. Berlin, in short, was worth the effort.

If Sir Arthur Harris was able to take comfort from ambivalent results, his main opponent did not. Generalleutnant Josef Schmid estimated that his night-fighters were shooting down about 5 per cent of Harris's bombers – a remarkably accurate guess – and he saw no reason for this figure to fall. The British had not adopted significantly new tactics or electronic counter-measures in recent months, and their H2S transmissions were still being read clearly.²⁸ But Schmid was also aware that despite their success, his night-fighters were powerless to break up attacks before they reached the target area, much less force Harris to call off his offensive altogether. Accordingly, unless the night-fighter arm was strengthened, Berlin (and other cities) would continue to be bombed, sometimes heavily. In mid-January, therefore, he had asked for substantially increased production of SN2 radar, Naxos, and other homing devices, only to be told that except for SN2, supplies of electronic equipment for air defence had low priority.²⁹

The same was true of aircraft. Fighter production in general fell from July to December 1943; and while the switch to pursuit night-fighting had paid obvious dividends, its success ultimately depended on having interceptors fast enough to overtake the bomber stream from behind or from the flanks. The early models of the Ju 88 had enjoyed such an advantage until they were laden down with all the external paraphernalia required to wage electronic warfare: but by early 1944 only the G-1 and G-6 series were entirely satisfactory and their production at times took second place to that of the Ju 88 bomber variants destined for the Russian front. Of the other fighters in service or soon to be so, the He 219 remained the clear favourite despite its requirement for long runways. Capable of taking on Mosquitoes as well as heavy bombers, it was also a dedicated night-fighter design unlikely to be stolen away by other branches of the Luftwaffe. However, no one could be found who would call a halt to the manufacture of obsolete machines like the Me 110 and Do 217, or such obvious disappointments (for night-fighting purposes) as the Me 210

and 410, which continued to roll off the assembly lines instead of the far more useful He 219.³⁰

Finally, wastage among fighter crews, mostly because of accidents and fatigue, was becoming a significant factor. In December, 1 Jagdkorps lost twenty-four crews, 3 per cent of sorties, but that figure increased to fifty-nine in January (4.2 per cent), fifty-three in February, and then jumped to eighty-seven (6.7 per cent) in March. The Wilde Sauen suffered even heavier losses over this period – about 45 per cent – although many came on daylight sorties. Herrmann's pilots were now flying against the Americans. These casualties were offset to some extent by the output from the training system – 1943 was a good year for the production of night-fighter pilots, seeing a surplus of 268 over the number of aircraft built – but that was unlikely to continue. Indeed, forecasts for 1944 called for a deficit in the supply of pilots in terms of the number of new aircraft received – not good news when, as we have seen, night-fighter losses were rising. Even more important, a large number of experienced and very skilled hands – zu Sayn-Wittgenstein, with eighty-three victories, Hauptmann Manfred Meurer (sixty-five), Oberfeldwebel Heinz Vinke (fifty-four), Major Egmont Prinz zur Lippe-Weissenfeld (fifty-one), and Major Alois Leuchner (forty-five) – were killed between 21 January and 14 March, and they could not be easily replaced. Night-fighting was a highly specialized endeavour in which this relatively small group of *Experten* had accounted for a hugely disproportionate share of enemy aircraft destroyed. Little wonder, therefore, that Schmid was not optimistic.³¹

At the Air Ministry the air staff's distress, dismay, and anger with Harris's fixation on Berlin and his insolent failure to do what he was told, had mounted considerably with the resumption of attacks on the capital in mid-February.* Even Air Vice-Marshal F.F. Inglis, ACAS (Intelligence), in the beginning the one senior staff officer to have fully supported Harris's Berlin campaign, was finally being forced to admit that Bomber Command's assault on morale would produce results only through a 'slow process of attrition' and even so would not, by itself, 'exercise a decisive influence on the outcome of the war.' More to the point, when Harris returned to Berlin in mid-February, D-Day was less than four months away. Yet largely because of weather, the Argument portion of Pointblank, calling for a devastating and concentrated Allied offensive against the German aircraft industry, had not yet begun despite general agreement that it had to be completed by 1 March in order to free the Anglo-American heavy bombers for other operations in support of Overlord. 'At long last,' however, 'on 19 February 1944, the weather over the German fighter factories began to open up,' and 'Big Week,' as Argument came to be known, began

* Like Sir Bernard Montgomery after Alamein, Sir Arthur Harris had been raised to almost mythic proportions by a media desperate to find and exhibit British success stories during a war in which successes had, as yet, been all too infrequent. Moreover, the AOC-in-C appeared to enjoy the complete confidence of an even greater mythic hero, Winston Churchill, so that it was exceedingly difficult for Sir Charles Portal to discipline him. Indeed, had he tried and failed, the CAS's own position might have become untenable.

the next day when the heavy bombers of the US Eighth and Fifteenth Air Forces, escorted by long-range P-51 Mustangs, attacked the Messerschmitt, Junkers, and Focke Wulf plants in the Brunswick-Leipzig area.³²

Having long ago agreed that Bomber Command would participate in Argument and that its night area attacks would 'coincide with the [American] daylight missions both in time and place,' Portal had spent the last six weeks failing miserably to persuade his AOC-in-C to take advantage of Bomber Command's bad-weather capabilities and begin the assault even without American support. But his directive regarding the inception of Argument was an unambiguous order and Harris chose to obey it.³³ Bomber Command's target for 19/20 February 1944 was Leipzig and 823 aircraft were dispatched on a raid that featured a very complex tactical plan. Bombing was not scheduled to begin until four in the morning, much later than usual, and it would be preceded by all sorts and conditions of spoofs and diversions. Led by four Pathfinders using H2S, forty-five Stirlings dropped mines in Kiel Bay; fifteen Mosquitos bombed Berlin; sixteen more, using Oboe, attacked night-fighter bases in Holland; and Window fell everywhere. All for nought. Although the German controllers scrambled their first interceptors just after midnight, in response to the aerial minelaying underway north of Kiel, the Mosquito effort over Holland persuaded a number of them to abandon that mission and to hold their fighters over Hamburg instead, in case the enemy's main effort came further south. It was from that point that they were inserted into the bomber stream.

This time there were no radar failures and no careless errors of omission. The fighters maintained communications with ground controllers throughout, and so negated High Wycombe's imaginative plan of attack, which saw the main force double back to Leipzig after feigning an approach on Berlin. All told, seventy-eight bombers were shot down (9.5 per cent), of which thirty-four were Halifaxes, just over 13 per cent of those dispatched. Understandably, Nos 4 and 6 Groups suffered the most, the former losing 12 per cent, and the latter 14 per cent, with another fifteen RCAF crews (almost 12 per cent) returning early. Heaviest hit once again was No 434 Squadron, in the fourth wave, with a third of its nine crews missing, but No 408 (in the first wave) and No 429 (in the fifth) were not far behind, losing four (of eighteen) and three (of sixteen), respectively.³⁴ Because of their extraordinary and unsupportable losses over the past few weeks, that was the last occasion when Harris would send Halifax IIs and Vs (then in service with Nos 419, 428, 429, 431, and 434 Squadrons) on deep penetrations into Germany.

Within Bomber Command it was increasingly evident that the enemy's switch from target to route interception had nullified most of the electronic and tactical counter-measures introduced since July 1943. To some it even seemed that the balance of the night air war had been tilted in the Luftwaffe's favour. Greater efforts would therefore have to be made, not only to mask the location and identity of the bomber stream better, but also to mitigate the effectiveness of those fighters which were successfully inserted into it. Although Harris would soon order his crews to fire 'upon every identified night-fighter,' this

did not reflect any change of heart or policy on his part. He would still have preferred them to evade rather than fight, but thought that Bomber Command had to become more aggressive now, so as not to lose 'the spirit of offensiveness so necessary ... for successful operations.'³⁵

Hoping to make operations more difficult for the enemy, two possibilities were raised besides restricting bomber operations to those nights when bad weather grounded a large part of the night-fighter force. First, reducing the length of the main stream by dispersing it more vertically, a move which should make it more difficult to find; and, second, dividing the main force into two streams taking different routes to the same target. (Harris still argued, however, that there were too few Pathfinders to mark two or more targets simultaneously.) So far as diversions were concerned, it was finally understood that if they were to have any effect at all, they would have to be mounted in greater strength and early enough to get the enemy airborne and committed before the main force was picked up on radar. That was possible, given the squadrons of otherwise redundant Halifax IIs and Vs that had become available for such operations. Moreover, a number of these aircraft were fitted with H2S, so even though the enemy's dependence on exploiting H2S transmissions was still not fully recognized, by happenstance the volume of their transmissions as an integral part of diversions would soon increase and cause the Germans considerable difficulty.³⁶

One of the new tactical measures was implemented the very next night after Leipzig, when 156 crews were sent on a Bullseye navigation training exercise over the North Sea in advance of the raid on Stuttgart, another Pointblank target – and it worked. The German fighters were drawn far to the north, and only nine crews were lost from the main force, 1.5 per cent of those dispatched. The next night, after all his prevarications, Harris selected Schweinfurt as the target. In addition to 289 Bullseye and Gardening sorties to distract the enemy, numerous offensive (Serrate) patrols by British night-fighters, and a strong Intruder effort against the German fighter bases in Holland, the attack was planned in two parts. One wave of bombers was scheduled to arrive over the target just after 2300 hours and the second two hours later, No 6 Group squadrons being a part of both attacks. Neither was to last more than fifteen minutes. Once again, the enemy reacted strongly to the Gardening and Bullseye forces, but the gap between their appearance over the North Sea and the start of bombing was not long enough. When the main force was discovered and reported 'far to the west' at about 2100 hours, the fighters were immediately rerouted and, following the stream, many arrived in the Schweinfurt area before the first wave had departed. Worse, the time between the two bombing waves was probably too long, as many of these same fighter crews had the time to land and refuel before the second wave appeared. Altogether, thirty-three bombers were lost (4.5 per cent), two-thirds of them in the first wave. No 6 Group lost five of seventy crews, about the average, and had twelve early returns.³⁷

Even so, these were not bad results in light of Harris's long-standing contention that attacking Schweinfurt was too risky for Bomber Command. He was