



Reaping the Whirlwind

*Bracknell Paper No 4
A Symposium on the Strategic Bomber Offensive
1939-45*

26 March 1993

Sponsored jointly by the Royal Air Force Historical Society and the
Royal Air Force Staff College, Bracknell

The originals of a number of the original photographs were no longer available when this on-line edition was prepared, hence the indifferent reproduction of some of the illustrations.

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‘For they have sown the wind, and
they shall reap the whirlwind.’

Hosea viii, 7

Preface

‘Reaping the Whirlwind’, the fourth RAF Historical Society/RAF Staff College Seminar in the Bracknell Papers series was bound to attract maximum attention from members.

Held at Bracknell on March 26th 1993, this meeting on Bomber Command’s offensive against the Third Reich in World War 2 covered a most evocative and controversial subject. The length of the campaign, from 1939 to 1945, the very large number of volunteer aircrew involved and the casualties – 55,000 dead – meant high quality in the papers read and strong participation in the discussion groups.

As was to be expected, the event was over-subscribed and the lists had to be closed when the facilities of the Staff College became fully occupied.

The proceedings were chaired by Marshal of the Royal Air Force Sir Michael Beetham. At the morning session six papers were read, covering a wide range of topics concerning the campaign, while in the afternoon the discussion groups talked at length over the issues raised.

The edited texts of the papers are incorporated in this book, together with a digest of the discourse in the discussion groups.

I have been greatly assisted in the transcription preparation of the Proceedings by Henry Probert, Sebastian Cox, Christina Goulter and Geoffrey Thorburn. In addition, Audrey Probert and Shirley Creed typed much of the material. I am grateful, too, to Edward Bishop, Cecil James and Ian Madelin for their work as reporters.

Derek Wood
Editor

1. Opening Remarks

Air Vice-Marshal R G Peters CB

On behalf of all of us here at Bracknell I should like to extend to each one of our visitors a very warm welcome. I know that many of you are old friends, amongst whom I am pleased to recognise several of my predecessors! I hope those that are here for the first time will rapidly become friends!

This is the 4th in the series of 50th Anniversary symposia hosted by the RAF Historical Society here at Bracknell. They have been very popular, and I am conscious that there has been particular interest in today's event, and a great pressure on the available places. I should explain that we have limited attendance to the 250 or so who are present for two reasons:

- a. I believe it is important that we do not overtax our facilities which could only result in us providing a less satisfactory service to those attending, and perhaps spoil their day.
- b. This is a part of the RAF Advanced Staff Course syllabus. As such I felt it was important that the majority of the course be able to attend and, equally importantly, that they should not be submerged and lost in overwhelming numbers of Historical Society members.

On this theme, I see these symposia very much as an opportunity not only to look back at an important element in our history, ensure that the record is correct, and see what lessons events then hold for us today, but also a precious opportunity to stimulate an exchange of views between those who took part and those who are now pursuing careers as professional airmen. For that reason, may I urge you all, visitors and course members alike, to make good use of the time available today, at coffee, lunch and in the bar at the end of the day, as well as in the seminars this afternoon, to interact together and mingle. I believe both parties have something substantial to gain from the

exchange.

Now, without further ado I should like to hand over to your chairman for the day. I do not believe he needs any introduction from me. Suffice it to say, he took an active part in the strategic bomber offensive himself, as a Lancaster pilot, was heavily involved in the running and development of Bomber Command after the end of the war, and ended his career as the leader of our Service: Marshal of the Royal Air Force Sir Michael Beetham.



Left: Commandant of RAF Staff College Air Vice-Marshal R. Peters and Marshal of the Royal Air Force Sir Michael Beetham.

2. *Chairman's Introduction*

Marshal of the Royal Air Force

Sir Michael Beetham GCB CBE DFC AFC

Ladies and Gentlemen, may I add my own warm welcome to that extended by the Commandant. We have a full house, which reflects the intense interest in our subject today. Sadly 35 of our members could not be fitted in but we fully understand the reason for limiting the numbers. I am pleased to see that we have a very wide cross section of experience – those who took part in the campaign, others who were in other Commands but could see the effect the offensive had. We have distinguished historians and authors who have written on the subject, and I am delighted to see several currently serving very senior officers – their interest in our Society is most welcome. We also have staff and students from the Staff College – we have to look to them to see that the lessons of the past are taken into account and applied to the future.

The strategic bombing offensive against Germany has attracted much controversy over the years. For example, did it justify the resources and priorities that were allocated? Were the right targets attacked? Could it be morally justified? The controversy has concentrated on the CinC, Sir Arthur Harris, who carried the enormous burden of conducting the offensive for three and a quarter years. This morning we shall hear from a range of very eminent speakers covering the major issues of the campaign. After lunch we shall debate the campaign in more detail in the smaller discussion groups, and at the end I shall try to draw some of the threads together.

Our first speaker, Dr Noble Frankland, is going to give us an overview of the campaign. He brings to us the practical experience of an operational tour as a navigator on 50 Squadron – he and I served together on Lancasters, which makes it a personal pleasure to see him here today. He also brings academic experience, both as co-author of the official history of the campaign and as Director of the Imperial War Museum for over 20 years.

3. *Overview of the Campaign*

Dr Noble Frankland

It is indeed a great privilege to stand on this platform under the chairmanship of a great friend and most distinguished airman. Sir Michael Beetham – whom I remember flying with as Flt Lt Beetham in those early days.

I take it we are all agreed on what a strategic air offensive is – I understand it to mean an offensive aimed at destroying an enemy's war capacity through destroying war production, ie the sources of his war strength as opposed to its manifestations. To take one example, the factories which generate the tanks rather than the tanks themselves. I have to say, however, that this may be a point you will wish to debate. General Carl Spaatz used to assure me on many occasions that he had no idea of what was meant by strategic bombing; nevertheless in my opinion he was the greatest air commander to date, and this greatness derived from his conduct of a strategic air offensive, so there may have been an element of bluff – but there is a meaning in that too. When I started studying the subject academically there was a debate as to what it did mean – hitting things at long range, short range, etc. I think we can forget all that and return to the definition I have tried to give you.

This campaign in British terms started in 1939 on the day war broke out, and continued until April 1945, so it was one of the longest – if not the longest – campaigns in military history, fought virtually without interruption throughout the whole period. Some sea warfare may compare in duration, but in sea warfare there are many more lulls than there were in the strategic air offensive. The offensive cost 55,000 lives of aircrew from Britain, the Empire and Commonwealth. Some 360,000 sorties were despatched and about 955,000 tons were discharged or intended to be discharged. Some went into the North Sea with aircraft which did not reach the enemy coast. To that you must add the efforts of the 8th USAAF and later the 15th. They added a further 624,000 tons in the assault against Germany. You can see

that this offensive was on a mammoth scale and in terms of the discharge of war weapons on a far greater scale than anything we are likely to see ever again in the future. The offensive killed between 300,000 and 1,000,000 people in Germany – which is quite a big gap. That is roughly what happened.

Now comes a fundamental question. What effect did this have on Germany's ability to wage war? How far did it contribute to the victory which the Allies undoubtedly won in 1945? The answer is: until July 1944 very little indeed, but afterwards a very great deal. It is that extraordinary comparison of results which brings us to the heart of the subject of strategic bombing in historical terms. We have to face it and not pretend that things happened which did not. Why was it that nothing much happened until July 1944? There are lots of reasons, many very obvious. First, bad intelligence: for Bomber Command this was bad throughout the war, with one or two shining exceptions – or else it was wrongly used. Then there was the inadequate strength of the force for a large part of the war, and the failure of vital things such as navigation to reach acceptable standards until late on, as a result of which the offensive was for a long time relatively ineffective. But these do not bring us face to face with the fundamental issue as I see it, namely that the doctrine behind the strategic air offensive in British thinking was flawed. Everybody knew that one was aiming to gain command of the air, or air superiority, but these phrases meant different things to different people. To get real results from strategic bombing we needed to condition the air so that we could use it as we were able. As Moltke said, in war you have to do what you can, and not what you ought. The problem of making things effective is to narrow the gap between what you can and what you ought until it diminishes to virtually nothing, and this is what happened in the last stage of the war when the bomber offensive became effective.

I will turn now to why the offensive occurred at all. No other power in the world – apart from the Americans, who had a glimmer of it – had the concept of a strategic air offensive before the Second World War. We alone, the British, had this concept. Why? The first reason lies in the trenches of France and Flanders 1915-18; an alternative method of waging war was urgently required. A second very important reason was the declining utility and increasing cost of sea power, which priced ships virtually out of the market. Capital

ships were so valuable that they really could not be risked, so the enforcement of naval blockade in the terms which Nelson understood were not open to Admiral Cunningham and the Navy of the Second World War – or, to a large extent, of the First. The result was to lay emphasis on a new style of warfare; allied to that rose the towering figure of Lord Trenchard, who did not write or argue things very logically but was nevertheless a great man. He welded together a theory of bombing which was the basis of the doctrine which led to the flawing that led the bomber offensive astray – but without which there would have been no bomber offensive, and without this the war would have been a different matter altogether with very possibly a different outcome.

Trenchard's basic idea was that the bomber would always get through, that fighters were just sops to politicians, that the bomber in getting through would be able to destroy virtually what it wished, so the side with the largest bomber force and the greatest determination would win the war – in fact a very misleading doctrine. But it was difficult to argue against. Trenchard was not an easy man to argue with; I remember him being allowed to read my dissertation before anyone else was permitted to see it – he was very gracious but not awfully pleased with it! I was in some difficulty to know what to do, for I had – and still have – high respect for this very great man. These are the reasons why the offensive arose, and I think Trenchard was one of those rare characters in history who actually made a huge difference to it – and largely for the good, though not in respect of the doctrine.

Then came the war itself and number of new factors. Hitler was a very important one – I need dwell no further on that. Then there were the defeats of the British army in Norway, France, Greece, Crete, North Africa and the Russian armies, the collapse of the armies and navies *in* the Far East – these turned the focus on Bomber Command, leaving it as the sole means of exerting offensive pressure of any kind on the Germans. But for its existence Germany would have been completely immune from suffering the consequences of her own actions.

The last point I was asked to discuss was the problem of writing the official history of this great offensive. It was a rather difficult business. The RAF's leaders at the end of the Second World War –

very distinguished, indeed wonderful people – were imbued with the Trenchard doctrine, which despite their very perceptive minds blinded them to a lot of the evidence of what they themselves had actually seen happening. Great men like Sir Ralph Cochrane – not many people liked him but he was a very remarkable man – believed that Bomber Command had done this, that or the other, and he would take no explanation or proof to the contrary. His attitude to my work was ‘we’ll turn him into an historian in the course of time.’ We became great friends in later years when we had both perhaps cooled down a bit. My difficulty was that the official history of the First World War had been written, more or less, at the dictation of the Air Staff. It produced a historical proof that the Air Staff doctrine of the ‘20s actually worked, that a very small force of relatively primitive aircraft had inflicted quite serious industrial damage on Germany; in fact it had done nothing of the kind but the official history demonstrated that it had, together with a lot of statistics to prove it. The authors were Sir Walter Raleigh – a professor of English literature at Oxford – and Mr H A Jones, a distinguished and gallant man who was Director of Public Relations in the Air Ministry in 1944; such people are not always independent in their thinking.

Sir Charles Webster – one of the most distinguished historians of his day – and I were expected to do a similar job but we declared we had no intention of doing that. We said we would write the history as though it were the history of the Battle of Waterloo, simply looking at it as historians. We were backed on that by the Cabinet Office (not by the Air Ministry); Lord Normanbrook in particular saw our book through. Whether it did good or harm is not for me to say. What I will declare is that it was our honest opinion as historians. The events we described were presented in historical terms without regard to what effect they might have. The Air Ministry thought the book should be suppressed because it was against the public interest – you can now read in the Public Record Office of the disputes that took place, which I really did not understand at the time. Nowadays I find I am much thought of as the man who wrote the whitewash of Sir Arthur Harris and Bomber Command – times change!

Chairman

We now turn to the technicalities. AVM Mike Hedgeland is standing in at short notice for Dr Alfred Price. He is well qualified to do so, for he worked on the development of H2S at TRE in the early '40s and then saw it into service with the Pathfinder Force. He served for many years after the war in Bomber Command, where he contributed much to our bombing and navigation systems.



Left: Dr Noble Frankland and A W Furse.

4. *The Technicalities*

Air Vice-Marshal Hedgeland CB OBE

After the departure to France of the No 1 Group Fairey Battles, Bomber Command began the war with a small force of approximately 280 twin-engined aircraft – the obsolescent Whitley and Hampden, the more effective and long-lasting Wellington and the short-ranged Blenheim. The harsh losses in daylight soon resulted in all attacks on the German heartland being made at night by the first three of these types. However, the absence of any navigational aids meant that dead reckoning (DR) from visual pin-points when the ground was visible and they could be identified, and from star shots when they could be seen, using the often erroneous forecast winds was the only method available to the crews to reach the target area. Once there, they were utterly dependent on the absence of low cloud, fog, industrial haze, smoke, and glare from searchlights to locate the aiming point visually. Consequently the vast majority of raids were completely ineffective. Suspicion that this was so began with the evidence from photographs taken by Spitfires of PRU. A visit from Professor Lindemann (Lord Cherwell) to the Central Photographic Interpretation Unit at Medmenham in the Summer of 1941 so concerned him – and through him Churchill – that D M Butt of the War Cabinet Secretariat made a detailed analysis with the Operational Research Section at Headquarters Bomber Command of 4,065 vertical release point photographs taken in 100 night raids. This revealed that only one in four of the crews claiming to have reached the target were, in fact, within five miles of it – and one third of the force did not even reach the target area. As a result, Churchill concluded that, unless an improvement could be made, there did not seem much use in continuing night bombing; and he minuted the Chief of Air Staff on 3 September 1941 inviting his urgent attention and proposals for action.

Up to this time the assistance of the scientists and engineers in the Telecommunications Research Establishment (TRE) had officially not been given, nor even sought. In any event, they had been fully

engaged in the defence of the UK – notably during 1941 with AI radars, to tackle the German night bombers, and ASV equipment, the submarine menace. On 26 October 1941, however, one of the famous TRE ‘Sunday Soviets’ was devoted to discussing means of helping Bomber Command, in particular with target finding, and from that time onwards much of the establishment’s efforts were directed at the task. Fortunately, the germs of the three systems which together were to lead to a dramatic change in the effectiveness of the bomber offensive already existed: two the product of the fertile inventiveness of certain scientists, and the third an unexpected by-product of another programme; but all had been set to one side to concentrate on defence. A fourth vital factor was the development of the strapped cavity resonant magnetron – only discovered by Randall and Boot at Birmingham University in February 1940 and developed for production by Megaw at GEC – which provided a high power radio frequency (RF) source at a wavelength of 10 cm. This revolutionised every kind of radar by allowing RF energy to be concentrated into a narrow beam by a parabolic reflector.

The first of the three systems to enter service had its roots in an idea by R J Dippy of the original Watson-Watt team as early as 1937, intended to aid approaches to airfields in bad weather. The principle was resuscitated following informal discussions in 1940 and Dippy was authorised to elaborate his ideas. As a result of the Lindemann investigations, an operational requirement was tabled in May 1941, Service Trials of twelve handmade sets began in August 1941 and sufficient production versions had been made for it to enter service on 8 March 1942.

The system was known as Gee, and its basis was the measurement, in the air, of the time difference between synchronised pulses received from three ground stations – a master and two slaves. The locus of all points at which the same time difference is observed between the arrival of the pulses from the master and one of the slaves is a hyperbola and so the range of all such time differences defines a family of confocal hyperbolae. The time differences between pulses from the master and the other slave set up a second family of hyperbolae, intersecting the first to form a diamond-shaped lattice or grid – hence G – which was overlaid on a plotting chart so that hyperbolic grid references could be converted to latitude and

longitude. Unfortunately the hyperbolae were divergent, so accuracy deteriorated with range from the ground stations, which was in any event limited by the earth's curvature, and the system was vulnerable to jamming. Nevertheless, Gee enabled the concentration of the 1,000 bomber raid on Cologne in May 1942 to be achieved and even after jamming became effective, it still improved navigational accuracy and concentration in all weathers at least to the enemy coast: but above all, it provided a very accurate aid to the safe recovery of aircraft to their home bases throughout the remainder of the war.

Gee was not, however, a blind bombing system, but the second, known as Oboe, was and, indeed, the most accurate blind bombing system of the war. It was the brainchild of Alec Reeves, who reviewed earlier work in connection with defeating the German 'beam system' and a proposed system called 'H' which was not adopted until later in the War, consulted Sqn Ldr (later Group Captain) H E (Hal) Bufton of the Wireless Investigation Development Unit (WIDU) on the practicalities of his concept, and came forward with a definitive paper. A team was set up at TRE under Reeves, assisted by Dr F E Jones, in May 1941 and development of Oboe proceeded, despite much opposition, in conjunction with WIDU which became No 109 Squadron.

The principle of Oboe was relatively simple. Two ground stations at separate locations in the UK measured the range of the aircraft, which carried a pulse repeater or transponder, to a very high order of accuracy and instructions were transmitted to the crew to guide them to the desired release point. One station, known as the CAT, maintained the aircraft on a curved track to pass through this point and the other, the MOUSE, determined the correct moment for release.

Oboe had its limitations: in range, like Gee, and because only one aircraft could be controlled at a time and needed a ten minute run-in to establish the required track. Thus only about six aircraft per hour could attack per pair of ground stations. However, it was invulnerable to jamming and its range was sufficient to reach the Ruhr and Cologne. Its accuracy even at a range of 250 miles from the ground stations for an aircraft at 30,000 ft was phenomenal – an average radial error of 150 yds. The aircraft used during much of the trials was the pressurised Wellington Mk 6 but the advent of the Mosquito provided the ideal platform and in three years of operations the losses

were less than 0.2% of the sorties. The first Oboe sorties were carried out on 20 December 1942 but the system reached its full potential in the Battle of the Ruhr beginning with the devastating raid on Essen on 5/6 March 1943.

Turning to the third system, it has been seen that both Gee and Oboe depended on ground stations and an independent navigation and bombing aid, unlimited in range from the UK, was urgently needed. After the October 1941 Sunday Soviet it was recalled that in 1937, during the flight testing of a primitive AI equipment, it had been observed that ground returns from urban areas were stronger than those from agricultural land. Professor Dee immediately arranged a trial flight over the Solent on 1 November 1941 using a centimetric AI system with its scanner depressed. Southampton was clearly identified and Dr A C B Lovell (now Sir Bernard) was forthwith charged with the development of a system based on this phenomenon which became known as 'H2S'.

The first flight of an experimental H2S system took place in April 1942 but in June 1942 a tragic accident destroyed one of two competing prototype systems and killed five members of the development team, three of them, including Alan Blumlein, from EMI, the firm which was to manufacture production equipments. Despite this setback, sufficient sets were produced for crew training to begin in Nos 35 and 7 Squadrons in November 1942 and the first operation in which the equipment was used took place on 30/31 January 1943 – less than ten months after the first experimental flight.

As in every conventional ground mapping radar since, H2S used a narrow rotating beam to scan the ground beneath the aircraft and presented the resultant radar returns on an indicator tube in the form of an 'echo map' centred on the aircraft's current position. It could be used for navigation to the target area by providing range and bearing 'fixes' from identified responses and for homing to the release point using appropriate heading and range markers superimposed on the indicator display. However, the radar map was crude and target identification required considerable skill. For example, the beamwidth of the Mk 1 and 2 10-centimetre H2S was 9° so that at a range of 20 miles, a discrete echo source would paint as an arc of over three miles to scale.

The change to the 3-centimetre magnetron, giving a beam width of

3°, improved matters, but even so the fact that cities could give very different response patterns depending on the approach heading still made aiming point identification extremely difficult. Tests carried out in 1944 on Derby under near ideal conditions by a very experienced Pathfinder operator revealed from vertical photographs an average radial error of 1¼ miles. Nevertheless, H2S did provide a true blind bombing capability, independent of any ground station.

So much for the equipments, but how were they to be employed? It is beyond the scope of this paper to rehearse the arguments that eventually led to the formation of the Pathfinder Force in mid-August 1942. However, it must be obvious that the control limitation of Oboe operations and the need for skill in using H2S, coupled with the initially small number of equipped aircraft would have, in any event, demanded a specialist force.

The basic tactic was to use the equipments to release a special type of coloured flare – the Target Indicator, or ‘TI’, whose development is a story in itself – to mark the target so that the main bomber force could release their loads aimed at the TIs. But the details were far more complex and a range of procedures was developed to deal with both Oboe- and H2S-marked attacks under various weather and ground visibility conditions. Briefly, there were three categories:

Blind illumination with conventional flares using H2S, followed by visual ground marking using the Mk XIV Bombsight, if the aiming point could be clearly identified – known as NEWHAVEN.

Blind ground marking using H2S or Oboe when the aiming point was obscured by haze or smoke – known as PARAMATTA. With H2S, ‘Primary Markers’ went in first dropping coloured TIs, followed by ‘Backers-Up’ dropping TIs of a different colour aimed at the primary TIs. With Oboe, called ‘Musical PARAMATTA’, the Mosquitos released their primary TIs at intervals throughout the raid and ‘Backers-Up’ followed each time to ensure continuity.

Thirdly, skymarking – known as WANGANUI – when there was complete cloud cover of the target area. A different type of TI burst above the cloud and the Main Force, flying on a predetermined heading with zero wind set on the bomb sight, aimed at the TIs.

Experience resulted in many procedural refinements: notably the

introduction of a 'Master Bomber' to ensure that the most accurately placed TIs were aimed at, and to reduce the inevitable 'creep back' as the raid developed; and methods both to support ground operations in France, during and after OVERLORD, and to suppress VI and V2 launch sites. The Pathfinder Force also used H2S to drop Route-Marker TIs on both the way to and from the target to help the Main Force retain the concentration essential to minimise losses.

I hope that I have been able to show you how the trio of navigational aids – Gee, Oboe and H2S – transformed the capability of Bomber Command to attack the enemy in all weathers. Indeed, as Churchill feared, it is doubtful whether, without them, the vast efforts and expenditure in the manufacture of four-engined bombers with all the attendant support could have been justified. The United States 8th Air Force profited too, for they suffered from the vagaries of the European climate in daylight as well, and all three systems were used by them. British made equipment was installed in their aircraft, but the H2S dubbed 'Stinky', was soon replaced by their own, well engineered H2X or 'Micky'. In fact Oboe was used by the 8th Air Force on 623 raids involving 1,663 controlled releases.

I must now turn, very briefly, to a different kind of warfare waged by Bomber Command – radio countermeasures with which to jam, spoof, or otherwise interfere with German radar systems on the ground and in the air, together with the communications needed to control them. Again, in the early days, little effort had been devoted to the subject, possibly for fear of retaliation. But by 1942 a number of equipments were being devised following photographic reconnaissance, intelligence reports and the Bruneval raid; soon a specialised RCM team was formed at TRE under Dr Coburn (now Sir Robert). At first, equipments were carried in Main Force aircraft, but at the end of 1943, No 100 Group was formed in Bomber Command, not only with heavy aircraft tasked with jamming or spoofing, but also with a force of Mosquito night-fighters to seek out and destroy their German counterparts.

Perhaps the best known and simplest countermeasure used both by the bomber force itself and 100 Group to great effect was 'Window', nowadays called 'Chaff' and first used on the Hamburg raids of July/August 1943. Its use was the subject of great controversy at the time. From 1944 onwards, 100 Group deceptive tactics, integrated

with the complex and detailed planning of each operation, had made a major contribution towards containing the toll of losses, parlous though they still remained, and the full story of the radio war is a fascinating one.

Finally, I can only just mention the many other facets of the support that made the whole offensive possible. Such items as:

The survey and construction of airfields with all the necessary buildings – well over 100 in Bomber Command alone

Training of both the aircrew and ground tradesmen.

Communications – the Post Office engineers played a vital role here, as they had done in the Battle of Britain.

The supply of all spare parts, consumables and especially fuel.

And, of course, the tremendous organisation in the aircraft industry and the Ministry of Aircraft Production to manufacture the aircraft in the huge numbers required.

I must pay homage to the sterling efforts of the groundcrews – airframes, engines and armament – who maintained the aircraft, often under the most arduous conditions on dispersals, and the radar tradesmen who had to cope with the unprecedented complexity of all the equipments that have been described.

Chairman

We come now to the role of the United States Army Air Forces. The bomber offensive was very much a combined affair, and the operations of Bomber Command were closely co-ordinated with those of the Americans. There was disagreement on tactics, but fortuitously their day operations complemented ours by night. We are fortunate to have with us today Dr Richard Hallion, Chief Historian of the USAF.

5. *The USAAF Role*

Dr Richard Hallion

We have been fortunate in our two countries to co-operate widely in military affairs in a number of areas – the Second World War is a classic example. If that co-operation has not always been perfect it has nevertheless worked to very good effect. The strategic bombing campaign is a classic example. It resulted in the German war machine getting very little rest and respite while we were both operating over German territory.

First a few statistics from the appendices to the Strategic Bombing Survey. We launched 501,536 bomber sorties, dropped 1,005,091 tons of bombs, had 35,000 men killed, and lost 8,325 aircraft (2½ % of our wartime aircraft production). On average, eight out of ten men died aboard every aircraft that was shot down. During the war we built 30,000 strategic bombers used in the European war – B-17s and B-24s – and 39,000 fighters – P-38, P-47 and P-51 – which increasingly played a role in escorting bombers and destroying the *Luftwaffe* when it came up to intercept them. Altogether during World War II we built 324,750 aircraft, compared with 111,077 in Germany.

I shall now consider wartime planning, some of the technical issues, the military experience and the human dimension. Basically the key planning framework that began our thinking about a strategic air war over Germany came out of Anglo-American co-operation in 1941, namely Plan AWPD1. It identified 154 targets arrayed in five target-sets: the *Luftwaffe*, electrical power, transportation centres, and morale. Three sub-sets were identified: airfields, aircraft production, and aluminium and magnesium production. Looking at the evolution of plans from now on, the planning framework went from a very optimistic ‘victory through air power’ view to the kind of terms one saw in popular writing (eg Allen Michie and Alexander Seversky) to a much more realistic appraisal by the middle of the war, when we formed a plan named ‘Argument’, showing that strategic bombing could not win the war on its own but could weaken Germany’s ability

to achieve its aims. AWP2 added some target sets and deleted one, namely morale. It added U-boat production and synthetic rubber production and ended up with a total of 177 targets.

The third major planning framework that came to influence the Anglo-American bomber offensive was the Pointblank Directive of 1943 which said that we would have a combined offensive, with the RAF bombing by night and the USAAF by day, to weaken Germany to a point where we could carry out a joint assault against Germany and prepare for the invasion. By this point, 1943, strategic bombing in the terms that air power advocates had perceived it at the outbreak of the war, was no longer seen as a way of winning the war on its own; it was now regarded as an important aspect of the war but not one that could operate in isolation. We had the same experience of war that you had in the RAF, ie that the combat operations were initially conducted in the spirit of unbounded optimism. Then came the shock and horror of what was faced in the depth and intensity of German defences in August – October 1943 at Ploesti, Schweinfurt, Regensburg etc. Thereafter came the third phase, right up to the end of the war, the phase of grim determination.

The plans controversy that broke out in the middle of the war – a battle reminiscent of the modern controversy between the air force's role in tactical and strategic operations – was over whether we should proceed with an oil plan (advocated very much by Spaatz) or pursue a transportation plan, advocated strongly by Zuckerman and supported by Leigh-Mallory and Tedder. This debate, which raged in March 1944 on the eve of OVERLORD, drew in Eisenhower who supported the transportation plan in a debate that picked up steam in April. The oil campaign was allowed to proceed as well and it began in May. Looking at German message traffic and other records, Speer seems to express more concern over the results of the oil campaign than that of transportation, since up to the period of the precision-guided weapon it was much more difficult to pursue interdiction than to attack relatively fixed and vulnerable soft oil targets. In late 1944, for example, Speer told Hitler that German oil production was meeting only 55% of consumption and Germany would have to draw the rest from stocks that could not be replenished. Since the war there has been much controversy about the strategic bombing campaign – which plan should have been pursued, the morality of bombing, area versus

precision attack – and as time goes on I feel that historians try to look for easy answers rather than considering the complexities of the campaign. As we look at this mid-war controversy between the oil and transportation plans as executed by our forces, we must recognise that between them they led to the collapse of Germany's war economy in early 1945. This conclusion is supported by historians Wesley Newton and Steve MacFarland in a book on strategic bombing which will appear fairly soon. These two plans took 40% of all the US bombs dropped in Europe; following up Dr Frankland's point there was a great acceleration in the bombing campaign in the last year of the war.

Turning to the combat experience of the USAAF, we went through our purgatory in 1943, when we encountered mass German fighter formations and had no escort fighters operating deep within the *Reich*. So the notion that the bomber force could penetrate deeply, relying on themselves to destroy the enemy fighters, was shattered by the tremendous losses we took on those raids. You had your own equivalent in the night raids over Germany, which in many ways anticipated the kind of difficulties we would find later in the Vietnam era and to some extent in planning for DESERT STORM, when we confronted tightly integrated air defence networks. The only things missing in 1945 were surface-to-air missiles, and had the war gone on a bit longer these would have been met also in the form of certain weapons the Germans had under development.

The key decision was when General Doolittle freed the American fighters to go after the *Luftwaffe*. A sign at HQ 8th Air Force had stated: 'the first duty of the fighters is to bring the bombers home' – this resulted in a 'tie the fighters to the bombers' mentality which did not leave the fighters free to roam independently. In January 1944 he changed this to: 'the fighters' first duty is to destroy German fighters.' There was now a dramatic increase in the number of German aircraft shot down, and air superiority was really won between then and the time of the Normandy invasion. When Eisenhower was visited in Normandy by his son (recently graduated from West Point) he was surprised to see the quantity of supplies moving relatively freely and said it would be impossible without air superiority. Eisenhower replied 'without air supremacy I would not be here.' That air supremacy had been won in the daytime sense by using the bombers as bait. The B-17s and B-24s would go to target areas in the

knowledge that the enemy fighters would be drawn to them just as honey drew flies, whereupon the escort could destroy them.

Another aspect of the strategic war we have not so far seen is that in 1944 we began using fighters for airfield attacks and genuine ground strafing operations. The combat impact of this was relatively low, since the fighters were armed only with heavy machine guns, but the panic factor that always occurs in air defence applied: the air raid warning sounded, plants started to shut down, and so on. This too, therefore, started to reduce the effectiveness of German industry.

To show how the Allied bombing campaign affected Germany, by March 1944 over 7,096 German fighters had been withdrawn to central Germany to cover Berlin – this drew their fighter force back within the *Reich* and prevented them helping their forces elsewhere. Moreover German war production now had to emphasise air defence technology – radars, AA cannon, night fighters, etc. The US Strategic Bombing Survey stated – perhaps a little strongly – that air superiority was the greatest single achievement of the air attack on Germany.

Looking at technology, we are tremendously in debt to Britain for H2S (which became H2X); in mid-1944 the bombing results we were achieving with radar bombing were far superior to those obtained visually by using the Norden sight which, before the war, had been heralded as able to do remarkable things but was in Europe critically dependent on the one thing in short supply, namely good weather. We are also indebted to you for the Merlin engine – I am a great fan of the P-47 Thunderbolt, but when we put the Merlin into the P-51 airframe we created a tremendous aircraft which, given its range capabilities, and other attributes, went on to become extremely successful in confronting the *Luftwaffe*. Another point relates to precision bombing. ‘Precision’ is a relative word – relative to the technology existing at the time. Given Oboe, radar bombing and all the other efforts being made to put bombs precisely on target, the results were good. We were happy in World War II to accept a circular error probability of 3,300ft with a 2,000lb bomb dropped from a B-17. Gp Capt Andy Vallance tells me that in 1943 on the Pilsen Raid 90% of the bombs fell within three and a half miles of the aiming point. Comparing this with the present day the average CEP for a laser guided bomb in the Gulf War was less than 10 feet (I think your experience with Tornados and Buccaneers was the same). That’s how precision has changed.

We in Britain and America benefited from something else. In the 1920s and '30s we were quick to take advantage of the monoplane revolution and the technological advances in structure, propulsion and flight control technology, so we were able – unlike the Germans – to build high quality, high performance, high payload, long range, four-engine aeroplanes. This was manifested by the big aircraft that both of us developed before and during the war.

In conclusion, air superiority has always been considered of vital importance in war – the first goal of an air force. Yet if you have the right vehicle you do not necessarily need it to get the job done. For example, the wartime Mosquito was undoubtedly the equivalent of today's Stealth fighter – it could sneak into Germany relatively unmolested, more or less free from the dangers of interception, and the only thing it lacked compared with today was the precision weapon. Nevertheless you could do some extraordinary things with it. At the start of the Gulf War the Stealth fighters operated as strike aircraft into Baghdad in order to set the conditions under which air superiority would subsequently be achieved, by destroying the command and control facilities.

Finally the human dimension. World War II was a costly war, and not least to the German people who paid a terrible price for having tolerated and supported the Hitler regime. But it was very costly too to our own aircrew – at some point today we should reflect on the sacrifices they made and the courage they displayed. They saved us all from a very grim future, and even if after 1945 our future was not as bright as we may have hoped for, we at least had a future, thanks very much to those young men.

Chairman

It is important now to look at the view from the other side and we are very fortunate to have with us Dr Horst Boog, until recently the Chief Historian of the German Office of Military History.

6. *The German Defences*

Dr Horst Boog

In discussing German home air defence we must remember that Germany was a continental power in the middle of Europe without natural boundaries and that her experience of air war in the First World War and in the Spanish Civil War revealed that co-operation with the ground forces brought more immediate successes than independent strategic bombing. There are two main consequences for German air doctrine:

- a. It was strongly ground-minded and orientated towards land warfare in both theory and practice; only later in the war was a more air-minded approach to the air war adopted.
- b. It was offensive rather than defensive, a posture that was reinforced by the initial successes of offensive air-land warfare.

The *Luftwaffe*, according to its basic operational manual (*L.Dv 16*), regarded itself as an integral, though autonomous, part of the armed forces which, in combination, would decide the outcome of a war. Its ulterior purpose was to assist in the destruction of the enemy armed forces. Thus it was organised along similar lines to the ground forces, ie regionally and not functionally. An air fleet had to co-operate with an army group; it was in effect a small *Luftwaffe* whose CinC was responsible for offensive as well as defensive operations in his area. So even when an air fleet had expanded into occupied territory, its CinC remained in charge of air defence in his original region in Germany. Obviously, however, during mobile operations he was more interested in offence than in defence, yet it was not until spring 1941 that the nucleus of a functional central air defence command was established.

This Air Command Centre (*Luftwaffenbefehlshaber Mitte*), was at first only responsible for the air defence of Berlin and central Germany, and not until late 1943 were all defence forces of the air

districts in Germany – until then distributed between four air fleets – placed under the Air Command Centre for all purposes, ie not only tactically – as some had already been – but also administratively. This slow development was partly to avoid damaging the prestige of some of the air fleet commanders, although some of them had pointed out as early as 1939/40 that the expected increase in bomber speed would necessitate larger areas for air defence operations and therefore wide command structures. Other reasons were the hopes that the war might not last long, the short range of the interceptors, the limitations of the enemy bomber force, the enemy's lack of long-distance fighters and the extension of the buffer zone beyond the German borders.

All these factors made the problem of a central air defence system seem less urgent. Another example of regional rather than functional thinking was that the air reporting services were unified only in late February 1944, when Goering ordered them to be separated from the air districts and the anti-aircraft-artillery organisation, and to be placed under the fighter headquarters. Thus the fighter divisions and the fighter defence corps, which were best suited and equipped for this task, now became the centres of all air reporting.

Other consequences of two-dimensional and ground-minded thinking were the concept of object protection and dominance of the anti-aircraft artillery in air defence. Fighters, unless attached to the ground forces or to the bombers, were in the early war years to be used for the protection of military and economic objects within specially assigned areas. The concept of space protection, of fighting enemy bombers not only at their targets or at the periphery of Germany but everywhere in the air space, developed only later in the war after the increasing numbers and speeds of attacking bombers made this method imperative. It is well known how difficult it was for Galland, the General of Fighters, to convince Goering of the necessity of changing from peripheral to centrally directed air space defence.

As for AA artillery its preponderance in air defence was not only due to its effectiveness in World War I and to optimistic assumptions based on unrealistically favourable exercises in the 1930s, but in particular to land-minded thinking. Air defence was, in an official textbook, considered to be a 'ground-oriented affair' based on the AAA (*Flak*) forces. The *Flak* was described as 'the decisive element of air defence', which caused Galland to complain that the fighters

only served 'to supplement the AAA'. In fact, Hitler dreamt of a 'grandiose' *Flak*-force that would make enemy bomber pilots think twice before crossing the *Flak* barrages. Even after the Inspector of the AAA had calculated in 1943 that to destroy a bomber force filling the space 1×2×3 km some 7.5 million heavy guns would have to be fired simultaneously (and there were only some 12,000 heavy AA-guns available). Hitler, in the fall of 1944, wanted to stop fighter production in favour of a tenfold increase of *Flak*-production, which was insane as well as technically impossible. Last but not least, it was AAA-officers who were generally appointed to command air defence where they also controlled – at least in the first years of the war – the fighter forces, whose tactical employment they understood little. On one occasion Field Marshal Milch, Goering's deputy, went so far as to observe that the *Luftwaffe* was run by *Flak* officers (this was, of course, somewhat exaggerated).

Little thought had therefore been given in German air doctrine to the problem of gaining air superiority or air supremacy by fighter-to-fighter combat. The problem was to be solved by destroying the enemy air force on the ground by bombing or by wearing it down in air battles with bombers and their escort fighters. The Battle of Britain came as quite a surprise to the *Luftwaffe* in this respect.

Another consequence of the belief that the AAA was the basis of air defence was that too much aluminium was diverted from fighter production to making fuses for heavy AAA-shells. This was despite the fact that fighters were two to three times more effective in terms of kills than the anti-aircraft artillery; by 1942 this had reached the limits of its effectiveness in terms of range and destructive power, and could not use proximity fuses, because Germany did not succeed in developing any. Yet *Flak* production amounted to about 30% of German arms production. The *Flak* barrages did, of course, cause a lot of aircraft damage and prevented exact bomb runs and hits on targets. However, as far as home air defence was concerned, it makes one think to realise that, during the war as a whole, the amount of aluminium going into *Flak* fuses would have enabled 40,000 more fighters to be produced on top of the 54,000 actually built. I am not saying that there shouldn't have been any *Flak* at all, but not only in the Battle of Britain but also in German home air defence a few thousand more German fighters at the right time would have made a

big difference – and bomber production might have been higher, too.

This brings us to the second important basic fact of German air defence, namely that offence was considered to be the best defence. Germany's geostrategic position and the practical impossibility before the advent of radar of an effective defence, made it imperative that the air war was carried into enemy territory in co-operation with the ground forces right from the start. So the bomber was regarded as the decisive weapon of the air war in German air doctrine, which also stated that 'offensive thought has preference over everything else'. Only as an adjunct would defensive military and civil protective measures have to be resorted to.

Germany's conviction that, for her, the only way to win a war was to take the offensive, was reinforced by her initial military successes in air-land warfare and this was the main reason for her belated change over to air defence; another important reason was that large bomber and fighter forces were tied down on the land fronts in Russia and North Africa. Germany started the war with about 2,000 attack aircraft (bombers, *Stukas*, assault) and only 820 single-engine day and night fighters of which only 86% were operational, because fighter pilot training – not that of bomber pilots – had been neglected in peacetime. In 1942 the production of attack aircraft still slightly exceeded that of defensive fighters, although in the air, Germany was already on the defensive. Goering's decision after the Hamburg raids in July/August 1943 to give priority to fighter production is well known, as is his change of mind after visiting Hitler who ordered that area bombing should be met by counter-terror and that the V-weapons should be built for offensive retaliation.

Even so Goering said in late 1943 that he considered bombers an important element of defence, and as late as May 1944 the Chief of the *Luftwaffe* Operations Staff believed that bombers were most important for the further conduct of the air war. He wrote this shortly before even Hitler became convinced that Germany could only be saved by fighters. At the Air War Academy, offensive doctrine dominated the curriculum almost until the end of the war, and in 1944/45 the home air defence fighters were repeatedly diverted to offensive operations in co-operation with the ground forces by order of Hitler, thus thwarting Galland's plan to build up his fighter force for the 'Big Blow' against the Allied bombers. 'Overlord', the

Ardennes Offensive and, above all, ‘Operation Baseplate’ (*Bodenplatte*) on 1 January 1945 should be mentioned as examples. The latter was the attack by about 1,000 German fighters, of which more than 300 were lost, on Allied airfields in the West to destroy several hundred tactical aircraft, all of which could be, and were, replaced within a few days. This operation demonstrates the perversion of offensive thought, for the *Luftwaffe* did not even have air superiority over its own bases, and the fighters should have been used against the enemy strategic bombers. One can understand this action only by considering that the war was already lost; it really did not matter much what one did, but something conspicuous had to be done to bolster morale. The situation was similar on 7 April 1945, when 183 volunteer pilots undertook a big ramming operation costing the Allies only some 20 aircraft, whereas the Germans lost very many more, with heavy casualties among the volunteers. These two operations were the self-inflicted death blow of the German daylight fighter force, which had earlier been more successful in the air battle over Germany.

It should also be mentioned that offensive doctrine was a major reason – besides false technical assessment – for the pre-war priority given to radio navigation research over radar research. Since the bombers needed radio navigational aids, and in the *Luftwaffe* view were far superior to all other air forces, there was no need to expedite radar research which was essentially defensive in nature. So especially in the field of centimetric wavelengths (H2S, Oboe) Germany never caught up with the British lead and never developed adequate jamming devices. These few examples must suffice to illustrate the lack of priority given to air defence. As a result Germany was a ‘fortress without a roof’ – or at least the roof construction began when it was already too late. The belated priority given to fighter production could not – despite a production peak in September 1944 of over 3,000 fighters out of a total of about 5,000 aircraft – change the ratio between Allied and German aircraft in favour of the *Luftwaffe*. It remained 8:1, locally 2:1, in favour of the Allied air forces in the last year of the war, and the Me 262 jet fighter could not tip the scales any further. While German aircraft production rose in 1944 to over 400% of the 1941 figure this corresponded to only 50% in terms of empty weight, and there was no longer enough fuel to keep all the fighters in

the air. Moreover pilot training fell to about one third of the time the Allied fighter pilots were given.

Before turning to a reassessment of the effects of bombing I should like to make some remarks about the methods of German air defence. These were not too complicated against the American daylight raids, which were increasingly – and quite successfully until the advent of the escort fighters – countered by mass attacks of fighter groups and *Geschwader*, although German fighter pilots, who were mainly experienced in dogfighting tactics, had difficulty in getting accustomed to them. Dropping bombs on the bomber formations and firing 23cm rockets into them were other methods tried, but with little success. The methods applied at night against Bomber Command were more complicated. After some trial and error in 1940/41 the so-called Kammhuber Line, named after the commanding general of fighter defences, emerged in 1942/43 as a radar-directed fighter defence zone extending from the North Sea to the Swiss border. It consisted of about 150 radar positions, each with two *Freya* and two *Wurzburg* sets for tracking the bombers and directing the fighters until they could see their targets on the screen of their airborne *Lichtenstein* radar, which could not so easily be jammed by ‘window’ or other methods such as the *Flak* radar. The radar ranges of the individual positions measured between 40 and 80 km and formed an overlapping system of boxes or – in German – ‘*Himmelbetten*’ (fourposter beds). Each position could handle one or two (sometimes more later on) night fighters simultaneously and was operated by one signal company. The system sufficed against small bomber forces, but proved totally inadequate against bomber streams. Kammhuber therefore proposed in 1942 and 1943 to expand it in depth and length, but Hitler and Goering refused. Lack of technical personnel, labour, aluminium and electronic equipment were the main reasons.

So in 1943 two new fighter defence methods were introduced. The so-called ‘Wild Boar’ tactic was a single-seat night fighter method developed by the former bomber commander Hajo Hellmann. With the fires in the burning cities lighting up the clouds above them, the fighters could see the bombers silhouetted and attack them. To begin with, when tried out by bomber pilots well trained in blind flying, this method was quite effective; but later, however, it was counterproductive when carried out by badly-trained day fighter pilots

who often could not find their way back to base and frequently had to bale out. Bad weather during the winter of 1943/44 further discredited the 'Wild Boar'. A better method was what was called the 'Tame Bear', the threading of longer range twin-engine night fighters into the bomber streams, which they followed while at the same time directing fighter reinforcements against the bomber formations. In addition to these main methods more could be said about air defence tactics, including passive methods such as camouflage and decoys.

Let me finally give you some more recent views about the effectiveness of the bombing. It has so far generally been held that the US daylight attacks, first against the German aircraft industry, then against oil targets and finally against communications, bore immediate results, especially after the Thunderbolt, Lightning and Mustang escort fighters had cleared the skies over Germany and established US air supremacy by day in the spring of 1944. It has also been considered that they would have been even more effective had they included electric power as a target group. The nightly British area attacks have, in contrast, been represented as a nuisance causing the deaths of too many British airmen and German civilians. While it is true that the German day fighter force was wiped out by the Americans, while the night fighter force, never beaten, petered out for lack of gasoline and other things, the judgement that the British area attacks were ineffective can no longer be supported. For a proper assessment we have to look at their indirect effects, bearing in mind that in 1943 the German Minister for Armament, Speer, stated that several more Hamburgs would be Germany's ruin. Let me give a few examples.

The mainstay of the German night fighter defence was the Ju 88 medium bomber, of which over 9,000 were built, and another 4,200 were produced as night fighters. This reduced substantially the strength of the bomber force in strategic or support roles on other fronts, where the Ju 88 was also the mainstay.

I have already described what the diversion of aluminium for *Flak* fuses meant for the fighters. Staying with the heavy flak, its tremendous increase in home air defence deprived the land-fronts of a formidable anti-tank weapon. Had there been no bomber offensive in 1943/44, things in Russia might have developed differently, though I do not mean this in terms of the Germans then winning the war. If one

recalls that over a million men were operating the AA guns at that time, one has to ask whether, in view of the constant labour shortage, the presence of several hundred thousands of them in the factories might have served the German war effort better.

The same applies to the personnel engaged in clearing the debris after air attacks, building shelters, evacuating cities and dispersing armament industries, as well as to those who were withdrawn from building fortifications along the Atlantic coast – not to mention the raw and construction materials needed for repairs.

The great aircraft losses – up to 3,500 monthly in Spring 1944, with only 40% due to enemy action and 60% of the rest due to bad training – could only be made up (and the output increased) by producing proven old types in large quantities at the cost of developing more modern types. This is why the *Luftwaffe* used the same, though improved, types of aircraft throughout the war and why the new fighters could not be built sooner in great numbers.

The change to night bombing in Spring 1940 put another burden on the supply of aluminium, the backbone of aircraft production, because this was now needed in large quantities for electronic equipment. Hitler's offensive reaction to night bombardment and his decision to mass-produce flying bombs and rockets to make up for the decimated bomber force further hampered fighter output. Fighters would have been much more effective than the inaccurate V-weapons were.

The number of man hours lost by frequent air alerts is impossible to measure, but since machine tools suffered relatively little from bomb damage the human factor must be rated very high in accounting for the decrease of fighter – and other – production in later 1943 and for the fact that, despite the tremendous increase in 1944, the plans could never be met.

If the morale of the civilian population is defined as their will to continue to work for the war effort, then German morale was not broken. But it was certainly weakened, as recent studies have revealed, especially in cities suffering heavy attacks. People continued to do their duty in a fatalistic and apathetic mood, and this did not increase their devotion to the political cause and to productivity. It was not morale in this sense that kept them on the ball. Rather it was the desire to survive – which, under the circumstances of the political surveillance system, also meant doing what one was told and not

shirking in the presence of others – and the hope that one day their dreadful existence and experience would be over.

In summing up it can be said that British area bombing had considerable effect, although the American daylight bombing raids with fighter escort were very much more effective. It is, however, hard to calculate the exact share of each in the overall cumulative effect which prepared the way for the final Allied victory.

Chairman

We are now going to listen to Professor Overy, from King's College, London, who has specialised in the history of the Second World War.

7. *An Assessment*

Prof Richard Overy

I am going to talk as briefly as I can about an issue already raised by several of today's speakers, namely the effect of the strategic bombing offensive against Europe. There is a popular view that bombing was on the whole ineffective and primitive destruction – it is certainly what many of my students think when the issue is first broached. I would like to talk about some rather different ways of looking at the overall effects of the offensive, particularly if one bears in mind the counter-factual argument of what might have happened had bombing never taken place. There are a number of way of assessing the strategic bombing effort. One is to look at it in the terms the Allies themselves thought of it: how effective was it in relation to Allied strategy and objectives? A second way is to look at it from the point of view of the Axis: what effect did it have on the enemies facing the bombing campaigns?

I will look first at the effects on Allied strategy. It is often argued that the Allies could have executed the bombing offensive more effectively, but these are judgements from hindsight. Much of the recent historical literature on the bombing campaign has emphasised that the choice of this target or that, or the pursuit of a particular campaign at this time or that, might have been a more effective use of resources. These things are arguable but what we have to deal with are the actual effects as historians, rather than the possible effects as armchair strategists.

I would argue that in its own terms the bombing offensive was probably much more cost effective strategically for the Allies than the popular view would normally concede. If we take the British case, for example, it was computed at the end of the war that this absorbed something like 7% of the total war effort in terms of man hours and so on. It seems to me that this was a relatively small proportion given the impact that bombing had on the enemy. And one could ask the counter-factual question: what would have happened if that 7% had

instead been devoted to more ships or more tanks? What would have been produced in the end would have been a distribution of resources which would not have equipped Britain adequately for re-entry to the continent of Europe or the defeat of Hitler.

We also have to be aware of something that was raised by Dr Frankland – the strong priorities put by both the British and American governments on reducing Allied losses of manpower. We know that Bomber Command and the USAAF suffered very high rates of loss for those particular services but overall it is difficult to argue that Britain and America did not succeed in conserving manpower very much more successfully than the Axis states. The 55,000 men killed in Bomber Command over a six-year campaign compares in overall loss statistics very favourably with German and Soviet or Japanese losses. The Germans, for example, lost 200,000 men at the Battle of Stalingrad alone.

We must also remember that bombing made a very important contribution to the success of strategies which involved other Services. It constituted, despite Soviet misgivings, a kind of Second Front from 1942 onwards – perhaps a less effective Second Front than Stalin would have liked, but it absorbed manpower, it absorbed a large quantity of armament and it made the Germans themselves think strategically and tactically and in terms of material, how to confront this new threat. Arguably it eased the pressure on the Eastern Front at very vital stages of that massive conflict. Secondly the bombing offensive contributed very substantially to the defeat of the *Luftwaffe*. We now know that for much of the war the *Luftwaffe* was a less powerful force than Western intelligence or Western public opinion believed it to be, but we need to remember that, for the Western Allies, defeat of German air power was always a top priority. The assumption was that Germany had a great deal of air potential, secret weapons up its sleeve and so on; the defeat of the GAF itself was an important strategic objective and of course it eased the entry to the Continent which was achieved in 1944. Indeed one could well argue that bombing played a very significant part not only in making OVERLORD possible and making it easier to prosecute, but also in easing the march of the Allied armies through Western Europe.

The issue which is usually argued about is the effect on the enemy powers in terms of their capability, their economic capacity and their

morale. There is much less argument, one should add, about the effect of bombing on the Japanese and Italian economies during this period. The assault on Japanese industry in 1944/45 would have made it impossible for Japan to support the war for very much longer. Research on the impact of bombing on Italy demonstrates that, shortly before her surrender, something like 60% of her industrial capacity had already been knocked out – not as it turns out destroyed, but largely brought to a halt because of the stampede of Italian workers to the countryside and surrounding regions as a response to the impact of bombing and the almost complete lack of effective air raid shelters or passive defences.

The nub of the issue, however, is Germany – and it always has been. Why should this be so? The answers are to be found in the conclusions of the Bombing Surveys at the end of the war. The USSBS exposed clearly to public view the fact that German production had expanded steadily throughout the period of the bombing offensive and indeed that German weapons production trebled between 1941 and autumn 1944, the period covered by the early and middle stages of the offensive. The Bombing Survey concluded that the bombing had probably caused no more than a 10% loss of all German production. I would argue that in many ways that judgement is extremely misleading. There are a number of ways of assessing the impact of bombing on Germany's war effort. The obvious way is the raw economic impact. Then there was the impact on morale, and also the effect on Germany's political scene and on the management of the war in the later stages.

First the economic impact. The important thing in discussing this is to be clear about the character of the German economy during the Second World War. At the mid-point, in 1941, despite her efforts to transfer very great quantities of resources to war purposes, the output of weapons was well below what should have been possible given the resources allocated to them. Hitler in that year insisted on the thorough-going rationalisation of the German war economy. In 1942 he placed these plans under his head architect, Albert Speer, who was largely, though not exclusively, responsible for achieving that trebling of weapons output by 1944 from a resource base that was not much larger at the end of 1944 than it had been in 1941. It was done by establishing a very sensitive and complex industrial web which relied

on the day-to-day distribution of parts, components, sub-assemblies and raw materials, so that most industries would hold relatively low stocks but would always know that at any given point this component or batch of raw material supplies would arrive. What bombing did was to place a very severe ceiling on what Germany could achieve under these schemes. To give one example, in 1944 Germany produced 39,000 aircraft, many of which could not actually be flown because components were missing, held up in some bombed areas; but they had planned to start producing at the rate of some 70,000 per year in 1941/2 and the scale of resources available to the German war effort would certainly have made these sorts of figures possible if they had been working in an entirely bomb-free environment. What bombing did – both area and precision – was to act as a constant source of attrition for most industrialists, interrupting transport flows, hitting small component factories, attacking gas, electricity and water supplies. Many of these were not critical but the important thing was their cumulative effect. What it meant was that for many German managers and engineers, much of the later part of the war was spent not just worrying about how to maximise production – the sort of things British and American managers were worried about – but how to do this given the constraints being imposed all the time on both their suppliers and their workforce by the experience of bombing.

Then there is the simple economic cost, which Dr Boog has already talked about, namely that the anti-bombing effort itself required an enormous diversion of resources. Two million men were employed in anti-aircraft and repair work. Something like a third of the production of the optical, electrical and heavy-gun industries was devoted to anti-aircraft defence. The indirect effect – forcing Hitler to concentrate on the so-called V-weapons as a way of getting back at the British and Americans to stop them bombing (and all it did was to deliver a few thousand tons of bombs not very accurately in London) – consumed the material that might have produced some 26,000 aircraft.

Lastly we can measure it simply in terms of loss of production. Here the figure of 10% supplied by the Bombing Survey is very misleading, because there were different losses in different industries. The losses sustained in the targeted industries like oil and aircraft production were considerably higher. If we look at the figures produced by the German authorities themselves in the early spring of

1945, when they looked back at the experience of 1944, they calculated that they had lost 35% of their tank production, 31% of their aircraft production and 40% of their lorry production in that year. In 1945 they lost almost 50% of their planned aircraft production and 40% of tank production. Had these resources been available for use, particularly by the German Army on the Western or Eastern Fronts, this might well have lengthened the war or indeed in the long run – as has been suggested – produced a different outcome altogether.

As for morale, we have already heard about this from Dr Boog and I have little to add to his views except to argue that the suggestion that had been floated in air power circles in the 1930s – that bombing would produce popular revolution and the overturn of governments – was not proved in any case and was highly unlikely to apply in Nazi Germany where, as the war went on, the degree of brutal terror exercised over the German population, let alone the captive populations of Europe, increased very substantially. There was no real prospect of a popular uprising to overthrow Hitler in 1944, and the widespread conception of what bombing might do had always been a misplaced one. Yet there is no doubt that bombing did have very severe disruptive effects on German society. Besides those killed and injured in the bombing, five million Germans were evacuated in the later stages of the war, creating all kinds of problems for distribution of food and the supply of consumer goods in rural and small town areas, and there is no doubt that the morale of German workers did decline quite sharply in 1944. It is hardly surprising that it should. Many workers – as in Italy – decamped to the countryside to avoid bombing and returned slowly to work. At the Ford plants in Cologne, for example – one of the important plants in turning out tanks and trucks – on any day in 1944 at least 25% of the workforce was absent from work. In such circumstances it is clear that the impact on morale also had a severe effect on Germany's productive performance.

Then there is the political aspect. As the bombing got worse, confidence in Speer and his reforms began to decline. Hitler began to blame him for what was going wrong with the economy. Increasingly the radicals around Hitler, particularly Himmler, began to encroach more and more on economic affairs. Himmler promised to build a massive array of underground factories, he increasingly used forced labour, labour working at the point of a gun to produce the tanks and

aircraft in 1944 and 1945. But the effect of this was to replace an economic system that was run by Speer and his engineer and expert friends by a system that was increasingly run by the SS and at the point of a gun. You can sustain such a system for a short while but there is little doubt that the political shift in running the economy in 1944 had an important part to play in generally running down Germany's productive performance; indeed Speer himself wrote an influential book on that theme shortly before he died.

So if we look at it this way, by asking what might have happened if Britain and America had not chosen the bombing offensive and what Germany might have been capable of achieving had it not taken place, we get a rather different view of the strategic effectiveness and influence of bombing on the course of the war. Of course it did not win the war on its own and very few people have ever pretended that it would, but it was one of a number of key factors. One might point perhaps to other factors such as the war for the oceans, which is often down-played in discussions about the outcome of the war, and of course that titanic struggle of armies on the Eastern Front which dwarfed anything occurring elsewhere for much of the war. But there is no doubt that bombing was also one of those significant factors which contributed a great deal to containing and limiting Germany's war effort from 1942/3 onwards and to speeding up the end of the war.

Chairman

To round off the morning we turn to Lord Mackie for a reflection on the campaign. He served three tours as a navigator in Bomber Command and in the Middle East.

8. *A Reflection*

Lord Mackie

You have had a fascinating session of fairly heavy stuff, and while my weight is heavy, my talk will really reflect what it felt like for many of us during the war of 1939/45. I had a most unfortunate reflection yesterday when I was considering the time lag; to all you keen-eyed, bushy-tailed course members we must look exactly like people from the Boer War! To a large extent this is true; we are the old and the bold, and the older you get the bolder you get. It is true that young men want to go to war – unfortunately in future, wars will not be suitable. But this one attracted people who went to war for simple reasons such as patriotism and the fact that young men like to go to war. Bomber Command was full of such men; their motivating force was pride. In September 1939 I was in Norfolk managing a lot of cows and I shot off as soon as war was declared and joined the RAF. I said I did not want to be a navigator, they said, ‘You can change over once you get in’! Like a fool I fell for it.

Eventually I got to Cardington where they kitted me out and I came into contact for the first time with the kind of disciplinary NCO who was much beloved by recruits. Then I went to Hastings, to ITW, and after three days was shifted to St John’s College, Cambridge, which gave me my first taste of the confusion that ruled in many branches. During that wonderful spring of 1940 we learned how to take to pieces a breech block, we did drill, we moved around looking for willing young ladies. Eventually I was posted to navigation training at Prestwick and they put us into a four-engine Fokker which flew us sedately round the area for air experience, after which we drifted around in Ansons flying between beautifully visible points learning navigation on a rather complicated instrument called, if I remember rightly, a course and speed calculator. It was a lovely summer – most enjoyable – and I had a glorious experience there, never to be repeated, when I went along to the dogs and put my last two shillings on a forecast 4 and 3 to win the next race. My forecast won, I went to

the window and the fellow started counting out notes. I said, 'I want to be paid'; he said, 'You fool, this is for you.' I got £28 (the equivalent of £800-£1 000 today) and I am happy to tell you I spent it all on a blonde called Phyllis!

Then we proceeded to Bombing and Gunnery School at Evanton, where we flew in different aircraft and learnt how to drop bombs – or thought we did – and fire machine guns, after which I went to Lossiemouth to complete my training at the OTU and crew up on Wellingtons. There I did begin to learn a bit about navigation and I was commissioned. I crewed up with a New Zealand sergeant and we got on with our training. We had a few frights which did us good; for example, we got into a snowstorm and were proceeding along, obviously heading for the water, whereupon I decided we had better turn back and make for Inverness, where we stayed for a day. Another aircraft went into the sea.

So we went to war after three of the six crews on our course had been lost in accidents and we thought it would be less dangerous to go to a squadron. I say this to show how extraordinarily bad was our training. It was doubtless the best that could be done, but compared with the competence shown by the pre-war trained Air Force crews and with that of today we really went to war not particularly well trained.

I did a few ops at Wyton. The first is worth telling you about; it was to bomb barges at Boulogne. We set off and saw searchlights, but every time we ran up – and I was dead keen to destroy these barges – the nasty Germans put the searchlights out, greatly confusing us all, until at last on the fifth run I saw below me the perfect picture – the harbour and the boats. Our stick of bombs fell right across the boats and we went home to find the wing commander thinking he had lost another sprog crew, so we explained in great detail how we had shortened the course of the war, and went off to have a drink. As I went out of the crew room I glanced at a great map of the coast on which was a perfect picture of my target. I regret to tell you, though I didn't tell anyone else, that it was Le Touquet.

We did get a little better, and then we went out to the Middle East – a nice place to fight a war. We had a little trouble getting out, but I had found a very simple method of navigation: we got the rear gunner to chuck out a flame float and take a sight on it; then at least we would

be on track. This suited my simplistic views and we were getting on quite well with this navigation aid. On the way to Malta, which was quite a long way, the rear gunner unfortunately went to the gunnery leader for advice to perfect his technique. He told him to take one sight and then another a minute later and give the navigator the difference, which of course was entirely wrong and meant that we had very little drift and so were on track. When we should have been over Marseilles the pilot said to me, 'I think those are clouds ahead'. I looked and replied, 'I think those are the Alps'. We got to Malta, of course, having shot an Me 110 down on the way. Then we joined 148 Squadron, commanded by a very distinguished officer 'Turkey' Rainsford, who is here today, and proceeded to operate mostly against Benghazi where my technique of dropping off an incendiary and taking drifts led us snap to the target every time, and as there was always a bit of cloud over the coast we knew when we had arrived. We also went to Greece and we did a very good operation when the whole of 205 Group blocked the Corinth Canal; it stayed blocked for the rest of the war – a considerable feat. We tried, too, to hit the tanks at Piraeus, and Turkey took me as his bomb aimer on this occasion because he thought I was good at bombing – as I was! We acted as a sort of pathfinder, spraying them with incendiaries, and the others came along and dropped bombs. They probably missed, but at least we had indicated the target. On the way home Turkey got out of the seat, handed over and went back to the astro hatch. Suddenly there was a shout: 'Tracer over the starboard wing.' A figure shot past my chair nearly knocking my head off. The rear gunner announced, 'The starboard engine's been giving off sparks for some time.' 205 Group in Egypt did a lot of good but not as much as it could have, particularly during the battle of Crete, where the intelligence was awful. We stood by and could certainly have done a lot of damage to the airfields and other things but we never knew when they were in German hands.

Eventually I came back to this country and I'll give you a short run through my further career. I went as an instructor and was not appreciated in any shape or form. The CI eventually sent for me. 'Mackie, I know what you want: you want to return to operations. But you are going on a course and if you come out with good marks you can go back.' So I did that and went back to Stirlings, the most awful

mistake one ever made. They were supposed to get to 20,000ft but you were very lucky if you could get them up to 12,000. They were eventually taken off the real circuit. I had a row with my CO because by this time I thought I was very knowledgeable, but was in fact far too over-confident. He posted me to Boscombe Down as the experimental bomber aimer, which was most enjoyable and very good for me; I learnt a lot about the development of weapons.

Then I heard that Turkey had picked up a squadron of Lancaster IIs and rang him up and asked if he could give me a crew as an observer captain, and possibly a flight. I went along, picked up a crew – a very brave chap who had been badly injured in a smash was my pilot – and we proceeded to operate. We started with mining – we were to take mines down to St Nazaire. On take-off with this new crew an engine cut dead; we bounced over some trees and came to a stop with all four engines burning. I was standing beside the pilot hanging on like grim death and when I looked out and opened the top hatch I was 30 feet up and still climbing. Then I suddenly realised I was supposed to be the captain and went back down. We got the crew out without anyone being injured except for the front upper gunner, who scratched his face in a gorse bush. I was about to depart from the aircraft for the second time and suddenly remembered I had left a new hat which had cost me £3 17 6d. on the navigator's table. So I nipped back and got that. Such was my absolute panic that I did not notice that a Leica camera, which could be flogged in London for £110, was lying on the table and about to be written off. This shows the poor state of mind I was in.

We did a lot of operations on Berlin – ten I think in a row – and were getting quite competent. On one occasion we were supposed to be over the Danish coast, and because I had very little to do, except charge about, I was down in the bomb bay and got a very good pinpoint, with the result that we kept on track and went into Berlin along with the Pathfinders. We got a picture and on the way home the winds were wrong. Over Germany at that time the searchlights were in such groups that you could roughly pinpoint yourself; Hanover for example was the shape of an egg and you could easily see it. I gave the navigator pinpoints and we came out on track north of the Ruhr, while the rest of the force seemed to go through the Ruhr. When we got back the Navigation Officer plotted the routes and said we were

slap on track and told the staff at Bomber Command who pondered for a while and said, 'Mackie should have gone through the Ruhr with the rest of them.'

I got through it and was taken off at 20 operations, but my crew were required to finish and I'm afraid they went down on the third from the end – an appalling fate, as with so many of our old comrades. On that squadron – I was on it for six months in the winter of 1943/44 – only five complete crews finished their series of operations. The losses were extremely heavy.

Then I went off, got married and became a staff officer in the Air Ministry, where the losses were very much less. It was most interesting and I learnt a lot, but after nine months I was getting fed up and wanted to get out. They told me no one got out of the Air Ministry that easily. So I wrote a memorandum about each member of the Directorate and circulated it. I started with my boss, Sidney Bufton, about whom I wrote:

'Sidney Bufton sits above
Planning is his special love
Of course he bombs provision too
But there he's often overdue.'

There was a particularly offensive one about a chap called Lawson (a good chap):

'Lawson is inclined to pander;
Hence his rise to wing commander.
With senior ranks he's quite au fait,
and gets much more so every day'.

One of the things I learnt about staff work was how to get one's own way in inter-service matters. In Bomber Ops there was a most distinguished wing commander with two DFCs and two DSOs; he had an absolute facility for infuriating admirals without overstepping the bounds of discipline in committee, and could reduce them to such a stuttering rage that they couldn't put any point of view. Their desire to divert our resources was always frustrated by him. Whether this is the sort of thing the Staff College should teach you I don't know. About him I wrote:

'Joe is large and sprayed with gongs

To B Ops One this brute belongs
He often is extremely rude
And would be ruder if he could'.

I would like to finish by saying a few serious words about morale. Morale is a result of pride; it is very strong in a number of people with various backgrounds. It is a stronger emotion than love; pride will make people give up their lives for a cause. It is very important to foster pride. In Bomber Command in difficult times all sorts of methods were practised in order to keep up morale and it is quite extraordinary how low was the incidence of LMF. One of them was the plain example of heroes like Gibson and Cheshire, whose influence permeated the whole Command; then there was the influence of second-tour veterans – most of them aged about 22 – and of course the Flight and Squadron Commanders. Black humour was very important. We have talked about ‘the chop’, for example. I came in to sign the book as a Flight Commander one night when we were operating and I found a large axe lying on the authorisation book with the blade underlying my name. This had been placed there by my second-in-command, an Irishman. This sort of thing made a big difference. It helped too if one went about with a certain swagger. A belief that you yourself were invulnerable also helped, and it helped your crews. I had terrible letters from relations after my last crew was killed, but in them were statements like, ‘Joe always said, don’t worry. I am OK while I am flying with Mackie. No Hun will ever get him!’ That sort of thing was all part and parcel of a marvellous exercise in keeping up morale in time of war, with incredible losses and inconsiderable chances of survival.

In conclusion I will say that, like all my old comrades here, I was very proud – and still am to this day – of being in Bomber Command and I will hear no ill spoken of it.



L to R: Sqn Ldr Randles RAF, Lord Mackie, Wg Cdr Evans RAF, Sqn Ldr Pulford RAF, Sqn Ldr Fox WRAF.



L to R: Major Smith RLC, Sqn Ldr Trembacowski-Ryder RAF, Sqn Ldr Anderson RAF, Group Captain Neubroch, Edward Bishop, Humphrey Wynn.



Major Hullena (left) course member and General Peltz, Luftwaffe.



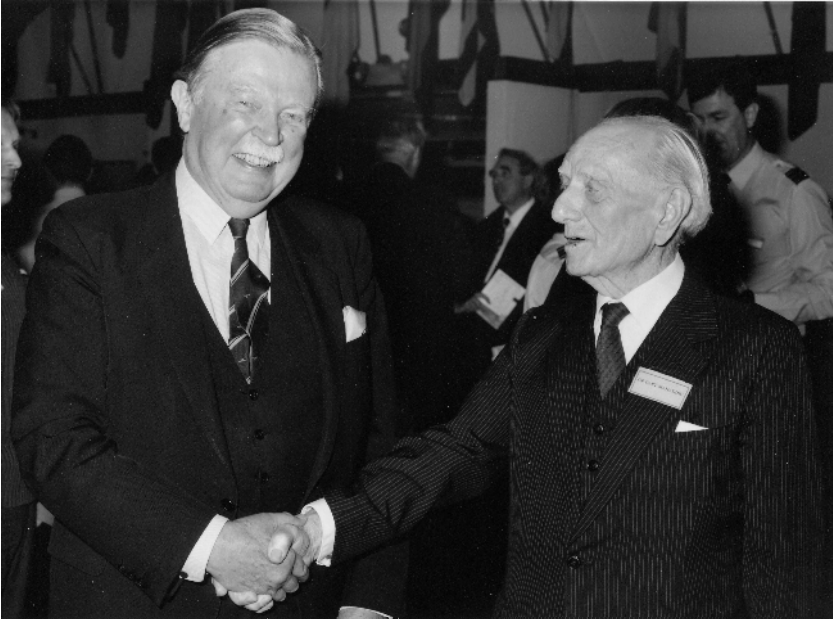
Brooke-Popham Auditorium – audience for main lectures.



Group seminar



Assembly and coffee in the Flag Room



Group Captains Ken Batchelor and Hamish Mahaddie.



Group seminar.

9. *Digest of the Group Discussions*

A) The Effects of Pre-War Theory and Doctrine

Several groups discussed the apparent paradox between an inter-war RAF theory based on the idea that the bomber always gets through (and the related concept of the ‘knock-out blow’), and the actual state of unpreparedness in Bomber Command on the outbreak of war.

Both *Sir Michael Knight* and *Dr Hallion* referred to the apparent lessons of the Spanish Civil War. The latter pointed out that Spain was a proving ground for World War 2, but that often the wrong lessons were drawn. In Spain proponents of the argument that the bomber would always get through seemed to be vindicated, for the bombers could usually hit the target – but this was a technological fluke. The technology of the twin-engined bomber/transport had raced ahead of the fighter during the mid-1930s, so modern bombers were confronting inferior-performance biplane or early monoplane fighters. By 1939 that had changed. In the USA the notion of the bombers getting through in self-defending formations had been accepted, but proved untrue: despite all their armament, they could not deal with the German fighter defence.

Sir Michael Armitage agreed that it seemed odd that capabilities at the outset had not matched intentions but there were many reasons for this, of which one was the lack of resources to back up concepts. A study of the period also showed that the RAF deluded itself, partly by the nature of the exercises it conducted, which were heavily weighted in favour of the attacking formations.

Professor Overy reminded the audience not to forget that the building of a bomber force was also intended as a political instrument. Chamberlain, in particular, believed strongly in the deterrent effect of possessing a bomber force, and he believed that it was sufficient to wave this in front of Germany, or any other potential enemy. It was

not until the late 1930s (especially 1938) that questions were asked as to what Bomber Command could actually do.

This view was echoed in another group by *Sir Michael Armitage* who pointed out that, once it was apparent that Germany was rearming and that war was possible, the whole thrust of Government policy was to show the Germans that they could be confronted with numbers, and prove to them that the industrial capacity existed to face them down. 'It didn't matter very much what aircraft they were as long as there were lots of them; the result was we produced a lot of light bombers and aircraft like the Wellington were not developed sooner because resources hadn't been there.' It is also important to remember that the Air Staff, while insisting on the supremacy of the bomber, were in 1936 to be much influenced by the appointment of a minister to oversee the co-ordination of defence. Inskip examined the whole problem of how Britain could best allocate the resources to what was seen as a possible future major war, and it was he who re-directed policy from emphasis on the bomber to the fighter. Concentrating our efforts towards preventing the enemy from knocking us out should be our first priority at that stage. Had it not been for Thomas Inskip's insistence – a man incidentally who had no military background – the country would have been in a far worse position than she in fact found herself in 1939.

Denis Richards expressed the view that certain myths were being perpetuated in the discussion. At the time it was made, ie 1927-1929, Baldwin's statement that 'the bomber would always get through' was fact, and it remained so for a considerable time. The situation was transformed with the development of radar defence, but the first chain was developed only in 1939, and until then those bombers would have got through, certainly any coming from France. It was easy to condemn our predecessors for fatuous ideas at a time of rapidly changing ideas and technology. Citing the example of the Fairey Battle, he commented that the decision to continue ordering it was not because it was so marvellous, but because of the need to keep the capacity going so that other aircraft could follow. 'There is perhaps too much acceptance of the idea that the Air Staff was imbued with strategic bombing: in my view it had an all-round concept which took account of the Army's requirements, though it didn't want to do the artillery's job; it had its maritime enthusiasts, of course, as well as its

strategic bombing devotees. I do not think that the Air Force had a totally strategic bombing strategy with totally inadequate means to pursue it – it's almost a matter of pinning theories on to them because they fascinate us now. We must remember that the RAF was heavily involved in India and Iraq at the time, and so such theories were but a part of the Air Staff's considerations. That we didn't have the means to implement a strategic bombing strategy didn't become apparent until we came to attempt it.'

Mr Cox made a similar point in Group 8 when he observed that Air Staff policy early in the war was to conserve the bomber force against the time when more advanced aircraft were available. He too stressed the industrial problem facing the Air Staff. 'CAS stated in 1937 that he did not wish to see any more Fairey Battles built. The problem, however, was that Bomber Command was effectively the sharp point of an industrial machine, and in order to TRAIN the workforce which would produce Lancasters and Halifaxes you had to build aircraft, and indeed aircraft factories. This process only started in any meaningful sense in the late 1930s, which meant that the more advanced designs were not yet available. Hence, just as aircrew were trained on obsolescent aircraft, so the aircraft industry trained its workers on Battles, etc.'

Several speakers, including *Sir Kenneth Cross*, *Gp Capt Neubroch*, *Gp Capt Madelin* and *Mr Blanchard*, pointed to the inter-war lack of proper scientific support and analysis of capabilities, bomber exercises, etc as one reason for the general failure to appreciate the problems of long range navigation and the need for specialists and radio aids. *Mr Blanchard* referred to the air exercise in 1938 in which two-thirds of the attacking force failed to find an illuminated Birmingham (a failure noted by the Chief of the Air Staff); the RAF Manual of Navigation, AP1234, of 1937, devoting half a page to night navigation, 'which will be performed by the light of towns'; together with the Operational Requirement of 1936 for heavy bombers which failed to make provision for a navigator, not even a table. This, and the absence of a specialised aircrew function of navigator until 1941, indicated a lamentable failure to appreciate the needs of the bomber. Navigators, even when their importance was recognised, tended to be considered an inferior breed, unlike the observer in World War One.

Mr Michael Allen said that he was one of a handful of men who

were rushed through as AI radar operators in 1941. He spent four years in two-seater fighter aircraft sitting beside the pilot – two in home defence and two intruding over Germany – yet was never put through a navigation course. Required to navigate a Beaufighter to Cairo, he spent two days at Lyneham ‘learning how to work an air plot’. *Tony Richardson* made the point that even later in the war a Sunderland carried three pilots and sometimes a specialist navigator. The third pilot did the navigation and was also responsible for refuelling the boat!

Sir Patrick Dunn was puzzled as to why so little attention was paid to navigation pre-war. In his own case, as a flying boat man from 1933 to 1936, he had qualified as a navigator after a six-month course. He was also a qualified pilot and flying boat captain, but there were so few flying boats and so many captains that he frequently flew as a navigator. Yet there was no provision for recording navigator hours in the pre-war log book, so his first log book showed 250 hours in the ‘Passenger’ column! ‘We were not very good at it but we could and did frequently tell the Fleet where it was. This was because it was not too difficult, even for a Supermarine Southampton at 65 knots, to return to the Channel Coast, check visually where you were, and return to the Fleet to tell them they were 10 miles from where they thought they were. They used to argue, until they got back to Portsmouth and found it wasn’t there because they were still 10 miles short. We thought we were doing well enough.’ He could not be dogmatic but a major factor could well be that the RAF was led by people whose formative experience had been in 1914-18 when whatever had been done would mainly have been in daylight and good weather, with pilots able to see where they were.

In another group *Wg Cdr Thomas* approached the same topic from a different angle when he asked how it was that Special Duties pilots were able to find the corner of a particular field in France when the overall standard of navigation was so poor?

Gp Capt Batchelor recalled that he had commanded a Halifax SD squadron roaming all over Europe dropping agents and arms to resistance groups. So far as possible, operations were undertaken in moonlight and were flown below radar cover, but even on a dark night rivers and towns stood out. Additionally, however, there were half a dozen torches flashing from the target area. In the later stages of the

war aircraft were also guided by Eureka ground radars which were triggered off by the Rebecca transmitters in the aircraft over the last 30 miles of an approach. Overall, operations in support of SOE were very weather dependent.

Prof M R D Foot pointed out that it was also true to say that most Special Duties aircrew were on their second tour and had much greater experience than ‘common or garden’ navigators in Bomber Command and experienced less difficulty in finding targets. In addition he stressed that SD pilots and navigators used low level map-reading techniques to find the general area of a target before relying on visual or Eureka ground signals. Clearly navigators in the main bomber force were unable to rely on visual low level techniques to find the target, so the comparison was to that extent a false one.

Wg Cdr Gordon Browne contended that the huge defeat leading to the fall of France was in large part due to an unwillingness to accept army co-operation as an essential function. ‘If we had invested in a joint-arms programme, such as we’ve seen emerge in the last twenty years and exemplified by RAF Germany, we might not have experienced that overwhelming setback in 1940. Had we had the will in the 1930s to join with the Army in producing a joint response to the threat it might have been a very different story.’

Both *Sir Christopher Foxley-Norris* and *Denis Richards* disagreed. Sir Christopher pointed to the strong pressure to split the RAF between the other Services in the inter-war period. He stated that ‘assuming such a division had taken place and that the Battle of France was lost, as was inevitable in the longer term, we should have lost the Battle of Britain if we had had a third of the Air Force army orientated, and third naval orientated, and the rest left for the RAF. The fact that such a division had not taken place enabled the RAF to win the one decisive battle which paved the way for subsequent victories.’ *Denis Richards* reminded the group that there was only a very small force earmarked for service on continental Europe right up to the last moment, and he posed the question, ‘What could such an army with a significant tactical air force have done in the face of the French collapse?’ He also pointed out that a major constraint was the small size of the Air Force inter-war. ‘The Air Staff was convinced that if you tied resources primarily to military requirements you wouldn’t have the means of supporting the bomber, air defence or

maritime concepts. There were times during the war when the demands for support aircraft were so great – Brooke and Pound in 1942 – that would have taken the entire output of the aircraft industry.’

In Group 4 *Sqn Ldr Spencer* asked what was the basis of target selection. *Prof Richard Overy* replied it was often forgotten that much of the target planning was done in the Air Ministry in the 1930s. From 1937 onwards the German economy was examined with the aim of establishing the most vulnerable points. Over the next two years much effort was devoted to analysing target systems and relationships between target systems, and detailed lists of industrial targets were drawn up. This material was then passed to the Americans in 1941, and it was combined with material from American firms with German interests.

Dr Christina Goulter added that the Ministry of Economic Warfare and its pre-war predecessor, the Industrial Intelligence Centre, also played a part. The latter was responsible for gathering industrial intelligence on foreign countries, and by the mid-1930s was concentrating on Germany. The relationship between the Air Ministry and the TIC or MEW was not always good. Difficulties arose in the late 1930s when the TIC chose to proffer advice on the priority which should be given to certain target systems, a process which the Air Ministry considered to be their preserve. ‘It was an unfortunate rift which widened once Harris came on the scene; he had an ingrained distrust of any civilian advisors, whether economists or scientists.’ [*cf* *Dr Frankland’s* comments in Group 1].

B) Strategy

In most Groups a central theme of discussion was the choice of strategic options. In Group 2 *Sir Christopher Foxley-Norris* believed that Harris was essentially a realist and a pragmatist, undertaking the campaign of area bombing when he found he couldn’t do anything else to justify our existence and take the attack to the enemy. *Mr Denis Richards* agreed, bringing out the fact that the decision to use area bombing techniques preceded Harris; the first such attack was as early as December 1940 against Mannheim and the first directive was issued in June 1941. ‘That is not to say that such targets as oil and transportation were not considered for, as early as 1940, directives

highlighted their importance but the objectives just couldn't be achieved. Bombers couldn't operate by day without severe losses and night bombing was too inaccurate, hence the turn to area bombing. When, later, greater accuracy became possible they went back to it, but Harris was reluctant to give up area bombing because he thought it was doing the most harm and also that his crews would be safer than in attempting to hit hotly-defended targets. So he had his reasons but I think he was wrong for the answer was unquestionably to go for oil and transportation and not area bombing. The disagreement between Harris and the Air Staff about this is very clear but it is an interesting point whether anyone can ever convict Harris of disregarding his orders – his directives even up to April 1945 still included area bombing, as well as oil and transportation. He always fiercely maintained that the best policy was area bombing but he equally maintained that, when given orders, he carried them out. Only members of his staff could ever reveal that he went for areas when he could have gone for oil. Group 5 also raised the question of Harris's continuation of area bombing when, with the availability of increasingly sophisticated equipment he could have pinpointed, for example, the all important synthetic oil targets. Harris's directive at Casablanca was recalled and he had followed it to the letter, leading to his disagreements with Portal.

Flight Lieutenant Frank Diamond, a XV Squadron member in 1943, took issue with Denis Richards over his use of the term 'convict' Bomber Harris as typifying a large body of opinion about his wartime chief. His reasons for using area bombing were, of course, that we didn't have the essential navigation equipment. He flew in Stirlings and the nearest they could get with any precision was the Ruhr and, using Oboe, they achieved precision on an area basis. He cited the example of Wuppertal on one side of the river, and Elberfeld on the other, both of which were wiped out in such area attacks. In contrast, the daylight raid on Augsburg, whilst successful, was hugely expensive in aircraft and crews. Their aircraft didn't have adequate range and defensive armament, and Harris therefore refused to go for precision raids by daylight because such losses couldn't be sustained. Even so, our losses were such that there were no crews which achieved 30 operations – he was only sitting here today because they were taken off when they'd done 28 missions because of a critical

shortage of instructors. The alternative to area bombing would have wiped out Bomber Command because they wouldn't have been able to replace either the crews or the aircraft. He concluded by extolling the great contribution of Cheshire and the Master Bombers in providing precise markers, however hazardous the task.

A similar thread in Group 1 led to some discussion about the bombing tactics of the 8th Air Force and Bomber Command and the view that there was, in practice, little difference. At a seminar in 1991 with the USAF Historical Foundation, General Potts had said that they had 'conducted a campaign of precision area bombing'. Whereas Bomber Command typically bombed within 5 miles radius of a target, 8th Air Force put large formations over and, with their 'pattern bombing' concept, all aircraft released their bombs together, following release by the formation leader.

As a corollary to this point, *Squadron Leader Bonham*, a staff course member, expressed surprise at Dr Hallion's statement that morning that the US 8th Air Force reached a stage at which their bombers were being sent out to draw up the *Luftwaffe* fighters to be engaged by escorting Allied fighters. This seemed to him totally wrong and secondary to what should have been the primary aim of precision bombardment. *Dr Frankland* assured him that Dr Hallion was right: General Carl Spaatz's primary purpose and driving force was to destroy the *Luftwaffe* because he saw that once that was done then you could sit down and decide what targets to bomb, and you could do what you liked. But until you had destroyed the *Luftwaffe* there was no future in bombing at all. He frequently said, 'I don't care what we bomb so long as it brings the *Luftwaffe* up'. In Bomber Command the idea was to evade the German defences; Spaatz was out to confront them. There were parallels in naval history: Nelson's aim was to find and destroy the enemy fleet; the French and German navies usually sought to avoid the British Fleet but to inflict damage less directly, for example, by commerce raiders and submarines – the *guerre de course*, which is what Bomber Command fought for the greater part of the war, and in *Dr Frankland's* view it never actually works. *Squadron Leader Bonham* said he doubted whether he would get away in the modern air force with a policy of sending the bombers in to get the enemy air force in the air so that our fighters could shoot them down and get air supremacy. *Dr Frankland* agreed that he might

not get away with it but it remained the case, at any rate in WWII, that what Spaatz realised was that to get an enemy into the air and destroy his pilots, as well as his aeroplanes, was the most direct way to success. Aircraft destroyed on the ground by bombing could be fairly readily replaced; it took much longer to train a replacement pilot. *Wing Commander Al Baram (Oman)*, an overseas student, said that in the Gulf War the Allied air forces wanted to get the Iraqi Air Force into the air because, with air supremacy achieved, they would have been an easy kill. But the Iraqis stayed in the hardened shelters which took a lot of effort to destroy. *Squadron Leader Caster* added that the USAF preferred not to attack airfields – there were very few on the target list – in the hope that the Iraqi Air Force would come up and expose aircrews as well as aircraft to combat.

C) Effectiveness of the Offensive

If *Dr Frankland's* contentious point that Bomber Command was virtually ineffectual until July 1944 was intended to provide discussion then it certainly succeeded. In several Groups, members were surprised by the comment which, in *Air Vice-Marshal Jack Furner's* view, 'completely ignores the effect of operations against such places as Hamburg, Wuppertal and Peenemunde in 1943 and is a nonsensical claim – not only does it not add up physically but also psychologically for it disregards the huge psychological effect the reporting of such raids had upon the British public. *Mr Robert Jackson* added that another successful feature of the offensive was that it had the effect '... of forcing the Germans to decentralise some of their key military projects, one of which was their nuclear weapons research project which had to be scattered piecemeal throughout Southern Germany. This is a most important point that is often overlooked because up to the end of 1942/early 1943 the Germans' research was very advanced, in some ways more so than the UK/US project'.

This diversion of German effort was also commented on by *Sir John Curtiss* who was convinced that 'if Bomber Command had not directed attacks against German industry, and that includes the submarine industry, there would have been a lot more schnorkel boats at sea before the war's end and that would have posed us quite a problem. Those attacks included the 20,000 pounders on the

Dortmund-Ems canal which was the supply route for parts. In the end I think they launched only one boat in time, and even that never became fully operational'. Air Vice-Marshal Kemp followed this with the observation that 'there was also the effect this campaign had for us on the Russians – and the Americans – in our dealings with them. Without it we could not have held off for so long the pressure to mount the invasion, and there would have been a much greater loss of life'.

With *Dr Frankland* in their midst, members of Group 1 were able to enjoy hearing him enlarge upon his statement during the morning session that the strategic air offensive had been a failure in the period before July 1944, though very successful afterwards. He explained that this was his view in the precise context of German war production: even more precisely, on the sources of war production, not including channels of supply and communication, such as railways. Nor was he assessing the effect of the offensive on civilian morale. The fact was that German war production increased steadily until July 1944; thereafter it tailed off very seriously due to the bombing offensive which by then could be conducted in conditions of general, if not complete, air superiority. This meant that targets could be chosen in terms of what was desirable rather than what was possible. He also mentioned that in discussion with Sir Michael Beetham after the morning session they had agreed that Bomber Command's operations against target systems related to the preparatory phase of the Normandy invasion in June 1944 had made a major contribution to its success. This was not, however, a strategic air offensive as he defined it.

Freddy Cox (ex-11 Squadron) asked about the most romanticised of all Bomber Command's operations, the attack on the Ruhr dams. Sir Arthur Harris was enthused by the results, and proudly displayed photographs of the damaged dams. *Dr Frankland* said that the pre-raid intelligence was reasonably accurate. It was known that a key factor was the linkage between the Möhne and the Sorpe dams; both had to be destroyed if the best results were to be achieved. The Air Staff did not entirely act on this intelligence but a serious difficulty was the lack of a suitable bomb to breach the earth-built Sorpe dam. The Wallis bombs were designed to destroy concrete dams such as the Möhne and Eder. The effect of the damage on German war production was

virtually nil; amongst other consequences some six hundred POWs and slave workers were tragically drowned. One immensely important dividend came from Wing Commander Gibson's demonstration of a method of attack that was entirely revolutionary and would previously have been thought impossible; and what it demonstrated to Leonard Cheshire in particular was that if Gibson could put a bomb down with a very high degree of accuracy, he might do the same with marker flares. Thus, in Dr Frankland's view, Gibson's Möhne dam attack was immensely important in its operational consequences; it changed the whole prospect of Bomber Command.

Squadron Leader Tony Davenport questioned the accuracy of the contemporary media in giving an accurate account of events and thus doing justice to Sir Arthur Harris. *Mr Denis Richards* answered that, 'the simple answer is that it wasn't an accurate account, it was an over-praised account – not for the effort but the achievement. Papers were fed material by the Air Ministry's public relations department which always greatly exaggerated the effects of the bomber offensive.' He then added that, 'while Bomber Command made a tremendous contribution, it wouldn't really have sufficed without the American contribution. It was the round-the-clock feature that made the Germans succumb – they might have coped with the day raids; they might have coped with the night raids, but they certainly couldn't cope with both.' *Wing Commander Crighton* endorsed this point recalling that his operational experience was with PRU and he had photographed aspects of both efforts and he felt bound to say that the Americans got better and better remarkably quickly, making an enormous contribution in that last year. A fine example of co-operative effort was quoted by *Wing Commander Gordon Browne* in response to a question about the destruction of Hitler's 'ultimate weapon', the V3. He referred to preparations to install the gun near the Pas de Calais and its destruction by the RAF and USAAF.

Asked whether he shared Dr Overy's doubts about the US Strategic Bombing Survey after the war, *Mr Richards* said that he, 'shared his views completely as a very, questionable exercise after the war. The Americans sent over a team of 1,100 people before the war was even over, which began interviewing people. We wanted a comparable survey but Churchill wouldn't allow Portal more than 30 people and so, finally, about a year late, we got a survey. Portal wanted it presided

over by an impartial scientist but it was run by Zuckerman, a brilliant scientist but a proponent of one of the bombing plans – the transportation plan, so naturally transportation came out top there. Again, we were following along, picking crumbs from the US survey. When the history comes to be written, what is there to go on production except these two surveys concerning? You can't do it all over again; it's impossible. I think the whole thing was flawed and much too much emphasis was put on loss of production and not nearly enough on other factors, such as the build-up of defences.

Taking up this aspect, *Wing Commander Crichton* referred to Dr Boog's comments about the massive employment of over one million German soldiers on *Flak* defences who might otherwise have been used as reinforcements, permitting another thirty, perhaps even forty, divisions to be deployed to Normandy. *Denis Richards* added that another million were involved in the equivalent of the Air Raid Precautions (ARP) and that over 20,000 88mm guns, which could have doubled as anti-tank guns, could have been similarly redeployed – an aspect which needs much greater emphasis.

It was *Sir Michael Knight's* opinion that Dr Overy had produced the most balanced assessment of the effectiveness of the strategic air offensive which was unquestionably the greatest air/land victory to date. Had the bomber offensive not been launched we could only speculate what the Third Reich would have achieved. *Mr John Terraine* pursued a similar theme '... to imagine the war without the bomber offensive is an impossible exercise. Churchill had spotted this as early as the summer of 1940 when he put it quite crisply to Beaverbrook that the only thing we had which could show the Germans that we were even in the war at all was Bomber Command. It is a ludicrous idea, even to try to subtract Bomber Command from the war. But I firmly believe that the war was eventually won by the interrelation of many forms of activity, of which Bomber Command was but one. There were all sorts of things that Harris would have sworn it was not fit to do, had never been trained to do and had better not do – and yet led it toward the doing of with very great distinction'.

D) Air Intelligence

The fundamental importance of sound intelligence had been emphasised during the morning sessions and, along with a number of

others, *Sir John Aiken* had been struck by the caustic remarks about intelligence shortcomings during the bomber offensive. Pursuing this point, *Mr Cecil James* raised the question of *Dr Frankland's* reference to 'bad intelligence' contrasting it with the overall view of *Sir Harry Hinsley*, the Official Historian of Wartime Intelligence, 'that the record of air intelligence in defining and identifying worthwhile target systems, over and above the large urban areas, was good.' The mistakes that were made were more in the timing of attacks, for example in seriously attacking submarine pens only after they had been built and were almost invulnerable and, even more important, delaying a determined offensive against oil targets. *Dr Frankland* said that he had to disagree with Professor Hinsley. The intelligence that was offered to Bomber Command was often abysmally bad and, worse than that, stupid. It was written by people who were academically very clever but did not know how things actually worked; in particular, they did not understand how Hitler's Germany worked. One example is notable because it turned *Sir Arthur Harris* off the intelligence community altogether, which eventually led him into some mistakes but enabled him to avoid others. This was the intelligence view that if the small number of factories producing ball-bearings could be knocked out the effect would be crippling. The US bomber force paid a very heavy price in their attack on Schweinfurt in October 1943 – there was another by Bomber Command in February 1944 which did greater damage but without significant effect on German resources. There were large stocks in German industry generally; Sweden was a source of supply and flexible joints were an adequate substitute – as in the FW190. This kind of experience meant that Harris mistrusted, 'the college boys whose clever ideas never worked', which in the end was unfortunate because it led him to undervalue some important intelligence.

Dr Frankland cited, by way of example, the intelligence about oil plants. Whether they could or should have been attacked earlier is debatable. The Chief of the Air Staff, *Sir Charles Portal*, took the view that there was little point in attacking oil plants until the Romanian sources of supply came within range, which was not until the US 15th Air Force could operate from bases in Italy. From then on, Portal was a strong advocate and from May/June 1944 oil was a target for Bomber Command and also the US 8th Air Force. But, because of his

earlier experiences, Harris remained sceptical, though in this case the intelligence was good, and did not bring the weight of attack to bear that was called for. These were not 'soft' targets – it was amazing how quickly the Germans could repair damage – and Bomber Command's heavier bombs than those of the 8th Air Force were needed and were the weapons that did the damage. This view was echoed by other speakers who commented on the few attacks on oil targets in the latter part of 1944 at a time when we had the ability to mount precision attacks. A possible explanation was voiced by *Squadron Leader Young* of 255 Squadron who said that in 1944 he'd been sent to look at why we were losing between 30 and 40 per cent of our people bombing the Ploesti oilfields and had found, 'that all the high tech stuff was being completely ignored. From the bomber stream of about 200 bombers the loss on one night was 78 – it was being routed over a cab rank of thirteen Ju 88 night fighters. It was always on the same route and became predictable'. *Mr A W Furse's* view was that, 'one of the biggest mistakes made was the failure of senior staff to listen to the recommendations of the operational commanders. None of the top commanders flew, with the exception of D C Bennett. This was in strong contrast to the USAF' – a point reinforced by *Air Commodore J Mitchell* of 50 Squadron who observed that No 4 Group HQ certainly seemed out of touch with no one seeming to know what was the effective range of aircraft.

Sir Christopher Foxley-Norris provided a fitting conclusion to this discussion when he recalled 'a ripe plum at the end of CD 1020 was not that we couldn't hit the targets but that we chose the wrong ones, and the extraordinary conclusion it reached was that target intelligence was too scientifically conducted and should have been conducted by serving officers with practical knowledge. As a result, there was an imperative need for any future CAS to have done at least one tour as an intelligence officer so as to guarantee appropriate decision making'. He could not recall, however, that the recommendation had been universally practised.

E) National Morale

The offensive's effect upon morale was widely discussed. *Squadron Leader C M Barker* in Group 4 suggested that Trenchard's emphasis on striking at an enemy's morale had created false

expectations. *Mr Humphrey Wynn* referred to First World War experience and the essentially strategic objectives of the Zeppelin and Gotha raids which, though not inflicting great damage, had a profound effect upon civilian morale. It was *Sir Michael Knight's* view, however, that morale was not a proper target and that results showed this to be so. *Sir Christopher Foxley-Norris*, whilst not disagreeing, observed, 'that everyone involved believed that morale was vulnerable to air bombing and that the side whose cities and homes were flattened would give up. It never happened and on all sides public will and morale disproved the theory.' *Mr Denis Richards* cited the only exception as being the northern cities of Italy.

The less measurable, but still important, positive effects of the bomber offensive in its early years were raised by *Squadron Leader Bob Watson* who posed the question: 'Was its value more in boosting British morale than in damaging Germany?' *Dr Frankland* agreed: 'I don't believe Britain would have carried on the war if we had not had Bomber Command. There is no record of any country carrying on a war when it is obvious that there is nothing whatsoever it can do about the enemy. Bomber Command may not have been achieving as much as was believed at the time but that belief was crucial to the continuation of the war and it was shared by the general public and their leaders. We could 'take it' because we were giving back, and more. The August 1940 attack on Berlin, while not doing much damage, gave an enormous boost to morale.' *Michael Allen* spoke of going on leave through the London underground and being greeted in his RAF uniform with cries of, 'Drop one for us, guv.' The sentiment was clearly at the heart of home front morale.

At a different level of appreciation *Professor Brandon* said that, putting the offensive at its lowest, some seven and a half per cent of our resources took out over ten per cent of those of Germany. Its effect on American opinion and American support, and eventually American participation, was another positive factor. Understandably the Bomber Command effort, actual and planned, was so impressive that its efficiency was widely believed. It influenced the advice General Spaatz gave to President Roosevelt after visiting London in the summer of 1940. Air Chief Marshal Sir Ralph Cochrane was mentioned as another exceptionally gifted senior officer so imbued with the Trenchard doctrine as to be convinced that such a massive

effort must be achieving massive, if not precisely definable, results. Later in life, when he and Dr Frankland were neighbours and friends, 'our views came closer together.'

Air Vice-Marshal Furner recalled that in the early months of 1942 the news from around the world was almost completely negative – from the Far East debacle to convoy and shipping losses – and the only positive thing that boosted us was Bomber Command going to Germany every night it was feasible. *Mr Graham Edwards* remarked that we should not ignore the crucial point that the Bomber Offensive induced the Russians to continue with the war at a time when the signing of a separate peace was possible. *Mr Denis Richards* agreed and mentioned that the raids on Berlin in late 1942/early 1943 at the time of the siege of Stalingrad were mounted to demonstrate Allied unity to the Russians. *Air Commodore Probert* added that we should not forget that it was also a great morale booster for the people of the occupied countries. 'Talk to any Dutchman who lived through those years, to any Belgian, to the French, the Norwegians, the Danes. There was no sign to them that anything was happening other than the bombers going overhead at night. Look at all the work they did to assist those who were shot down to escape, often at the cost of their own lives.'

The offensive's impact on the morale of Germany's forces was raised by *Major T Hullena*, a German student on the staff course. *Mr Robert Jackson* pursued a similar train of thought in Group 2 when he referred to contemporary German records showing that, 'with the Allies approaching the Rhine in 1944, Hitler ordered the evacuation of the West Bank population to the East but the population would not budge, wishing the Allied advance to roll over them because then they would be released from the Allied bombing. In my view, that is the key feature of the effect of Allied bombing on German morale.' *Professor Overy* considered that the subject, 'has not received the attention it should have. Only local and city studies have been made. However, what we can say from the letters from the Front is that German soldiers were anxious about the impact of bombing on their home centres, especially after going on leave. There was generally a great sense of shock when soldiers saw the Home Front.' Group Captain Neubroch added that this was certainly the case with the U-boat crews. 'They apparently weathered the losses sustained in the

Atlantic, but had difficulty coping with the devastation of their home cities.'

At the end of the discussion *Dr Boog* reminded Group 8 members, 'that the belief that the bomber offensive was started in retaliation for German attacks was erroneous. The pre-war manuals of the RAF laid down civilian morale as a target, and Churchill ordered the offensive to commence on 15 May 1940 in response to the German breakthrough at Sedan and the manifest superiority of the *Luftwaffe*. It was, in other words, originally an attempt to relieve pressure on land and in the air. He considered that both the *Luftwaffe* and the RAF had originally intended to strike at broadly defined, military targets, but both equipment and techniques and training were lacking and accuracy therefore lagged some way behind the intentions of both sides.'

F) The Morality Issue

The extent to which the German population was affected by the offensive was discussed in most Groups. A staff course member in Group 7 posed the ethical issue when saying that one of the problems of the campaign was the moral, not morale, side of it. He referred to the intensity of feeling aroused when the Harris statue was unveiled in the Strand and by the bombing of Iraqis fleeing from Kuwait, and present day society's conscience about the killing of civilians.

Dr Hallion commented that, 'a modern idea in the USA nowadays is that war must be fought with absolutely minimum casualties on both sides – a very dangerous trend for policy makers. We have a terrible tendency to engage in moral relativism, where everything is seen as equivalent to everything else; Harris was suddenly equated with the V2 missile – the most appalling lack of appreciation of history in context.' *Sir Christopher Foxley-Norris* expressed the view that the nature of war has changed. 'We no longer go to war with other nations but with regimes', and cited the example of Saddam Hussein in Iraq, not and Iraq. 'In World War I and II we were encouraged to hate the Germans but a change has come about since then – possibly generated by the Vietnam War – that the military task is to topple a regime, not make war on the people around it.'

Referring to British opinion at the end of the war about German population losses, *Group Captain Madelin* said that the simple answer

was, 'that one didn't think that way. If your own town, which might have been Plymouth or Bristol or Bath or London or wherever, had been bombed it simply did not enter your calculations that a town in Germany might have been bombed four times as much. Your town had been bombed. Where there were homes there are now none. People who were alive are now dead; people who were hale are now mutilated. You would not have thought to draw numerical comparisons'. *Sir John Curtiss* added, 'You've got to remember too how we got to where we were. We'd seen Czechoslovakia invaded, Poland invaded, we'd seen Norway, Belgium, Holland, France. There'd been chaos, and the whole population were right behind anything we could do to win the war. One of the great morale factors for us was that nearly every night, and however ineffectually, Bomber Command were going out and bombing the enemy. Our ships were being lost at sea, we'd suffered defeats in North Africa, but there was a big counter-morale being built up by the bomber offensive.'

Air Vice-Marshal Jack Furner probably represented the bulk of opinion when he remarked that, 'many of us have pondered over this question for almost 50 years and many have been worried by the answer they've arrived at. I don't worry at all. Cities all over Europe had been attacked by the *Luftwaffe* and we were merely returning the medicine.' However, *Mr Saxon* did point out the, 'enormous change in attitudes between the early part of the war and much later; to begin with we were refused permission to attack land targets at all'. But *Group Captain South* recalled that, 'If you were in London you would be told by total strangers, 'Give 'em one for us, guv'. There was not much talk about morality – it was total war; we were fighting for our lives.' The point was reinforced by *Mr Heritage* who said, 'I can't speak as one who took part in the bomber offensive, because I ended up in Coastal and Transport, but when I was in training I can only say I looked forward to the prospect of dropping bombs on Germany with the greatest enthusiasm. I was at home in Coventry in autumn 1940 and I remember the night a landmine came down and demolished a part of our house. I went down into Coventry the next day to look up some old friends and I'll never forget the appalling scene of devastation. The feeling was that they had started it, and whatever we could do to them, they'd deserved it.'

Dr Dockrill turned to the apparent failure to achieve the declared

objective of destroying German morale. 'We've heard a lot today about the high morale on our side and the destructiveness of our operations on the other side. But this was not what Trenchard, Portal, Harris said it was supposed to do. We heard nothing about German morale collapsing – and that was the story we were getting throughout the '20s and '30s, not from 'popular sources' as Richard Overy said this morning, but from official sources. We heard nothing about Harris's statement in 1943: 'If we bomb Germany from end to end it will cost us a lot of aircraft but it will cost Germany the war'. He continued: 'Nobody this morning mentioned the pledges and promises that the Air Staff made in the 1930s and 1940s'. *Sir Kenneth Cross* took up this point. 'The fact is that no one made any promises. I was in the Air Staff in the '30s. You make policies; you decide what you are going to do. But you can't make promises in war. You have the enemy against you. You mention the courage of the crews, but you cannot separate them from the purposes of the campaign as you try to because they all had complete confidence in it too.'

Squadron Leader Singleton of the Air Historical Branch noted that in examining the results of area bombing, 'a point that seems often to be overlooked is that industrial complexes and their associated workforces existed side-by-side and that any attack on the former naturally involved the population, which wasn't being attacked per se.' While this was true in certain industrial complexes, *Mr Denis Richards* said that, 'an aspect of area bombing that is worth bearing in mind concerns the aiming point, which was normally the centre of the town, whereas the bulk of factories were out in the suburbs; had we gone for them there would have been a great waste of effort. The principal objective was to destroy the houses of the workers.' *Group Captain Batchelor* observed that, 'Berlin and other cities were riddled with war plants of one sort and another. We used to refer to area bombing as post office raids because the central aiming point was the main post office.'

The subject of the Dresden bombing inevitably came up. *Squadron Leader Williams* asked how it was perceived at the time by the aircrews in Bomber Command – as something special or just one of a series of raids? The short answer was that it was just another target. What should not be forgotten is that Dresden was one of four targets given to Bomber Command in January 1945 by the War Cabinet, in

the interest of possible German revival. The Ardennes offensive had been launched in December and the attacks in prospect were to be a shattering blow to convince the Germans that it was useless to carry on. Harris did not select Dresden; it was one of the targets he had been instructed to attack. *Dr Frankland* commented, 'He actually opposed it: he thought it was a silly idea, on the grounds that it was very long-range and not important enough to justify the sacrifices he thought it would mean. Actually, the casualties were virtually nil, because the German defences never got up and therefore the raid was far more effective than it would otherwise have been. It became a case of over-bombing.' An attack on Chemitz in the same period by a force of similar size – about 800 aircraft – was opposed and achieved the normal degree of success. Lack of opposition to the Dresden raid and clear weather meant that virtually all aircraft got to the target and bombed accurately. By that time – mid-February – the need, as seen in January, for this kind of attack had passed; but the war machine is such that, once set in motion, it is not easy to stop. *Michael Allan* recalled going to Leipzig on 10th April 1945: a major attack on a long-range target, but only six aircraft were lost. The whole range of German defences – aircraft, searchlights, guns – was disintegrating. 'It was a much simpler matter to get into the target area, identify the aiming point and so the resulting damage.'

Sir John Curtiss commented that he had been on the Dresden raid, 'and we had no doubts about it at all. We were told we'd been specifically asked to do this by our Soviet friends, because there was a concentration of *Panzers* in and around Dresden. It was not till years after the war that I heard the slightest criticism.' *Group Captain Madelin* felt it would clarify thinking if one or two facts were brought out. 'Today anyone who wants to have a go at Harris brings up Dresden, as if Bert had simply said, 'Well tonight I think I'll have a go at Dresden.' Of course it wasn't Bert who decided these things and target priorities were arrived at more or less as they are today. Churchill and Roosevelt agreed the broad overarching objective of the strategic bombing campaign and this then gets translated into target systems, then into targets and then you get target listings, and Dresden had been on the list for a very long time. Nor was this the first attack there. The Americans had bombed Dresden in the October of the previous year. What was special about this particular raid was that it

turned out to be more devastating than it might have been. At about the same time we were bombing Leipzig and Chemnitz. And had this happened to Leipzig then today we would be talking about Leipzig and not about Dresden'. A similar point was made by *Air Commodore Probert* who said that it was his understanding that, 'the order to put Dresden on the list came from the top. Harris himself indicated that it came from SHAPE: it certainly came through the Chief of Staff. When the order was received at High Wycombe – and the essential reason was that it was to assist the Russian attack on the Eastern Front – the order was queried by the headquarters staff. I have not seen it on paper but I have heard it from several people, including 'Digger' Kyle (later Air Chief Marshal) who was there at the time and was very specific about it, that they went back to the Air Ministry and said 'do you really mean this at this point in the war?'. The answer came back, 'Yes.' So Harris went ahead.

Turning to the point about the momentum of the offensive *Mr Laity* said that Cheshire had told him shortly before he died that Dresden was an historical inevitability. Yet he wished it hadn't happened because it was unnecessary. He concluded that the momentum of the bombing campaign carried the thing on. We had this immense weapon which carried on beyond the point it was necessary. It would have been better to divert the effort to more tactical targets. However, *Mr John Terraine* made a final, telling point when he remarked: 'Today the argument is misphrased, as if it had been: 'Should we bomb Dresden?' In fact it was 'Should we *not* bomb Dresden?' – and there was no conceivable reason for not bombing Dresden'.

G) Sir Arthur Harris

There was much discussion of the qualities and role of Sir Arthur Harris. In Group 6 *Air Vice-Marshal Oulton* recalled being with him in Washington on the night Portal told him he was to be CinC Bomber Command. 'He was a solid character, very steady, unemotional; he had a young wife and new baby, all of which had psychological effects, I'm sure. I found him firm, strong, reasonable. My impression was that he had been told to do this job – a horrible one – and was going to do it with all his might and main. He's had a rotten press for doing what he was told to do'.

Group Captain South was an aircraft captain at the time, 'I never set eyes on the CinC until 1968. He was very highly regarded by us young crew members; it was a remarkable example of leadership by remote control. He was affectionately known as Bert (he was Bomber or Butch only to the press). He didn't believe in visiting stations, for if he went to one he'd have to go to them all; he kept his hands firmly on the reins at High Wycombe. I don't know that I'd agree with criticism of his political judgement, for he spent much time cultivating Churchill and other vital notables, whom he invited to view his Blue Books at High Wycombe.'

Air Vice-Marshal Peters posed a key question: 'Why did they respect Harris whom they never saw and was a leader by remote control? There is a feeling today that one needs to be seen, to get close to the chaps, to have a public persona. Harris did not do this. What was his secret?'

Professor Martin, an engineer officer at Scampton at the time, suggested that he chose his AOCs with extreme care, that they in turn imbued their Station Commanders and others, and that it all filtered through. *Air Commodore Probert* referred to the messages he used to send, which were couched in the crew-room vernacular and often read out at the briefings. That must have been in marked contrast to the methods of his predecessor Richard Peirse, who probably did not carry much weight in Bomber Command during 1941. Certainly the choice of subordinates, including Squadron Commanders, was important, but otherwise it may have been an awareness at squadron level that up at High Wycombe someone was burning the midnight oil, doing everything he could, and that he had the ear of the Prime Minister and of Portal. At the same time enormous improvements were taking place in the Command which must have been very obvious in 1942 compared with earlier years – in terms of aircraft, weapons, navigational aids etc. *Professor Martin* observed that the first item on the BBC's morning news was often, 'Lancasters of Bomber Command last night attacked so and so'; the morale value of that had to go into the equation. *Mr Saxon* believed we should beware the judging of men outside the context for their time, and that Harris was right for his time. We should remember too the public reaction. They had been bombed themselves, and a chap like Harris came across as a down-to-earth man; they didn't want an intellectual. Portal wouldn't have fitted

that part as well.

Dr Hallion offered some general reflections. ‘If we take a look at the developments of organisational theory and psychology since 1945 our notions of proper leadership styles have changed. Harris’s style may be seen to suffer according to modern theories – but at the time it was perfectly acceptable, and particularly because of the extreme care he took in picking his subordinates. After 1945 Harris suffered, like all military leaders, through changing popular attitudes towards war. So a public myth was created, coupled with the publication of quasi-historical works that tended to view the individuals who led the strategic bombing campaign (American as well as British) as lacking human values. Harris, in my view, was very concerned about his men – he took their losses very hard. It was total war – unlike more recent ones – and he was pursuing it in a way that was peculiarly Anglo-American. We are slow to anger, but once we get into a war we strive to achieve decisive and overwhelming effect. He should not be faulted for his part in that.’

Air Commodore Stockwell recalled that his family lived in the London area, where they were all being bombed. If any newspaper editor had published the sort of things recently published about Harris he would have been torn to pieces by the population of London; perhaps in 20-30 years’ time General Schwarzkopf might be slated for killing all those people in Baghdad. One had to do what one could at the time. *Air Vice-Marshal Oulton* returned to *Air Vice-Marshal Peters’* question. Harris’s leadership style was because of the type of man he was; his orders were simple and straightforward; ‘This is what we have to do, and how we are going to do it,’ he said, ‘and if there’s anything wrong let us know and we will put it right.’ *Squadron Leader Bryant*, a Bracknell course member, commented: ‘My concern is that maybe the nature of the warrior has changed. From the Gulf War publicity our men do not appear to present the same brave and committed face that we heard about this morning.’

In another group *John Terraine* referred to the enigma of Harris. ‘There are times when he infuriates me enormously, like the time when, speaking to Churchill about the Battle of the Atlantic, he said: ‘Coastal Command is an impediment to winning the war.’ Not a very bright remark. (*Sir Kenneth Cross*: ‘But they all knew Bert!’) He did say in a letter to Winston that he could win the war before D-Day was

launched. Well he didn't. So what did he do then? He put himself heart and soul into the jobs he was given to do. The results almost suggested that he had underestimated his own Command because what they were able to do was fantastic.'

Sir Kenneth Cross recalled working with him at this period. 'I was fortunate enough to attend the meetings held every morning at Bentley Priory after D-Day when all the air commanders sat round the table. Bert was always the awkward one; I think he might often have brought the meetings to a halt but Tedder was always there (Leigh-Mallory was in the chair) and it was Tedder who really kept them on track. The question of dealing with the French railways came up and straightaway Bert said something like: 'I can't do that. I've got a war to win. I can't fiddle about with things like that. You can do that LM with your medium bombers.' LM, who was a pompous chap, said: 'I'm not going down to posterity as the man who killed Frenchmen.' Quick as a flash Bert said: 'What makes you think you're going down to posterity at all?'

Another who remembered working with Harris was *Sir Lewis Hodges*, who had been on his staff at Bomber Command in 1944 as a controller in the Operations Room, and recalled Harris as a terrifying personality. The telephone on the controller's desk had a series of lights on it, including a red one which indicated that the CinC was on the line. He well remembered his fervent prayers that the red light would never come on! Harris did, however, command enormous affection throughout the force. Although he hardly visited a station or a squadron, somehow his personality pervaded the whole organisation and he imbued a tremendous spirit of loyalty throughout the Command.

Sir John Curtiss, who had entered Bomber Command as a young navigator in that same year, made a similar point. 'Even though one never saw him, somehow he projected an aura. One had the feeling that one was fighting the war for him as much as for King and Country and one always tried to do a good job for him. I never knew quite how he achieved this but it was a remarkable example of leadership at a distance.' *Curtiss* agreed with *Cross* that the crews had implicit faith in him personally. They knew he would never send them to do something which was not worthwhile.

Harris's morale-boosting messages were often referred to. *Mr*

Dennis Richards called them ‘extremely pungent’, adding that his crews knew he was 100% behind them – he might be sending them to their deaths but not one more than he could help. *Group Captain Mahaddie* said the only time Harris went to a station was just after the Dams raid, but he would send memorable, morale boosting messages. When the chaps heard these, they didn’t need aircraft; they felt they could just fill their pockets with bombs and off they’d go. *Mr Graham Edwards* referred to Harris as a great communicator. ‘He used to have his voice relayed during briefings and there would be a tremendous hush. The voice of the AOCinC would come in over the Tannoy with some gruff, brief message such as, ‘Tonight it’s going to be a big one, boys. Go there and take them out.’ There’d be a few catcalls, a few. ‘Oh, yes’s?’ But the general level of reception was terrific.’ *Mr Cassell*, who served on Lancasters, quoted the next sentence: ‘If you don’t get it tonight, you’ll take it out tomorrow night.’

Squadron Leader Pilgrim, Chairman of the Bomber Command Association and formerly of 44 Squadron, had no doubt of Harris’s leadership qualities, and the thousand members of the Association attending the annual dinners at Grovenor House would agree. He would come down the stairs and make his way to the top table. If he had then said, ‘War has been declared, I want you to take-off tonight,’ every man would have gone. There was something about him you just had to admire: he could lead anybody anywhere. He was quite a shy man but very human and knew how to deal with people. At a briefing he attended, a pilot possibly wanting to draw attention to himself, suggested that the armour plating behind the pilot’s seat should be taken away in the interest of a bigger bomb load. Harris said, ‘Thank you very much,’ and turning to the Squadron Commander, ‘You have my permission to remove that man’s seat!’ But it was not said maliciously.’

Dr Frankland was sure that anybody who had served in Bomber Command would agree with this. Indeed Harris’s leadership was the primary reason why the LMF figures were so low. ‘Although he was supposed to be rather brutal about such matters, he was actually a very sensitive man and lived on very light food, lettuce and that sort of thing. I think he was undoubtedly a very great leader. As fine a leader of air forces, but a great strategist as well, was Carl Spaatz: he had all the virtues. He saw, not by working it out but by instinct, what courses

of action would result in victory and he saw it with astonishing clarity. Harris had all the qualities but he was unfortunate in strategic issues. He had extreme prejudice, for very good reasons, against intelligence and also the Air Staff. He loathed the Air Staff and his letters, even to Portal, whom to a certain extent he respected, were frightfully rude. His relations with the Air Staff and the intelligence agencies were very bad and, in the long run, that served nobody.'

Harris was in fact appallingly treated by both the Air Staff and the politicians, *Frankland* continued. 'It was not Harris who decided the policy of area bombing. His initial view was that it would be a waste of effort, 'to brown the German towns.' Having been ordered specifically by the Air Staff to undertake area bombing he was then subsequently accused of having invented it. He became addicted to it because he believed there would not be enough time to develop other policies and he began to stick to it more rigidly than perhaps he should have done. In the dispute between him and Portal as between going on with area bombing or adopting more selective policies, such as oil and transport systems, Harris won the argument because he was the stronger character. He took the line that if the policy was to be changed Portal must find another CinC. He said this several times and Portal always backed down. Churchill encouraged him strongly until about May 1944 when he decided that Harris was going to be politically inexpedient: so he abandoned him. The treatment of Harris was dreadful, as was that of the whole of Bomber Command. The King wrote to him, inviting him to the unveiling of the memorial to 5 Group in Lincoln Cathedral and Harris did not reply to the letter. He has been criticised for this but he had every excuse.'

H) Morale

Closely linked with leadership were the many aspects of morale, including LMF (Lack of Moral Fibre), which were also widely discussed, especially in Group 1.

Professor Brandon in his post-war capacity as RAF Advisor and a specialist on stress and its cause, was asked about LMF policy. He said that Air Ministry Memorandum 100, circulated to units and medical officers in March 1939, stressed the need to recognise signs of wavering and vulnerability and to remove individuals as rapidly as possible. A definite LMF policy emerged some months into the war,

laying down criteria for distinguishing between those who had forfeited the confidence of their commanding officer, ie LMF cases, and those who were medically ill. Medical officers were required to be involved in sessions; specialist referral was possible; cases labelled LMF were given the option of interview with their AOC; and there was provision for review by Captain Harold Balfour, Parliamentary Under-Secretary at the Air Ministry. In practice, this was widely ignored; there was enormous variation between Commands and commanders. One CO proudly claimed that every waverer he identified appeared before a court martial and received an exemplary sentence. Others never invoked such action. In general, most COs put the emphasis on the general, as well as individual, interest of reducing to the minimum the numbers taken off flying. Medical officers' advice was obviously important but many who were involved were neurologists without training in psychiatry. It was said that any aircrew wearing dark glasses in the Mess or whose moustaches could be seen from behind were 'obviously LMF'! Fear of being so stigmatised may have kept men flying who would have been better not flying at all: they were more afraid of not going than going. Yet despite the heavy losses and tremendous stress – the US 8th Air Force reckoned that for every two aircraft lost one individual came off flying for nervous reasons – LMF accounted for less than 0.5% of RAF aircrews throughout the campaign. The officers' fears of LMF as a contagious disease and a major threat were never realised. The weight of evidence is that a sensible, sympathetic, even bluff and hearty approach was more effective than a Draconian policy. This was a lesson learned in World War I which, like others, had to be re-learned in World War II. The whole subject of LMF was difficult to research; most of the documents appeared to be unavailable in the Public Record Office. *Professor Brandon* stressed the significant statistic that 40% of LMF cases occurred among non-operational aircrew, which indicated that many under training were frightened of flying.

Air Vice-Marshal David Dick said that as President of a Squadron Association, with a history going back to World War I, he was constantly impressed by the importance the members attached to their own constituted crew. *Professor Brandon* agreed: failure to appreciate its importance lay behind the Anzio mutiny in the Army. This occurred in a special unit consisting of previously wounded men,

many with distinguished fighting records, from a variety of units. US experience of the 'Buddy System' in Korea also supported the lesson that people in small groups, closely related to each other, was the way to good morale. To break up crews 'to give them a change', as some commanders did, was utter folly. In general discussion numerous points were made about LMF: lack of flying experience and depth of training before exposure to operational stress; the exigencies of war which meant that too much might be asked of individuals after terrifying experiences in the air following which they should have been grounded. In the modern air force, the Flying Supervisors Course included sessions with experienced psychiatrists on recognising warning signs and how to deal with them. The emphasis was placed on sympathetic treatment within the unit, rather than by medical officers, which increased the chances that the barrier of anxiety could be successfully overcome.

The subject was often touched on in other Groups. The role of padres and medical officers was acclaimed; *Professor Martin* mentioned David Stafford-Clark at Scampton, who helped prevent many chaps coming unstuck when they had perhaps only a few more trips to do. *Denis Richards* who had been in touch with about 200 Bomber Command aircrew and asked them, *inter alia*, about morale, said it was obvious that by and large it was extremely high. Those cases where it faltered were really at local level – if crews felt they had a Squadron Commander who only put himself down for the soft operation, then they tended to flag; if well led at that level then morale was high. *Air Vice-Marshal Oulton* made a similar point; where a squadron was thought to have low morale (it happened in Coastal, but also he thought elsewhere) the CO would be changed, a fire-eater would replace him, and morale would quickly pick up. *Sir Freddy Sowrey* followed this up: 'One of the advantages in war is that youth is on one's side. As an immature squadron pilot of 19 I remember the arrival of a 28 year old CO. We thought of him as a 'dead beat' on grounds of age, let alone ability. That could affect morale, whereas the appointment of someone you knew and trusted could immediately restore it. If you are operating you are always losing friends, but your own safety mechanism helps – there is the cynicism of youth: if someone gets the chop it will not be me.' The youth of some of the Squadron Commanders, compared with those of today, was mentioned

by *Sir John Curtiss*. One of his, on his third operational tour, was 25 years old, and a great leader.

Squadron Leader Shephard, a staff course member, asked whether modern theories of post-traumatic stress and concomitant techniques, and counselling those who suffer, were something which Second World War aircrew would have benefited from? In response, *Sir Lewis Hodges*, *Professor Higham*, *Mr Radcliffe* and other veterans all commented that today's society tended to be too ready to make concessions to those said to be suffering stress in situations which would have been considered laughable in 1939-45. Stress was felt simply to be a normal part of aircrew life.

Mr Cox dissented, pointing out that much modern opinion on stress had its roots in studies done during the War. Furthermore, the RAF had employed psychiatrists who were studying stress as such, and who had produced a detailed study after the war entitled 'Psychological Disorders in Wartime Aircrew'. *Mr Cox* went on to say that a study of Air Ministry Orders promulgated on the subject of LMF during the war tended to show a growing awareness of the medical aspects of the problem, and an increasingly 'liberal' approach designed to bolster the self esteem of those categorised LMF in the hopes of getting them back onto squadrons. There was, however, considerable resistance at Station, Group and Command level, where LMF tended to be regarded as an 'infection' which must be caught before it spread. A further point was that the entire vexed question of tour lengths, which caused so much soul-searching at Command and the Air Ministry, was inextricably linked to the twin aspects of morale and stress – effectively how much it was reasonable to expect of aircrews.

Both *Sir Lewis Hodges* and *Mr Lewis* disagreed with descriptions of bomber crews under stress written by fighter pilots and quoted by *Mr Cox*. *Sir Lewis Hodges* said he simply did not recognise the picture drawn, whilst *Mr Lewis* did not deny that crews were under intense stress but believed they overcame it through high morale. Most veterans present agreed, and it was generally accepted that the focus of morale was crew spirit and the bonds forged with fellow crew members. *Professor Higham* observed that one aspect of morale and leadership which had not been touched upon was black humour, which played an important part in maintaining morale and inculcating team spirit. Relaxation clearly played its part. *Group Captain Batchelor*

could recall only one case of what in 1914-18 was called shellshock. 'We were all scared out of our lives at one time or another but the last thing you were going to do was to admit it. We went to the pub instead. This nation could never have produced kamikaze pilots. We always gambled 'my number's not up.'" *Squadron Leader John Burningham* agreed. 'A pint of beer helped overcome the trauma.' So did *Group Captain South*, for whom going to the pub after a raid was no problem. 'It was a peculiar war in that respect. Compared with the soldier spending six months in a trench in pouring rain in Burma we came back to warm beds.'

Air Commodore Stockwell pointed out the contrast with the present: 'A high percentage of our aircrew were young and single, without much interest in the world outside what they were doing, whereas today a high proportion are married and have family responsibilities.' *Squadron Leader Bryant* of today's RAF agreed: 'Yes, we are talking about totally different situations; your Squadron Commander today can be 40, with several staff tours behind him – he could almost be a grandfather. It is difficult for him to portray the dashing image.'

Mr Hugh Thomas, who acknowledged the debt owed by the medical profession to early studies of neurosis in Bomber Command, accepted that instances of LMF were actually very low in the RAF. Morale in the RAF was generally high and a high standard of operational training was an important factor in maintaining it.

Views on the quality of training differed. *Group Captain Verity* recalled that training for day flying was excellent, but there was far too little for night flying or instrument flying. 'What proportion of our trained Bomber Command crews were lost on non-operational flying in poor conditions?', he asked. Particularly early in the war we were ill-prepared for flying at night or in bad weather. *Air Commodore Stockwell* wished he had had more flying hours. 'Today all pilots have a very high level of expertise but in the war this was not possible – we had to learn on the job.' *Air Vice-Marshal Oulton* remembered being Chief Instructor at the School of Air Navigation in 1938, when he was sent twelve Squadron Commanders to teach them navigation. 'All claimed to be competent. I set each of them to navigate an Anson flown by a staff pilot to the Terschelling light. Most had never flown over the sea before, and none found his way there or back to Manston.'

Until 1938 navigation was only taken seriously in the flying boat world, and when the expansion came we did not have enough to provide the instructors. It took several years before we could remedy the situation and initially many of the instructors were little better than the students.' *Professor Higham*, who joined the RAF in 1943, was trained in Canada on a 1938 syllabus! And *Mr Lewis* remembered that, of twelve crews posted with him to OTU for operational training on Wellingtons, only two survived long enough to be posted to squadrons. In the first week on OTU he had flown missions to Düsseldorf, Bremen and Essen, and he believed the crews had insufficient training and were needlessly lost at the OTU stage. Yet the training achievement should be acknowledged. Observing that he had entered in May 1941 and did not reach the front line until March 1943, *Air Vice-Marshal Furner* considered that the setting up of the Commonwealth Air Training Scheme was one of the wonders of the war, and *Dr Stephens*, from Australia, agreed. 'The strength of the allied air training systems was one of the great contributors to victory. In January 1945 there were some 12,000 aircrew in the UK awaiting posting to operational units where there were no vacancies. By contrast the *Luftwaffe* had to switch its instructors to front line units in the middle of the war, which had a dreadful effect on their whole system'.

I) Elitism

In several groups, questions were asked by present day aircrew about how Bomber Command aircrews of the time felt about the creation of elite units such as the Pathfinders and 617 Squadron, and whether the policy was considered controversial at the time.

Sir Lewis Hodges thought it was recognised that special measures were required to meet the problem of bombing accuracy, and that the Pathfinder Force was a response to that need. Then, later in the war, *Air Marshal Cochrane*, when commanding No 5 Group, developed what might be called an elitist force to some extent in competition with the PFF, but specialising particularly in attacks on V1 sites and similar precision targets such as the *Tirpitz*.

Group Captain Smith, who did all his bomber trips in the Pathfinder Force, commented: 'We thought we were pretty good. Harris did not agree with the concept, and with some justification – to

take the very good crews from the Main Force squadrons and form them into an elite group would have an adverse effect on the Main Force. Air Ministry, however, overruled him and he got on with it. The improved technology was of great value in improving accuracy but it took a long time. Our relationship with the rest of the Command was one of mutual respect, and there was no shortage of volunteers.’ *Air Commodore Stockwell* wondered why it should be thought unusual to have some special expertise in order to undertake a particular role; the Pathfinders were providing the necessary centre of expertise.

Squadron Leader Cornfield then drew a comparison with the way our squadrons were manned in the Gulf War. ‘When we deployed we were fully expecting to go to war and we chose the best crews available on the Wing. Later on we started to switch crews round, and ended up with some of the less good ones deployed. In effect we set up new squadrons actually to do the job and in a way became unstuck.’ *Air Commodore Stockwell* pointed out that *Squadron Leader Cornfield* was talking about relatively small numbers of aircrew, all trained to a high standard, whereas in World War II many of the crews were inexperienced and needed relatively little expertise, so the specialist unit was needed. *Sir Herbert Durkin* thought rose-coloured spectacles were being worn, and that there was strong resentment in at least some areas. If your squadron was losing its best people, your own chances of survival decreased. It was not just a matter of taking the best crews; it was often taking the best individuals, which meant re-crewing. He felt the PFF was resented, at least to start with, and *Squadron Leader Cornfield* responded by saying that elitism in any shape or form was nowadays resented and presented great difficulties in a smaller force.

The subject was also discussed in Group 1, after *Sir Patrick Dunn* had described his own experience of well-trained and less well-trained pilots in two fighter squadrons. In the first, in 1940, the squadron had been together for two years and there was no question of apprehension: ‘They thought they were immortal’. In the second, which he commanded, one flight came from the first squadron and two from fairly ordinary pilots, some half-trained. The squadron was successful but it was the first flight that came up with the answers; for the rest, those who did not realise their inadequacies did better than the sensitive ones, who did. This led *Squadron Leader Bond*, with the

modern two-seat operational force in mind, to pose the question of an elitist approach to manning – with the emphasis on two able and experienced aircrew – or giving two the opportunity to move together from the training to the operational stage or a mix of experience and inexperience. *Sir Patrick Dunn* said that if immediate results were the objective it was crucial to keep the high performers together, as he had done, with the less able or less well-trained doing their best to emulate. Some made the grade and became successful; one or two were LMF. He emphasised that he was talking about a fighter squadron. *Mr Michael Allen, Dr Frankland* and others agreed that elitism did not enter into the wartime crewing-up process. This usually took place at the OTU stage and was mainly a matter of kindred spirits finding one another. Crew loyalty quickly became immensely important even though there might be disparities of skill. *Air Vice-Marshal Dick* said that crewing up was done in much the same way in the V-Force but there was a world of difference between the unavoidable lack of experience of wartime crews and the crews who formed the V-Force. Supervision of training and a sophisticated system of leaders and categorisation made for high standards; operational training took place in the V-bomber squadrons after the OTU stage. The whole thing was a continuing professional process which had been built on subsequently. many Tornado crews had over 1,000 hours on the type which could not be the experience of operational crews in World War II.

There followed a discussion with Staff College members and staff about crewing policy and, specifically, selection of crews for the Gulf War. *Group Captain Brooke* said that whereas RAF traditions were based on squadron identity and loyalty – training, working and fighting together continuously – for the Gulf War very high quality crews were brought together from a number of squadrons, and commanders were selected from those crews for what were effectively new squadrons. That was how the war was fought. Was there a basis for comparison here with squadrons such as 617, formed for special operations, and the Mosquito squadrons of the Pathfinder Force formed for a specially important and difficult function? Aircrew of that period and also a participant in the Gulf War thought that an elitist policy did not work well. Nevertheless, was a squadron such as 617 valuable beyond its operational efficiency, as a boost to morale for

Bomber Command, the RAF and the general public? *Dr Frankland* was in no doubt: 617 Squadron was enormously admired in Bomber Command. Another such squadron, which nobody talked about, was 9 Squadron, which accounted for the *Tirpitz*. These two squadrons were distinct from ordinary squadrons; he personally would never have got into 617 Squadron. That there were squadrons far better than the rest was an inspiration and good for the aim. *Dr Frankland* said that the Pathfinder Force was not in the same category. It required many more men; it called for a tour of 60 sorties; understandably, Squadron Commanders were not all that keen to send their best crews nor was the prospect of such a long tour universally popular. Many PFF crews were drafted to it – ‘The kind who were likely to have taxiing accidents’ – which affected the quality of the force. So although the PFF did marvellous things and enormously improved bombing accuracy and was, in *Dr Frankland’s* words ‘The most gallant component of Bomber Command,’ it could have done even better. The crews for the Dams raid were personally chosen by Wing Commander Gibson and the losses suffered could not be replaced by crews of similar quality and experience; the standard was somewhat reduced – to crews who had done as few as 90 sorties(!). Later, when Leonard Cheshire was brought in, the morale and skill of the squadron reached the heights.

Mention of Leonard Cheshire prompts inclusion of this reflection by *Sir Christopher Foxley-Norris* who, as a young man, shared rooms at Oxford with him. ‘We were scared stiff of the Somme; we did not reckon that our generation could put up with the sort of hardships that they did on the Somme in 1916. We were proved wrong, proved wrong by Bomber Command. Look at the average expectation of life of the crews, which was sometimes down to three sorties. There was no glamour, no excitement, no great Officers Clubs. You sat in a muddy Lincolnshire field with no entertainment, inadequate rations, no inspiration at all. And you went off on your third trip and you got killed. That has been very badly underwritten; nobody has ever really paid tribute to the enormous courage and determination of those very young, often immature, young men, who had little expectation of survival. The morale that pervaded Bomber Command has not been adequately recognised or compared with World War I – and it was very comparable.’

J) The Luftwaffe

In Group 4, discussion of the effectiveness of the strategic bombing campaign led to questions being put to the German participants regarding the *Luftwaffe's* achievements during the war. *General Peltz* suggested that, at the beginning of the war, Germany was superior in the air, but that the Allies quickly overtook Germany in this regard. He commented that there were no clear objectives for the *Luftwaffe*, other than targets in support of *Wehrmacht* operations. The aircraft in the *Luftwaffe's* possession were good for the Army co-operation role, especially the Ju 88, which was particularly useful as a dive-bomber. The Poles and the French could not assemble their land forces during the respective campaigns because of the *Luftwaffe's* attacks.

However, when the *Luftwaffe* came up against the RAF, it was a different situation. Over the Channel and Great Britain, German fighters could not protect the He 111s and other bombers effectively, and were shot down easily. This was due, in part, to the lack of a definite strategic bombing doctrine within the *Luftwaffe*, and the consequent lack of well-defined bombing tactics. It was remarked that German night bombing was a weak prelude to the British effort, and as a former squadron leader in a Ju 88 unit, *General Peltz* felt he was able to say that the German attacks on London had little impact in comparison with British and American efforts. German incendiaries were not strong enough to create firestorms.

In Group 8, *Dr Boog* commented on the state of training in the *Luftwaffe*, and it was suggested that the training of fighter pilots, especially in escort duties, was relatively neglected in favour of ground attack training. The quality of training deteriorated in the course of the war. There was a discernible fall-off in 1942, when the offensive on the Eastern Front failed to achieve its goals. Length of fighter training, in particular, was further reduced at the mid-war point, so that by 1944 a German fighter pilot had approximately one third of the flying hours of his Allied opposite number, and very little training on the aircraft type he would fly in combat. Poor training resulted in high non-combat losses. In the first half of 1944, total monthly losses among fighter pilots were approximately 3,000, and 1,800 to 1,900 of this number were due to non-combat causes.

So, although by 1944, the aircraft supply situation was reasonably

favourable, the overall quality of pilots to fly these aircraft was poor. The general shortage of quality pilots meant that no fighter pilots were promoted to Staff posts. If this had been done, *Dr Boog* maintained, the fighter force would have been accorded a more prominent place in the wider German war effort.

Sir Frederick Sowrey in Group 3, made the point that the lessons learned in the operational sphere were not being transferred to the higher staff level because of a tendency not to promote people out of operational squadrons. This had much to do with there being no concept of a limited tour of duty within the *Luftwaffe*.

Hitler's responsibility for doctrinal inflexibility within the *Luftwaffe* was discussed in Group 8. It was asked why the *Luftwaffe* failed to prosecute intruder operations over the UK, to which *Dr Boog* replied that the principal blame lay with Hitler, who believed that RAF aircraft shot down over the UK had no propaganda value, whereas those shot down in Germany were seen by the local populace. *Sir Lewis Hodges* commented that he had always been astonished at the lack of such attacks, since, in the latter part of the war, aircraft were literally lined up in rows being bombed-up for raids. When an intruder alert was sounded, chaos resulted. However, this was relatively infrequently.

Hitler's interference in the operation of German home defence was discussed by a number of groups. In Group 2, *Mr Robert Jackson* referred to Horst Boog's comments on the Me 262's vicissitudes. He pointed out that, while Hitler certainly interfered with the aircraft's production and employment, its appearance in late 1944 caused the 8th Air Force to change its tactics immediately. Before that point, escort fighters, mainly P-51s, were sweeping ahead of the American daylight bomber streams, bringing the *Luftwaffe* up into combat. All that changed with the appearance of the Me 262, and close escort had to be adopted (as had happened to the *Luftwaffe* in the Battle of Britain). However, the Me 262's input to the battle for Germany was seriously hindered by attacks on *Luftwaffe* airfields. The deployment of the Me 262 was limited to a relatively small number of airfields which were suitable for jet aircraft, and, when these were attacked by the Allies, the aircraft's operations fell off dramatically. Then chronic fuel shortages put an effective end to the Me 262's service.

In Group 1 there was also discussion of the employment of the Me

262 and the *Komet* rocket aircraft. It was remarked that the number of aircraft was small and, although there were successes against the Allied bombers, the level of experience and quality of training among pilots were low. Dr Frankland had seen some of them during daylight attacks in Bomber Command: 'They rather astonished us, but they failed to engage us; they simply overshot and were obviously not very skilfully flown.' *Michael Allen* added that the new German types made little impact on night operations. He observed that Allied night fighters were meeting Ju 88, Me 110, Me 109 and Fw 190 aircraft over target areas, but there were few jet fighters.

10. *Closing Remarks*

Sir Michael Beetham.

I would like now to pull together some of the threads of today's seminar, drawing on my own experience, the excellent talks we heard this morning, and some of what I have gleaned from the lively and wide ranging discussions this afternoon.

At the onset we also need to bear in mind that it was the first time in the history of warfare that a strategic bombing campaign on any significant scale had ever been attempted, so it is hardly surprising that some mistakes were made, and that training initially, as Lord Mackie brought out, was a bit haphazard and left a lot to be desired. The impetus for the offensive grew not only out of the thinking of Trenchard, Douhet and Mitchell but also, as Dr Frankland reminded us, of the imperative of avoiding the stalemates and horrendous casualties of trench warfare in World War I. The feeling was that another way had to be found, and strategic bombing seemed to provide it. The problem was that when it came to be tried it was not as easy to be effective as the protagonists had so forcibly and convincingly predicted. Thus, the so-called area bombing policy, which has been the subject of much of the controversy, was really forced on us. We would have bombed precise military targets if we could, but we did not have the military capability to do so against targets in German territory at night and against those very formidable defences. We did not have that kind of capability until about mid-1944 when perhaps – with hindsight – the emphasis should have turned from cities to other strategic targets such as oil or power. But I emphasise that that's with hindsight, and Harris had very good reasons at the time for not doing so.

I am sure you have all been very interested in the remarks of Dr Boog and Professor Overy about the effectiveness of area bombing; they also drew attention to the indirect effects. Nor must we forget that Bomber Command did not only do area bombing. For example in the

pre- and post-OVERLORD periods when the force was assigned to General Eisenhower, major attacks were made on the French rail communications system. These were against lighter defences, done at medium level, and the bombs could only be dropped if the aiming point could be visually identified; those attacks were very effective indeed. I heard Dr Frankland say that they were in fact decisive, but this was of course not strategic but tactical bombing.

We haven't covered today the contribution of Bomber Command to the war at sea, such as the mining, the attacks on the ports and the U-boat pens, and do not forget that Bomber Command sank the *Tirpitz*.

Operating against targets in Germany the Americans had very much the same sort of problems, even though they operated in daylight. Much has been made in some quarters of their stated policy of precision bombing as against ours of area bombing. The difference was summed up very well by a USAF General who attended our earlier Historical Society seminar at Hendon. He said that the 8th Air Force did area bombing of precision targets whereas Bomber Command did precision bombing of area targets. The area bombing policy was never directed at the killing of civilians *per se*; indeed from my memory when we got to briefing, back came the curtain, there was the target – Essen, Cologne, Berlin or wherever and, when we got to the specifics of the briefing, the actual aiming point was always military, industrial or economic in nature: railway marshalling yard, factory, chemical works or something similar. I personally never remember being briefed to bomb a housing estate or people, but of course we all knew the limitations of our equipment; we also knew that the bombing would, in effect, be over the whole area and would in fact cover those sorts of targets. We have to ask ourselves the question: why anyway should civilians not be attacked in war, particularly if they are working for the war effort? It's a myth that wars in the past, conducted by armies and navies, did not target the civil population. Throughout history armies have besieged cities, raped and pillaged them. Navies have blockaded and bombarded ports and attempted to starve out the populace. War is a nasty business.

Leonard Cheshire before he died was interviewed by Mark Laity, whom I'm very pleased to see here with us today. This will be reproduced in full in the Proceedings of today's symposium, but let

me quote here what Leonard said in answer to a question about the morality of bombing: 'The moralists say that the blockade is morally acceptable. The blockade of Leningrad killed 900,000 people, most of them innocent. When you blockade a place you know that you are targeting the weakest because the defenders divert all the food and everything else to those who can fight. The moralists say you haven't done that yourself; they have done it. But the truth is you know they will do it and this is where double standards come in. Our offensive saved millions and millions of lives. Every day the war lasted, another ten thousand were exterminated in the concentration camps. When you are fighting that kind of enemy you have to do everything in your power to bring it to the quickest end with the minimum loss of life. That is what, to me, makes the bomber offensive morally justifiable, because no other alternative has ever been suggested.'

Somehow bombing does seem to cause a special psychological hiccup in the political and the public mind. I remember being in Aden in the mid 1960s when we had a small war up in the Radfan mountains. At Khormaksar, which I was commanding, we had a strike wing of three Hunter squadrons, and they were quite free to attack the terrorists with rockets and cannon without any restriction at all. The problem was how to get at the terrorists, because they took shelter in the caves, the Hunters couldn't stay there very long and, as soon as the aircraft left, out they came again. A very effective way to keep their heads down for some time and thus enable the Army to get at them was to bomb them with one of our Shackletons, which could carry a load of $18 \times 1,000$ lb bombs. The Shackleton could drone overhead for hours on end dropping one bomb every half hour or so in co-operation with the Army on the ground, but to do that we needed each time to get clearance from 10 Downing Street. In my two years at Khormaksar we were only given that twice.

The Dams Raid, on the other hand, does not seem to have attracted any particular disapproval from the critics even though the clear aim was to flood the Ruhr; civilian life was severely disrupted, and many civilians were killed by drowning. In discussion, Dr Frankland brought out an important point about the effect of this raid, for it demonstrated precision bombing at low level and showed that a target could be precisely marked. Guy Gibson did a great service in that way; as Dr Frankland observes, there was some friendly rivalry

between Gibson and Cheshire, but Cheshire saw that here was a way for him to mark a target at low level. So the low level target marking which he developed subsequently owed a great deal to what was seen in the Dams Raid.

Those who criticise the bombing campaign should say what else we could have done to stem the German tide and take the initiative away from them. How else could we hit directly at Germany from the fall of France onwards? The critics do not answer this question, for there was no alternative – a point brought out by Dr Frankland and Professor Overy. The other aspect is that the bombing campaign gave hope to the British people. Everything was going wrong, everywhere. Germany was right on top; what could we do? The hope that was given – whether the bombing was effective or not the British public, not even Bomber Command, knew – had a tremendous effect. Quoting Dr Frankland again, looking back in history there is no example of a people who have no hope failing to sue for peace. The likelihood is that, had we lacked the hope engendered by the bombing, we should have sued for peace.

Dr Hallion spoke about the USAAF's fight for air supremacy. It was the air supremacy over the beaches that really made OVERLORD possible: it was our combined offensive that forced the *Luftwaffe* on to the defensive and wore them down so that on D-Day there was not a single German bomber over the beaches. Think too of the resources the Germans had to put into their defences; this Dr Boog brought out, telling us that a million men were on AA duties and searchlights alone. What if those resources, the manpower, raw materials and so on, had been used to build fighters or other armaments for use against the Allied armies, including those on the Eastern Front?

Another important aspect is the effect on the German civilian population. Germany had started two world wars within the space of twenty years. World War I had been fought in Flanders, not in Germany. How else, except by bombing, could the horrors of bombing be brought home to the German politicians and civilians? And has not a major bonus of the campaign been the resulting anti-militarist attitude of every post-war German government?

We have also touched today on leadership and morale on the squadrons, both in Lord Mackie's amusing presentation and in some of our discussions. This was vitally important in any fighting force

and where more so than in Bomber Command, where 100,000 aircrew went on operations, 47,000 of them were killed and something like 29,000 were taken prisoner? The odds on a crew completing a tour of 30 operations were not really very high. With losses on that scale you had to believe in what you were doing, and that was where leadership had to come from the top – and it did. Sir Arthur Harris made a tremendous impact on the Command, though he never had time as CinC to visit his stations. That was a very different kind of leadership from that exercised by, say, Montgomery and was against all the accepted tenets that a commander should be seen by his troops. Yet it worked. Such was the force of his personality, his straightforward blunt honesty, that he inspired all of us to believe that what we were doing was winning the war. He *was* feared, but was also trusted not to hazard his crews unnecessarily. My experience was very much like that of Lord Mackie and, from most of what I heard in the discussion groups, morale among the crews was generally very good. But, as with any squadron, this depended on the leadership and example of what Lord Mackie referred to as the heroes, the Cheshires and the Gibsons, and also, of course, the leadership of Squadron and Flight Commanders. Where this was deficient – fortunately not often, but there were a few cases – then, as in any organisation, morale did suffer a bit. Generally the feeling I have, like that of most others who served in the Command, is that morale was very good.

To round things off I want to show you five short clips of an interview with Sir Arthur Harris which was done at Bracknell by Tony Mason when he was Director of Defence Studies in the late 1970s. They bring out some of the key points which Sir Arthur Harris made during the interview.

Interviewer: Talking of target systems, you were not very enthusiastic about panacea targets, were you?

Sir Arthur No I certainly was not, because they arrived in showers. Any bright lad in or out of the Service, in the Air Ministry or the Ministry of Economic Warfare could come up with ideas; they all seemed to think their ideas could be put to the test and that I would take responsibility for the results. I didn't quite agree with that. Also I was taught at the Army Staff College about a principle of war known as the maintenance of

the objective. You cannot change what you are aiming at every few days.

Interviewer: Over your three years in command what were the greatest problems you had to overcome to implement your strategy?

Sir Arthur: The most difficult problem was not only to get enough aircraft for the job but to hold on to those I had. There was continual argument. Everybody wanted them, not only the Admiralty and Coastal Command but also the Middle East and then the Far East. We always said we wanted 4,000 heavies – that was if the Americans had not come in. We never got near that, though with the American contribution we were not far off it at the end.

Sir Arthur: During the whole of the invasion until it was thoroughly sure and we were progressing through France, I was under Eisenhower's direct command and I took what he said and did it – or rather my boys did it: How well they did it was shown 25 years after the war when there was released, from the top secret archives in America, correspondence between Marshall and Eisenhower. Marshall was very worried because he said the Chiefs of Staff had decided that the invasion was going so well that the time had arrived to take the direct command of the British bombers away from him – and the American bombers too – and return them to the heads of their own Services, for there were theatres of war other than France to cope with. Marshall expressed alarm lest Eisenhower would get less support than he had become used to from my boys. Eisenhower's reply – I could show you a copy, and remember that this correspondence was entirely between the two of them; nobody else saw it – stated that he had no such fears as Marshall had expressed about the British bombers being taken away from him. He had come to regard them as one of the most effective parts of his whole organisation, always seeking, finding and using new ways of helping the armies on the ground forward.

Sir Arthur: The Dresden business is always cropping up.

Dresden was bombed on a direct order from Eisenhower's Headquarters and, when I informed the Air Ministry that I had been instructed to wreck Chemnitz, Leipzig and Dresden in that order, I had it confirmed in writing from the Air Ministry. At about that time all the big shots were up in Yalta arguing with each other, and about the same time Winston was in dispute with Sinclair, Secretary of State for Air, about what if anything we were doing to help the Russians forward. In the middle of all this arrives the order to write off Chemnitz, Leipzig and Dresden in that order, which we did. There was one other reason for it. The intelligence side were all under the impression – I think they were misinformed – that the Germans were preparing an Alpine redoubt where there were underground factories, their best troops, great stores of ammunition, new super weapons which would out-atom the atom bomb, etc, etc. So when we had defeated them elsewhere the picked troops would carry on the war in the redoubt at immense cost to the Allies in casualties, chaos and money. The whole thing was an absolute mare's nest; there was barely a word of truth in it. But Chemnitz, Leipzig and Dresden lay on the only routes still open along which German forces and reserves could be moved, north to south or south to north, especially back into the redoubt.

Interviewer: There appears to have been some change in relationships between Bomber Command and the government near the end of the war, which seems to have culminated in failure to recognise, by the award of a campaign medal, all the work that Bomber Command did. Why was this?

Sir Arthur: I do not think there was any change in the relationship. I doubt if it ever entered Winston's head that Bomber Command should have a campaign medal. I only heard they were not going to get one after the 8th Army had got theirs; this was rather late in the day, and I naturally took it up but I don't think he wanted to alter arrangements he had already made. When you read now about what the Germans thought our share of the war was – quite apart from Montgomery, Eisenhower, etc – you realise that if the 8th Army got a campaign medal for every cook, butcher and candlestick-maker

in the back areas, the bomber force certainly deserved a special one.

Although Sir Arthur was about 90 at the time of that interview, we can see clearly that his blunt, direct, down-to-earth personality had not faded much with the years. You will note what he said about panacea targets; this does much to explain his single-minded determination not to divert his force to other strategic targets. As an example, referring again to what Dr Frankland said in discussion about the intelligence about the ball bearing capacity, both we and the Americans were told: bomb Schweinfurt, knock out its factories, and that will completely destroy their ball bearing capability. That raid, which caused the Americans, in particular, very heavy losses, was actually completely successful, but the intelligence was flawed to put it mildly. The Germans didn't need as many ball bearings as we thought and they had masses of them anyway. One of the effects was to make Harris say 'take all these experts away.' When it came to oil, the intelligence was in fact right, but Harris discounted it. As has come out in our discussions, the intelligence and its analysis really were very poor. Even today with all our high technology, the service we get from our various intelligence sources still leaves a lot to be desired. I had experience of this myself during the Falklands War.

Sir Arthur also referred to his greatest problem: lack of resources. This is not an unusual comment from a commander in war, but Harris did firmly believe that if he was given the resources he could have forced the Germans to capitulate. Experience probably tells us that in this he was wrong with the weapons and aids then available. But there was a step change, as has been brought out today: an acceleration in capability by mid-1944 in terms of numbers, navigation aids, experience of crews. Yet even then it was probably not enough on its own to bring Germany to her knees, and the invasion was still necessary. I leave you, however, with this thought. What if the atomic bombs dropped on Hiroshima and Nagasaki in August 1945 had been ready eighteen months earlier? Would Churchill and Roosevelt have authorised their use on Germany? Would not that have brought the war to a rapid end as it did in Japan, and then made OVERLORD unnecessary? There is perhaps a subject for a future seminar.

11. Mark Laity Interview with Lord Cheshire

Before his death, Group Captain Lord Cheshire VC OM DSO DFC was interviewed by Mark Laity of the BBC on the subject of Sir Arthur Harris and WWII bombing policy. As it is of particular interest to Society members, the text is given here in full.

ML: Where would you disagree with what Harris did?

LC: With hindsight I would have stopped bombing cities come winter 1944 because that, as I see it, was a long-term strategy. It didn't pay immediate dividends and now that we were in Europe it was more important to go for targets that helped the army. I think probably Eisenhower and Portal were right, that we should then have gone for oil. It would have been no good going for oil earlier; we couldn't have reached it, we couldn't have hit it and the enemy would have dispersed it – and he had such vast supplies.

By 1944, however, the stranglehold was already there. I think we'd have accelerated the end.

ML: Why do you think Harris didn't? He did after all have a directive saying 'Oil Plan – attack oil targets'.

LC: In one sense I sympathise with him because, from the very beginning, people were going to him and saying, 'Don't bomb Germany in general. Pick out ball bearings or pick out this, that or the other. If you knock those out you will have finished them.' We wouldn't have finished them. We wouldn't have been able to hit them and knock them out and the Germans, as Speer later said, would have dispersed them. He got so fed up with these people coming to him with all sorts of ideas that his mind was closed and, when someone mentioned oil, 'Ah', he said, 'another panacea merchant.' But there is another side to it, which is a criticism of me, indeed of all of us who took part. I feel that in war military strategies have their own momentum and it's very difficult for the military man's mind to

change, to see that a new situation has arisen and that something different is needed. The huge machine you have built up almost takes over and you go along with it. That machine, in my view, was a major contributor towards victory; certainly without it there could have been no re-entry into Europe in '44.

ML: Do you think Harris deserves a statue?

LC: I look upon him as one of the great commanders of World War Two. The BBC, in their series *The Commanders*, pick him out amongst six commanders of all sides. I am convinced that without the bomber offensive as he ran it we wouldn't have prised Fortress Europe open enough to let the armies in. For one thing the combined American and Allied offensives forced the *Luftwaffe* up, made them fight and defeated them so that come D-Day we had complete mastery of the air. There was not a single German bomber overhead and, had there been, I don't think it would have succeeded. Then look at the vast quantities of men and resources brought back from the battle fronts: 900,000 men on ack-ack and searchlights alone and half those ack-acks, the 88mm, were convertible to anti-tank guns and would have been used on the Eastern Front. It was Speer that used the term 'Second Front'. He actually said to Hitler, or says in one of his books, 'This is one of the greatest campaigns of the war that was lost.'

ML: The debate now often looks at the issue in terms of morality not strategy. On a recent programme the presenter intervened and said, 'But what you did was terrible, wasn't it?' This presenter could not forget that the aerial bombing campaign had taken approximately half a million lives. What do you feel when you hear that?

LC: I share his feelings. If you look merely at the bombing then I agree that it is completely unjustifiable, but what are you actually looking at? You can only make a moral judgement by putting it in its total context. As Christians we are told, 'Love thine enemy', so people say, 'How can you love your enemy by killing him?' My answer is: suppose one group of people is exterminating another group of people. To whom is my first Christian duty? My duty is to defend those that are being killed, unjustly killed and, if the only way I can stop it is by shooting the man with the gun, I have got to shoot him.

ML: But do you feel that in a way it was terror bombing, designed to

terrorise rather than merely to take out industrial complexes, to bomb military targets?

LC: No, I have to dispute that. The decision was taken by the War Cabinet at the highest level and ratified by the Americans at Casablanca. If you're telling me that the highest level of the Allied Command launched a campaign that was aimed at terror rather than to attack his war production and create the platform from which we could get into Europe, then the whole of the Allied Command was immoral and wrong.

ML: But that is what they were doing. Portal himself wrote about killing 900,000 German civilians. Harris mentions specifically that morale was a target. They were following Trenchard's dictum that the morale effect to the military effect was as 20:1.

LC: Morale was a factor, yes. If we could have broken that morale before it came to the final battle face to face, the Soviets, the Western Allies, all of us would have gained. But the principal objective was to tie down as much military capability as possible into this battle. There was no other front that we could open up. Africa was peripheral. The only way to get into Europe was through the bomber; as I said, Speer talks about it as a second front, a vital one which he failed to defend. So I don't agree that the primary objective of the bomber offensive was morale.

ML: Let me read you something from your own book (*Bomber Pilot*) which you wrote in 1942 after the 1,000 bomber raid on Cologne. 'We looked hastily at the Rhine but there was no mistake, what we saw below was true. Cologne was burning, it was burning as no city in the world can ever have burnt and with it was burning the morale of the German citizen.' What do you think, looking back on that?

LC: I must have thought it but remember that was 1942, the worst time of the war. Our armies in North Africa were in retreat, the Japanese were racing over South East Asia, the Germans were virtually threatening the survival of the Soviet Union and we needed a boost. Things were very black then – our very survival was touch and go. I think you do feel that kind of thing. Yes I was wrong but on other raids why would I spend 40 minutes over a target trying to hit a factory, which my log book would show you I did quite often, if I

didn't think that hitting the factory was the main thing?

ML: But area bombing, by its nature, aiming at the centre of the town which tended to be where the people lived because that was the best you could do owing to the inaccuracy of the bombing, often left the factories unscathed at the edge. In a sense you said, 'We'll have to bomb the centre, hit the civilians and hope we hit the factories on the edge.'

LC: You are ignoring the nuts and bolts. For the bomber offensive to be effective it had to go on night after night, had to draw more and more men and equipment into the battle, had to keep the enemy guessing where the next attack was coming. Then we had the weather against us; you couldn't hit a factory through ten-tenths cloud. We had poor navigation and bomb aiming equipment. But we had to keep going and hope to weaken the whole spectrum of their defence capability – and I suppose also weaken their morale.

ML: I don't want to sound presumptuous, but would I be unfair in saying that a lot of what you devoted your life to since the war was seeking reconciliation in order to overcome the scars of war? Do you think it is now appropriate to have a statue (to Harris) so long after the war? Ought we not to forget all this and move on in the sense that you moved on?

LC: You have asked me two separate questions. What made me want to do something along the lines of what I have been doing is the thought of all those who died and didn't survive when I did. I thought that I had a debt because I survived to try and do something, not just go away and earn my own money. But when you come to the statue I think deeply that it should be there: we forgive, but we shouldn't forget realities and the reality is that Hitler forced on us a total world war. Total war. It wasn't just the German army and the *SS* and the *Gestapo* fighting that war; it was virtually the whole German people, without whom the war couldn't proceed. Those people could have left the cities. We evacuated our women, old people and children from our cities; they didn't. They could have done. They knew we were coming and the awful thing is that, if total war is forced on you, you have no other option. And I will ask you a question about morality. The moralists say that blockade is morally acceptable. Now the blockade

of Leningrad killed 900,000 people, most of them innocents; once you blockade a place you know that you target the weakest because the authorities divert all the food and everything to those who can fight. The moralists say, 'Ah, but you haven't done that yourself, they have done it', but the truth is *you know* they will do it. In my view there are double standards here. But I don't want to evade responsibility: the only real judge of what is right and wrong is God and one day I shall face Him and I shall have to give account. If I am judged wrong, I am wrong. But at this point of time I still hold that our offensive saved millions and millions of lives. Remember that every day the war lasted, another 10,000 were exterminated in the concentration camps. When you are fighting that kind of enemy, in my view, you have to do everything in your power to bring it to the quickest end with the minimum loss of life. That is what to me makes the bomber offensive morally justifiable, because no other alternative has ever been suggested.

ML: It would have been better if there had been more Hamburgs?

LC: Yes. Speer said to Hitler, 'Five more Hamburgs and we are finished.' We didn't know that. Had we been able to do several more Hamburgs and finish the war in '43: the 20 million people who died between then and '45 would have lived; Germany wouldn't have been divided; Poland wouldn't have been occupied; Czechoslovakia, Hungary and Austria would have been free. So how do you answer that?

ML: Let's go to Dresden, which is widely seen as a symbol. Do you think Harris is rather scapegoated over Dresden?

LC: Yes I do. For one thing he did not want to do it. He telephoned Portal and said, 'I do not want to do this' and Portal said, 'It is Churchill who wants it.' So he had to do it. This is one thing I do complain about. Our weakest point was economic intelligence coming out of Germany, so there was no really hard evidence to go on, to decide what targets to attack. A whole number of reasons were given for attacking Dresden and they were quite formidable reasons. For one thing the Russians had said – they were 50 miles away – 'Please bomb everything, saturation bombing, in the line of our advance,' and Dresden was the next stop. Nobody knew there were so many refugees

and a crucial thing was that nobody knew the Germans had taken away all the defences. So instead of about 40% of bombs falling on the city, as in most raids, the lack of opposition meant every bomb fell on the city. It was just one of those sad facts resulting from an accumulation of different elements.

ML: Does it then, in a sense, symbolise the way Harris is taking responsibility for what all the allied leaders should be responsible for, and perhaps Churchill in particular? There is a statue to him and no one complains.

LC: That's my whole point. The bomber offensive was decided by Churchill, the War Cabinet and the Allied Supreme Command and Harris was the instrument. He was about the only man who would have succeeded in doing what they wanted. He is vilified and those who took the decision are legendary figures in history. To me it doesn't make sense.

ML: Why do you think the vilification or, if you like, the embarrassment started so quickly? Dresden does seem to have been the catalyst on the Allied side. Harris didn't get his baronetcy; Bomber Command didn't get their campaign medal; it is almost as if society had stepped back in horror at what society had done.

LC: When the war was over and everything was finished, I think we British started to feel sorry for those we had defeated. The politicians who had taken the decisions found that bombing was no longer a political asset because a lot of people could start making complaints that they had not made during the war. And the moment they saw that, they dropped Harris. Up until that moment he had been Churchill's blue-eyed boy but then even Churchill dropped him.

ML: Doesn't that in a way show the kind of moral ambivalence of the whole affair in a rather disgraceful way? Doesn't it suggest that society and the Government were almost ashamed of what they had done?

LC: It shows me that the politician is more concerned with his political career than with justifying something which is over and done with, which he had completely approved of and initiated but now finds some difficulty with. No, I just don't like that political about-face.

ML: There have been complaints about the statue from the Mayor of Cologne, the Mayor of Dresden. What would you say to them? They are saying that this is tasteless, that it shouldn't be done, that it is time to put these things behind us.

LC: I can only say that it was in Germany's interest, as well as the rest of the world, that the war was brought to an early end. It would not have been brought to an end in 1945 without the bomber offensive. So what has the Mayor of Dresden got to tell me about that? He and his city were supporting extermination camps which were killing a minimum of 10,000 a day and would have gone on doing so because, as the war's end approached, the killing rate was accelerating. They were going to mad lengths using extraordinary methods to kill people in horrible ways and when you have an enemy like that you have just *got* to get at him.

ML: In a way it is the brutalising effect of war on everyone, isn't it?

LC: Yes. If you are going to point a finger of blame, point it at the politicians of '38 and '39 of all parties, and at the Foreign Office. All refused to recognise that Hitler was going to do what he said he was going to do. And at Munich we could have stopped him.

ML: When you were doing your raids, especially your low level markings, when you were doing you best to hit your targets but knowing you were killing civilians however hard you tried, was that something that you thought about a lot at the time? Was it something that was discussed at the time?

LC: When I was doing my low level raids we weren't hitting civilians. We went to endless lengths not to, because we had the means at our disposal to avoid doing that. You will find this a harsh statement but I don't feel that I am a harsh person. If you are engaged in a life and death struggle you daren't take your eye off the target. Suppose a man comes into a crowded bar with an automatic weapon and fires; you've got to stop him. If somebody says, 'Didn't you think that killing him was an unkind act?' you wouldn't have been thinking about that. If you did start thinking that you would do nothing. I am sorry to say it, but most of us just kept our eye on the job, tried to do it with the utmost precision, generally spent longer time over the target than we needed in the hope of dropping an accurate bomb, and came back.

ML: It is one of the enduring moral contradictions, dilemmas, that you can do something from 20,000 feet which you couldn't do with a grenade at ground level. You could drop your bombs knowing that they might well kill civilians and yet, if you were a soldier with a grenade or a flamethrower, you couldn't do that. Isn't that true?

LC: I have always said that war is a paradox. On one side of you is a fighting man who does nothing but think of the fighting. On the other side is the human being. To me this is epitomised in the story of World War One where a sniper had a German in his sights and was about to pull the trigger when the German squatted down and dropped his trousers to relieve himself. He couldn't pull the trigger because it wasn't an enemy with a gun in his hand, it was another human being doing a human act. Yes it is perfectly true. Every soldier goes through that dichotomy. You are torn in two. But you talk about looking down on civilians. Yes, I am quite certain we did. We also looked down upon the gas chambers and, if you have the two down there, to whom is your first priority?

12. *Biographical Notes on the Main Speakers*



MRAF Sir Michael Beetham
GCB CBE DFC AFC

Sir Michael Beetham took part in the strategic bomber offensive as a Lancaster pilot on 50 and 57 Squadrons in 5 Group from 1943-45. Much of his early post-war career was spent in Bomber Command, commanding 214 (Valiant) Squadron in the V-Force from 1958-60 and serving both as Group Captain Training and as Group Captain Operations at Bomber Command Headquarters between 1961 and 1964. His later appointments included Commandant of the RAF Staff College, Bracknell, Commander-in-Chief RAF Germany and finally Chief of the Air Staff from 1977-82.



Dr Noble Frankland
CB CBE DFC MA DPhil

Dr Frankland obtained his degree at Oxford and during the war served in the Royal Air Force as a navigator, completing an operational tour on Lancasters with 50 Squadron. Afterwards he worked as a narrator in the Air Historical Branch and then as a military historian in the Cabinet Office, where he wrote, with Sir Charles Webster, the official history *The Strategic Air Offensive against Germany 1939-1945*. From 1960 to 1982 he was Director of the Imperial War Museum. His biography of Field Marshal HRH the Duke of Connaught is now in the press.



Air Vice-Marshal P M S Hedgeland
CB OBE BSc(Eng) FCGI CEng FIEE

Air Vice-Marshal Hedgeland was posted to TRE Malvern in July 1942 and in August joined Bernard Lovell's H2S Group. In November 1942 he went to RAF Graveley with the first H2S set to go to an operational squadron; he served there as the Squadron RDF Officer on No 35 (PFF) Squadron where he remained until March 1944. He then spent nine months at RAF

Wyton as Station Radar Officer before returning to TRE to take charge of the development of H2S Mk IIIIF, intended to give improved definition to deal with the difficult radar response from Berlin.



Dr Richard P Hallion

Dr Hallion qualified at the University of Maryland in 1970 and obtained a doctorate in the history of aerospace technology in 1975. He subsequently worked as a curator at the Smithsonian Institute's National Air and Space Museum and, between 1982 and 1990, he held chief historian appointments at Edwards, Wright-Patterson and Andrews Air Force Bases. He took up his present appointment, historian of the United States Air Force, in December 1991. He is a

practising pilot and the author of a number of books on aerospace history.



Dr Horst Boog

Dr Boog is a native of Leuna-Merseberg, where he suffered first-hand experience of allied bombing. In 1944, aged 16, he was trained as a glider pilot, and later transferred to the *Volksturm*. After the war, having spent a short time as a translator and interpreter at Nuremberg, he went to the USA as an exchange student, then worked for the USAF in Germany on intelligence duties. He studied part-time at the University of Heidelberg, obtaining his PhD in 1965. Since then he has worked in the Military History Research Office in Freiburg, first as Senior Air Historian and later as Chief Historian. He has lectured extensively inside and outside Germany, and has written several important works about the Second World War and the German Air Force.



The Lord Mackie
CBE DSO DFC

Educated at Aberdeen University, Lord Mackie spent the Second World War in the Royal Air Force, serving in Bomber Command and later on the Air Staff. Afterwards he became a farmer, entered politics in 1959, sat as a Liberal MP from 1964-66, and became Chairman and later President of the Scottish Liberal Party. He is a member of the Parliamentary Assembly of the Council of Europe. He was created a Life Peer in 1974.

Royal Air Force Historical Society

The Royal Air Force has been in existence for seventy five years; the study of its history is deepening, and continues to be the subject of published works of consequence. Fresh attention is being given to the strategic assumptions under which military air power was first created and which largely determined policy and operations in both World Wars, the inter-war period, and in the era of Cold War tension. Material dealing with post-war history is now becoming available for study under the thirty-year rule. These studies are important both to academic historians and to the present and future members of the RAF.

The RAF Historical Society was formed in 1986 to provide a focus for interest in the history of the RAF. It does so by providing a setting for lectures and seminars in which those interested in the history of the RAF have the opportunity to meet those who participated in the evolution and implementation of policy. The Society believes that these events make an important contribution to the permanent record.

The Society normally holds three lectures or seminars a year in or near London, with occasional events in other parts of the country. Transcripts of lectures and seminars are published in the Proceedings of the RAF Historical Society, which is provided free of charge to members. Individual membership is open to all with an interest in RAF history, whether or not they were in the Service. Although the Society has the approval of the Air Force Board, it is entirely self-financing.

Membership of the Society costs £15 per annum and further details may be obtained from the Membership Secretary, Dr J Dunham, Silverhill House, Coombe, Wotton-under-Edge, Glos, GL12 7ND.