

**ROYAL AIR FORCE  
HISTORICAL SOCIETY**



**JOURNAL**

**50**

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First published in the UK in 2011 by the Royal Air Force Historical Society

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ISSN 1361 4231

Printed by Windrush Group  
Windrush House  
Avenue Two  
Station Lane  
Witney  
OX28 4XW

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## SELECTED ABBREVIATIONS

ACRC	Air Crew Reception Centre
AI	Airborne Interception equipment (ie rader)
AMO	Air Ministry Order
AMWO	Air Ministry Weekly Order
BCMH	British Commission for Military History
CDS	Chief of the Defence Staff
DERA	Defence Evaluation and Research Agency
D/F	Direction Finding
FEAF	Far East Air Force
GAPAN	Guild of Air Pilots and Navigators
HF	High Frequency (radio)
IFF	Identification Friend or Foe
ITW	Initial Training Wing
MAP	Ministry of Aircraft Production
Nav(B)	Navigator additionally qualified as an air bomber
Nav(W)	Navigator additionally qualified as a wireless operator
Nav(Radio)	Navigator additionally qualified as an AI operator
OTU	Operational Training Unit
PRO	Public Record Office
RC	Recruit Centre
RDF	Radio Direction Finding ( <i>later Radar</i> )
RUSI	Royal United Services Institute
SHAEF	Supreme Headquarters Allied Expeditionary Force
TG	Trade Group
TLS	Time Literary Supplement
TNA	The National Archives
WEM	Wireless and Electrical Mechanic
WOM	Wireless Operator Mechanic

**Our Guest Speaker at the RAF Club, following the Society's AGM on 16 June 2010, was the recently retired Director General of the Royal Air Force Museum and current President of GAPAN**

**Dr Michael Fopp**

**whose topic was**

**THE BATTLE OF BRITAIN – 70 YEARS ON**

*Dr Fopp's presentation was built around audio tapes and video clips which, by their very nature, do not lend themselves to reproduction in print. What follows, therefore, reflects the content of what was delivered on that occasion but extensively revised, and selectively amplified, to adapt it for publication. Ed*

For the last seventy years Churchill's words predicting 'Our Finest Hour' have rung ever true, both for their historical accuracy and for their eloquence. They conveyed a message of defiance and resolution and were a powerful indicator to all who were listening, at home and abroad, ally, enemy and potential ally or enemy. They have also served as the inspiration for decades of embellishment, analysis, review, revision, hero worship, character assassination and rainforests of paper and books about a relatively short period of British history. That period is officially 10 July to 31 October 1940, the dates promulgated, after the war, to determine who would be entitled to adorn their 1939-45 Star with the Battle of Britain clasp. To qualify, aircrew were required to have flown one operational sortie with a designated unit within Fighter Command between those dates. Thus they were then categorised as participants in the Battle of Britain. These are dates with very little supporting evidence to justify their existence. Prior to 10 July other encounters with the *Luftwaffe* had been just as ferocious as they were to become after that date. On 4 July, for example, Ju 87s confirmed their deadly accuracy with 500kg bombs on a coastal convoy, and free-ranging Bf 109s flew around Sussex in search of Hurricanes and Spitfires. After 31 October there were also many hard fought aerial engagements right up to December.

Few of us appreciate having our cherished illusions distorted by reality. My generation, which was born soon after the end of the Second World War, was reared on classic films such as *The*



*Among the participants in the Battle whose recorded voices featured in Dr Fopp's presentation were (left to right, with contemporary ranks): his father, Sgt Desmond Fopp of No 17 Sqn; OC 257 Sqn, Sqn Ldr Robert Stanford Tuck and Major Adolf Galland, Geschwaderkommodore JG26.*

*Dambusters, Reach For The Sky, Carve Her Name With Pride and The Battle Of Britain.* In some measure, at least, these epics were 'faction'. Such films are often denounced today, because all of their errors were on the side of generosity, to emphasise heroism and enlarge achievement. Few people find this practice offensive. 'Faction', especially about the war, chiefly incurs the wrath of the public when it diminishes legends, rather than enhancing them.

Unlike so many historical periods or events, the passing of time has dealt kindly with the Battle of Britain – because the basic story is true. While the eloquence and rhetoric of Churchill (and others) served to steel the resolve of the British people, his words were impressively accurate and perceptive. It is interesting to observe that, apart from being the first decisive aerial battle in history, the Battle of Britain is also probably unique in being the first battle that was given a name before it began and had victory acclaimed before it was over.

So what can I do to retell such a well-known story after so many years? What can I do, as someone who was not even born at that time, although I would claim to have more than a passing interest? First, I am the son of a Battle of Britain veteran. He was an Australian and, as such, one of the 'Few of the Few'. My father never talked of his

experiences, either of the battle itself or of his long career in war and peace as a Royal Air Force pilot. Secondly, I have, for more than thirty years, made my living as an aviation historian, lecturing on the subject and working at the Royal Air Force Museum – for twenty-two of those years as its Director General. I am, therefore, privileged not only to have known many of the participants in the battle, but also to have had access to the archives and collections of the Museum that has the most comprehensive array of material relating to the period.

This Society has already given the subject careful consideration during its *The Battle Re-Thought* symposium in 1990 and in Dr Alfred Price's post-AGM address in 2002 when he analysed and described the events of Battle of Britain Day itself in some detail. I am not, therefore going to deal in any great detail with the facts of the battle, since these are already well documented. I hope instead, to provide an insight into some of its aspects that may have been distorted or obscured by the plethora of material which has been published over the past 70 years.

### **How The Story Was Told At The Time**

There was no 24-hour 'rolling news' coverage on TV in 1940, of course, and news bulletins on the radio were strictly censored. Beyond that, the story of the battle was told in films and newsreels made for propaganda purposes, not least to impress the United States. These films were essentially documentaries, featuring real people, rather than actors, and, despite the underlying intent and the constraints imposed by security considerations, they do provide us with an impressively accurate impression of the period.

I decline to participate in any revisionist debate, because the Battle of Britain story is, essentially, true. There can be no disputing the fact that it was an extraordinary feat of arms – a 'finest hour'. Throughout the summer and autumn of 1940, Fighter Command translated into reality the rhetoric of Churchill's defiance of Nazism. It was, however, a campaign characterised by paradoxes and ironies. For example, the mere fact that the British were even continuing the war was at odds with logic. A government of coldly rational men in London in June 1940 would surely have made peace with Berlin. After the fall of France, Britain had no realistic prospect of defeating Hitler alone, even if the war lasted for ever. The gulf between the real and potential



resources of the two adversaries was simply too great. The British deceived themselves mightily in the summer of 1940, by supposing that they already faced the fully mobilised might of Germany. In reality, Hitler had scarcely begun to exploit his nation's industrial potential for waging war.

## PREPARATIONS

So how could our nation repel a belligerent Germany after it had conquered everything else in its path? Nowadays we tend to overlook the preparations that led to the victory. We gloss over the detail in the belief that David beat Goliath more by luck than judgement, by merely picking up the nearest stone to hand and throwing it very accurately at the enemy. This gives us the mythical tale of a few valiant airmen courageously beating a significantly stronger enemy, almost by accident. There is some truth in the myth, but success was hardly achieved by accident. The architect of victory was Air Chief Marshal Sir Hugh Dowding.



*Air Chf Mshl  
Sir Hugh Dowding*

### **Dowding**

Dowding's career had not provided him with any notable experience of operational command at a senior level. Not having been very happy at school, at Winchester, he joined the Army in 1899, via the Royal Military Academy at Woolwich. After service as an artillery officer in a variety of imperial outposts, he joined the 1912 Staff College intake at Camberley. In December 1913 he qualified for his RAeC Certificate at Brooklands and gained his RFC 'wings' in the following April on graduating with the CFS's No 5 Course. That automatically earmarked him for the RFC Reserve, an option which the RFC exercised on the outbreak of war and he was in France before the end of 1914. Active service saw him commanding flights, squadrons, specialising in the development of wireless for artillery observation, and ultimately a wing. Home-based and involved in training from 1917 onwards he

ended the war as a 35-year old brigadier-general.

Between 1930 and 1936, he sat on the Air Council, first as the Air Member for Supply and Research and later, from 1935, as the Air Member for Research and Development. As such Dowding had greater responsibility than any other officer for fostering technical progress within the RAF. While some mistakes were made on Dowding's watch (one could cite, for instance, the loss of the R101, the Battle light bomber and the Defiant turret fighter), he made some personal decisions which would help win the battle a few years later. Two of these were of critical significance. First, recognising the need for much faster and more heavily armed fighters, he endorsed the specifications that produced the Hurricane and Spitfire. Secondly, perceiving the need for early warning of the approach of hostile aircraft, once the initial experiments had demonstrated its potential, he backed the development of radar from the outset.

Appointed in 1936 as the first AOCinC of the newly created Fighter Command, Dowding did not endear himself to his superiors, although they were subsequently obliged to keep him in post beyond his scheduled retirement date. Once war was declared, his aim was to prevent an invasion and to do that he needed to maintain a fighter force of adequate strength and to use it, not to destroy German fighters, but to engage enemy bombers before they dropped their bombs. This was an important distinction, one that was later criticised within the Royal Air Force itself, where an ultimately persuasive faction thought that the principle aim should have been to shoot down the greatest number of bombers, whether they got through to their targets or not. We now know that such an approach, had it been pursued, would have resulted in defeat. Perhaps even more importantly, earlier, on 16 May 1940, Dowding had held his political and military superiors' feet to the fire when he wrote to the Under Secretary of State at the Air Ministry as follows:

'I believe that, if an adequate fighter force is kept in this country, if the Fleet remains in being, and if the Home Forces are suitably organised to resist invasion, we should be able to carry on the war single-handed for some time, if not indefinitely. But if the Home Defence Force is drained away in desperate attempts to remedy the situation in France, defeat in

France will involve the final, complete and irremediable defeat of this country.’

Having won his argument, and prevented his squadrons being frittered away in losing the Battle of France, the subsequent Battle of Britain would be won because it was underpinned by Dowding’s ‘System’ which was based on the use of radar.

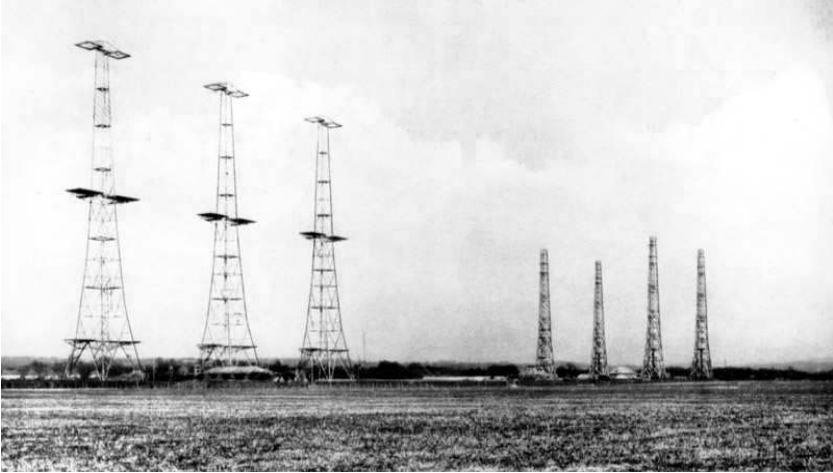
### **Radar and the Fighter Command System**

In October 1937, a *Luftwaffe* delegation, led by Milch and Udet visited Britain. According to Milch, while in the anteroom of the Officers Mess at HQ Fighter Command, he addressed the assembled officers as follows: ‘Now, gentlemen, let us all be frank. How are you getting on with your experiments in detection by radio of the aircraft approaching your shores?’ Milch claims that ‘more than one glass was dropped to the floor with a crash’. There was embarrassed laughter and an attempt to change the subject, but Milch persisted. ‘Come, gentlemen, there is no need to be so cagey. We’ve known for some time that you were developing a system of radio location. So are we, and we think we are a jump ahead of you.’

The British had begun their experiments in 1935, and had since then been developing radar, then known as radio direction finding (RDF) in deadly secrecy. It had never occurred to them that, as is often the case with advances in technology, parallel experiments might have been going on elsewhere. In fact the German Navy’s Signal Research Department had created a workable radar set by 1934, and by 1939 Germany possessed gun-laying, and indeed early warning, radars in advance of anything that Britain had built.

But while Germany had a firm grasp on the technology, it had signally failed to exploit its potential whereas British scientists and engineers, in close cooperation with Dowding, had, between 1935 and 1939, devised the command and control system, with its crucial communications links, that would make victory possible in 1940.

Dowding’s ‘System’ had its origins in facilities established at a fighter airfield, the so-called ‘Biggin Hill Experiment’ and later refined and extended to embrace Bawdsey Manor, Northolt, Uxbridge and Stanmore (Bentley Priory). The buildings, in which the facilities that were needed to test the system were built, still exist. The prototype Filter Room was set up at Bawdsey; HQ Fighter Command



*A Chain Home station – transmitter array on the left, receivers on the right.*

was at Bentley Priory; HQ 11 Group and its Operations Room was at Uxbridge and Building 27 at RAF Northolt housed the first Sector Operations Room. Copies of these installations would, eventually, be rolled out to cover the defence of the whole of Britain.

In action, the way in which the system functioned may be summarised as follows:

- 1 Enemy aircraft were detected by the Chain Home radar sites that had been constructed along the east and south coasts. The transmitter aerials were wire ‘curtains’ strung between steel lattice towers about 350 feet tall, which ‘floodlit’ the sky with pulses of radio energy. There were two receivers, both with dual arrays. One set, mounted at the top of a 240-foot wooden mast, determined bearing (by comparing, by use of a goniometer, the received signal strength in each of its two antennae), the other was sited lower down and assessed altitude in a similar fashion. Range was calculated from the elapsed time between transmitting and receiving a pulse of energy.
- 2 Low-flying aircraft were detected by Chain Home Low (aerials sometimes mounted at roof top height on cliff sites,

but often raised on a lattice mast).

- 3 Radar operators (principally WAAFs) converted range and bearing into a grid reference and passed this, along with the height and estimated size of the incoming raid, to the HQ Fighter Command Filter Room at Bentley Priory.
- 4 Having received the information, deconflicted it from other known tracks and decided that it was hostile the Filter Room tagged the raid with a serial number and passed the details simultaneously to the Operations Room, where it was displayed on the plotting table, and to the Operations Rooms at Group and Sector HQs.
- 5 There was no overland radar cover so, once a raid had crossed the coast the flow of information was sustained by the Observer Corps (not 'Royal' until April 1941), which continued to track the raid visually and report to their own Group HQs which relayed the updates to Bentley Priory and down to Sectors.
- 6 Stations were committed by the Group HQ with squadrons being scrambled by Sectors, which also subsequently controlled the interception. Controllers vectored their assigned fighters towards the hostile plot, aiming, if time permitted, to position them above the raiders and 'up sun'.

New symbols were constantly being added to the map on each plotting table to reflect the latest information received. They were colour-coded to correspond to the five-minute segments marked in red, yellow and blue on the face of each Ops Room clock. By cross-referencing the colours of the symbols and the clock, the Controllers, all of whom were experienced pilots, could tell at a glance the 'age' of the plot and make the appropriate decisions. At Bentley Priory, the most important of these was to determine which plots were hostile and, of those, which were real raids and which were feints.

Bearing in mind that the closing speed between an incoming raid and an intercepting squadron could be more than 500 mph it was critically important that the plot displayed on the Ops Room tables always reflected the most recent reports. There were, however, practical limits to what could be achieved. While WAAF plotters



*The underground Operations Room at Bentley Priory.*

could handle up to five plots a minute, this would have involved receiving reports from different sources, since this exceeded the capabilities of a single radar site. It is important to appreciate that the familiar ‘plan position indicator’ type of radar display did not become available until early in 1941 so the interpretation of the raw radar returns was a relatively lengthy procedure. It actually took some 24 seconds to determine the range, bearing and height of each echo, and this was supposed to be reassessed every two minutes, so the maximum number of returns that an operator could keep track of was five, with four being a more realistic figure. Interpreting the radar returns required a high degree of skill – it has been described as 60% experience and 40% intuition – and women proved to be particularly adept at this task.

There was much more to Dowding’s approach than radar, however; he sat at the hub of a complex network that fused together, under the overall direction of the Royal Air Force, army and navy anti-aircraft guns, the balloon barrage, the Fire Brigade, the police and other

emergency services, the Observer Corps, the Post Office (which was responsible for telephone communications in those days), the electricity companies, the national Air Raid Warning System and a variety of functions handled by local authorities. It was an extraordinary, and very effective, machine.

Nevertheless, the conduct of operations was critically dependent upon radar and the British early warning system was quite unique in 1940. Although the Germans did have radar on many of their ships and along the coast of Europe during the Battle of Britain, they had not yet co-ordinated its use and it would seem that, at the time, they never really understood what the British had achieved. The mere possession of radar was not enough in itself; what was needed was an efficient means of using radar-derived information. *Luftwaffe* crews were constantly reporting that the Royal Air Force always seemed to be at the right place at the right time but German intelligence does not appear to have understood exactly how that was being achieved.

### **Luftwaffe Intelligence**

Apart from their failure to grasp the subtlety and complexity of the RAF's warning system, the Germans constantly miscalculated Fighter Command's strength and underestimated its effectiveness. As late as 16 July 1940 *Luftwaffe* intelligence was confidently reporting that the Royal Air Force was inferior to the *Luftwaffe*. The Hurricane and Spitfire were inferior to the Bf 109, whilst the Bf 110 was inferior only to 'skilfully handled Spitfires'. Production of British aircraft was estimated at between 180 and 300 fighters per month, whereas production actually exceeded 300 for four of the seven months of the battle. The report continued that, at senior levels, command was 'inflexible' and that formations were 'rigidly attached to their home bases'. At medium level, control was in the hands of Station Commanders who were 'no longer accustomed to flying'; low level leadership was assessed as 'generally energetic but lacks tactical skill'. As a result, it was anticipated that the RAF would be 'obliged to limit its activity primarily to night operations even in the advent of intensified air warfare. These operations will undoubtedly achieve a nuisance value but will in no way be decisive.' The Intelligence Report's conclusion was that 'the *Luftwaffe* is clearly superior to the RAF as regards strength, equipment, training, command and location

of bases.’ There was absolutely no mention of there being an effective early warning system in place.

Hopelessly inadequate intelligence assessments aside, the Germans also had to cope with significant tactical problems. As Adolf Galland has noted, once airborne, because their radios were crystallised differently, direct communication between fighters and bombers was impossible. The only way for a fighter commander to ‘talk’ to the bombers was to call his home base and ask them to telephone the bomber unit and for it to relay the message to its aircraft. A case in point arose on 13 August, following the postponement of *Adler Tag* (Eagle Day), due to poor weather. One bomber unit failed to receive the order and proceeded with the mission. Halfway across the Channel a squadron of Bf 110s attempted to head off the formation by weaving in front of the leader’s aircraft, but this was dismissed as high spirits and the bombers flew on.

### **Code names**

A variety of code words was in use in 1940: ‘angels’ for altitude in thousands of feet, for instance; ‘pancake’ – to land, ‘vector’ – to steer and ‘bandits’ for enemy aircraft. Most of these have been discarded but there is still an echo of one of them in the current aviator’s lexicon. Bearing in mind that there was no overland radar cover in 1940, Controllers had a problem keeping track of friendly aircraft. The initial solution was ‘Pipsqueak’, a clockwork device that, when switched on (only one aeroplane in a formation would use it), caused the TR9 radio to broadcast a tone (to ‘squeak’) for 14 seconds in each minute. Ground-based HF D/F stations would each take bearings on these transmissions and, when plotted on a chart, their intersection revealed the location of the aeroplane/formation. This was soon superseded by IFF which came to be known as a ‘Parrot’, so ‘squeaking’ became ‘squawking’ and today, when using a secondary radar transponder, we are still asked to ‘squawk’ a specified code.

What amounted to *pseudo*-code words could also be useful as a source of misinformation. The German intelligence services constantly monitored British radio traffic, of course, and Bob Stanford-Tuck used to tell a tale arising from this. When he was eventually shot down he recalled that, clearly believing it to be of some significance, his interrogator was very interested in the term ‘Put





*Spitfires of No 610 Sqn wearing national markings and unit codes in the style that was in vogue in the summer of 1940.*

a cork in it'. This was, of course, merely a handy phrase used by a colleague when he wanted his pilots to stop chattering on the radio and concentrate on the job in hand. The Germans, however, were quite convinced that it referred to some new tactic or device; Tuck did not disillusion them.

## THE FIGHTER AIRCRAFT

### The Principal Types

Much has been written about the aeroplanes that fought the Battle of Britain. The following notes are intended to reflect the salient characteristics of the main types of fighter that were engaged, while avoiding overstating any cases or being partisan.

**Construction.** The Hurricane was the most conservative of the three single-seaters, employing a traditional fabric-covered steel-tube structure which made it strong, resilient and easy both to manufacture and repair. The Spitfire, with its sophisticated elliptical wing, represented the other end of the complexity spectrum; it has been described as 'an engineer's dream but an industrialist's nightmare'. The Bf 109 was, like the Spitfire, an all-metal aeroplane with a monocoque fuselage but it was all straight edges and 'ease of manufacture' had been a design feature from the outset.

**Power.** The contemporary Merlins and the DB601A were broadly comparable 12-cylinder liquid-cooled Vee-engines (inverted in the case of the DB) in the roughly 1,100 hp class. Both air forces



*The contrast between the Hurricane's traditional fabric-covered 'formers and stringers' style of construction and the Spitfire's (and Bf 109's) all-metal monocoque is apparent in these factory shots.*





*After being damaged in combat with Spitfires of No 54 Sqn on 31 August, Ltn W Fronhöfer was obliged to land his Bf 109E-4, 'Yellow 10' of 9./JG26, wheels-up at Ulcombe (in Kent, between Maidstone and Ashford).*

started out using 80/87 octane fuel but the RAF had switched to 100 octane in the spring of 1940, which permitted an increase in boost pressure, and higher speed, at low and medium altitude. While the Messerschmitt's petrol may have had a lower octane rating, this disadvantage was offset by its direct fuel-injection; at the time both British fighters still had float carburettors which meant that their engines would cut out during negative 'g' manoeuvres or sustained inverted flight.

**Undercarriage.** The Hurricane had a robust, wide-track undercarriage that was inherently stable and tolerant of rough surfaces. The Spitfire and the Messerschmitt both had very narrow, and relatively weak, undercarriages making them more susceptible to landing or taxiing incidents and the Bf 109 is said to have been rather prone to ground looping.

**Cockpit Canopy.** Both British fighters had rearward sliding canopies which provided a relatively unobstructed view and could be opened in flight. The Bf 109's canopy was heavily framed, which restricted visibility and opened by being hinged to the right,



*Hurricanes of No 87 Sqn.*

which meant that it could not be opened in flight.

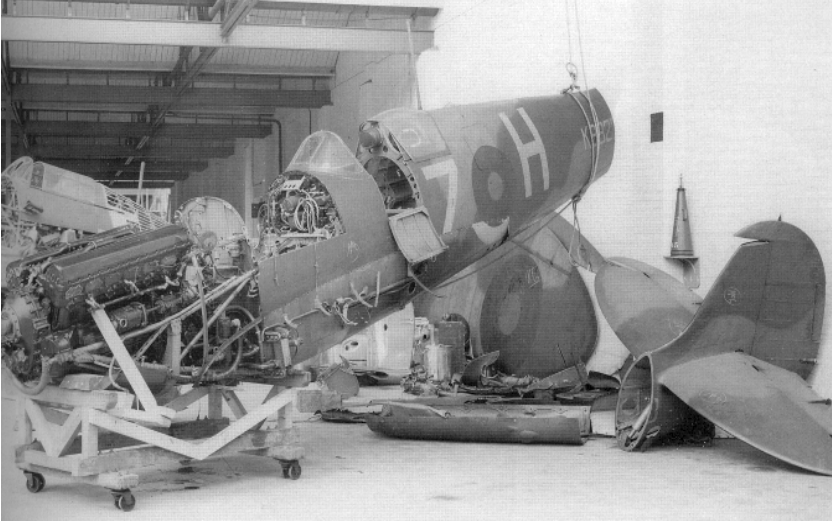
**Performance.** To attempt an objective comparison of the performance of the three single-seat fighters would demand numerous graphs and tables – and even then probably invite an argument, since much that has been published has been contradictory. Furthermore, an aeroplane that had seen some service will have acquired its fair share of dents and scratches, and in all probability a few patched bullet holes, and have an engine that was becoming due for overhaul. The performance of such an aeroplane would have fallen a long way short of the figures in the manufacturer's brochure. Suffice to say that the Spitfire and the Messerschmitt were in the same performance bracket in terms of speed and rate of climb, with the Hurricane being more sluggish all round, perhaps 30 mph slower and taking a couple of minutes longer to reach 25,000 feet. Where the Hurricane scored was in its range/endurance which gave it a 30% advantage over the Spitfire and 65% over the Bf 109. This was a critical factor, especially for the Messerschmitts which were operating at extreme range.

**Handling/Manoeuvrability.** The Spitfire and the Hurricane could both turn inside the Bf 109 but, beyond that, handling and manoeuvrability were generally comparable and all three aeroplanes had, and have, their champions. Since the aircraft were broadly similar in both performance and handling, the outcome of

an engagement was more to do with the comparative skill of the individual pilots and such factors as: the initial advantages conferred by superior speed, altitude and surprise; the direction of attack with respect to the position of the sun; numbers; the amount of fuel in hand and so on.

**Spitfire v Hurricane.** Like their comparative handling, the relative contributions to victory made by Hurricanes and Spitfires is another subject of endless debate surrounded by conflicting statistics. The literature is strewn with exercises of this nature but I will cite here the relatively recent analysis published by John Alcorn in 2000 (*Aeroplane* Vol 28, No 7, pp24-29). By taking the 2,480 claims submitted by the pilots of Fighter Command's Hurricanes and Spitfires and comparing them with known German losses (to RAF single-seaters) he concludes that they reflected only 1,194 actual victories, a not unusual overclaiming rate of the order of two to one. Alcorn's analysis further revealed that the nineteen Spitfire squadrons committed to the battle were credited with 529 actual victories, about 27 per unit, whereas the thirty Hurricane squadrons that were fully engaged (four others were never deployed in active sectors) accounted for 656, or 22 per unit, which would suggest that the Spitfire was 1.25 times more effective than the Hurricane. Another interesting finding was that Spitfire squadrons accounted for Bf 109s at about twice the rate achieved by those flying Hurricanes, which was not too surprising as, when possible, the Hurricanes were usually directed towards the bombers while the better-performing Spitfires engaged the escorting Messerschmitts. Nevertheless, in absolute terms, Hurricanes clearly inflicted more damage on the *Luftwaffe* than did Spitfires.

**The Bf 110.** Also fielded by the *Luftwaffe* as a 'fighter', the twin-engined Bf 110 was being misemployed. Conceived as a 'destroyer' (*Zerstörer*), it would have been very effective against bombers, and in due course it would do just that, and with considerable success, at night. It was, however, and quite understandably, hard pressed to hold its own against far more nimble single-seaters. This must surely have been obvious to the crews who were obliged to fly them, but evidently not to the high command. When they were intercepted by the RAF, the Bf 110s



*A damaged Spitfire in the hands of the Civilian Repair Organisation.*

tended to fly a WW I-style defensive circle, each aircraft covering the tail of the one in front. This may have minimised their chances of being shot down, but it also meant that they were no longer protecting the bombers which they were supposed to be escorting and, on occasion, the Bf 110s were even provided with an escort of Bf 109s.

### **British Aircraft Production.**

Beaverbrook was appointed to head the newly established Ministry of Aircraft Production (MAP) in May 1940 and the timing meant that he had a direct influence on the battle. One of his key decisions was to focus production on just five aircraft types – the Wellington, Whitley, Blenheim, Spitfire and Hurricane. Sustaining such a policy would have had serious drawbacks in the long-term, but if the Battle of Britain had been lost there would have been no ‘long-term’ and, whatever else it did, Beaverbrook’s ‘big five’ policy will have served to ensure the production of larger numbers of fighters in the short-term (although the production rate had already begun to increase in April, before the MAP was set up).

Other positive Beaverbrook initiatives were to transfer the administration of the huge Shadow Factory at Castle Bromwich from

Nuffield to Vickers, which undoubtedly resulted in the earlier delivery of much larger numbers of Spitfires, and assuming control of the Civilian Repair Organisation which rebuilt and returned to service more than 60% of the battle-damaged fighters struck off squadron charge during the summer of 1940. The MAP also stimulated the delivery of American aircraft and contracted Packard to build the Merlin in the USA, although neither of these developments would have any immediate impact on the battle. With hindsight, some of Beaverbrook's 'achievements' may have been more apparent than real but, at the time, his decisiveness and dynamism were very impressive. The fact is that, despite its heavy losses, Fighter Command could actually field more aeroplanes at the end of October than it could at the beginning of July and, at least some of, the credit for that must surely be attributed to Beaverbrook.

### **British Fighter Armament**

In 1934, to arm its future fighters, and bombers, the RAF had selected an anglicised version of the .30" American Colt-Browning machine gun, adapted to take standard British .303" ammunition. Both the Spitfire and the Hurricane had eight of these, four in each wing. This meant that there were no problems with the propeller interfering with rate of fire, although the guns were prone to overheating and jamming if fired in long bursts. In practice, therefore, although both aircraft carried about 15 second's worth of ammunition, it was only fired in 3-second bursts. In the spring of 1940 Fighter Command began to employ incendiary bullets based on the Belgian De Wilde design, and these roughly doubled the effectiveness of the relatively small calibre guns. The guns of the RAF's fighters were originally harmonised to converge at 400 yds – the 'Dowding spread' – but this was later reduced to 250 yds.

Both aircraft were equipped with the Bar & Stroud GM2, known to the RAF as the Reflector Sight Mk II. Interestingly, because the manufacturer, could not produce the numbers required, and there was no suitable alternative source in the UK, in 1938 an order was placed with an Austrian company, C P Goerz of Vienna, and, before deliveries ceased in September 1939, they had produced some 700 units as the Reflector Sight Mk III. Ironically, therefore, many of the RAF pilots who fired on *Luftwaffe* aircraft in 1940 actually did so

using gun sights built by the opposition.

Having recognised that heavier guns would be necessary, by 1938 the RAF had selected the 20 mm Hispano cannon but a number of technical problems were encountered and they did not begin to become available in production quantities until the autumn of 1940. A few Spitfires with one cannon in each wing were issued to No 19 Sqn for field trials from June onwards but the experience was not satisfactory. There were constant problems with guns jamming and the cannon-armed aircraft were withdrawn on 4 September.

### **German Fighter Armament**

The *Luftwaffe* had accepted that cannon would be necessary long before the RAF and its standard fighter in the summer of 1940, the Bf 109E-4, had a 20mm MG-FFM in each wing with 60 rounds per gun. This was a Swiss (Oerlikon) gun manufactured in Berlin by Ikaria. As with the RAF and its De Wilde ammunition, the Germans had upgraded theirs too and they were using high explosive rounds, indicated by the 'M' (*Minengeschoß* – mine shell) suffix in the gun's designation. The cannon were supplemented by a pair of 7.92 mm Rheinmetal Borsig MG 17 machine guns in the engine cowling with 1,000 rounds apiece. Since as early as 1936 the Bf 109 was always supposed to have had a gun firing through the propeller spinner but problems with cooling and vibration had still not been overcome by 1940 and, despite appearances to the contrary (the open-ended propeller boss of the E-4 looked as if it might have accommodated a *Motorkanone*) none were actually armed in this fashion during the Battle of Britain. Compared to the Spitfire and Hurricane, different rates of fire, different calibres and thus different trajectories, and synchronising the cowling-mounted machine guns to avoid damaging the propeller, complicated the harmonisation problem for the Germans.

Despite having only half as many guns as British fighters, however, the Bf 109's armament still gave its pilots an edge over their RAF opponents. A three-second burst from a Spitfire or Hurricane delivered a total of 80 lbs of ammunition while a three-second burst from a Messerschmitt delivered only 56 lbs, but 36 of those pounds were of heavy calibre explosive cannon shells and that permitted it to inflict much more damage – clearly underlining why the RAF needed



to expedite the introduction of cannon.

As with the British fighters, the Bf 109 had a reflector sight, in their case the *Revi C/12 (Reflexvisier)*. Designed and manufactured by Carl Zeiss, this sight had been in service since 1937 and had been field-tested in the Bf 109B during the Spanish Civil War

The other German fighter, the Bf 110, also had a pair of MG-FFM cannon plus four MG 17 machine guns, so it was not that much more heavily armed than the Bf 109, although it did have ample ammunition – 1,000 rounds per gun of 7.92 mm and 180 rpg of 20 mm – and, because the guns were all mounted in the nose, their fire was far more concentrated. A fifth machine gun, a hand-held 7.92mm MG 15, was provided in the rear cockpit to defend the tail.

## TACTICS

### RAF Tactics

In 1940 RAF doctrine still reflected the procedures originally laid down in the pre-war Manual of Air Tactics. The basic function of the fighter was to intercept and shoot down *unescorted* enemy bombers, not fighters, and the manual had assumed, in any case, that advances in aircraft performance and the associated ‘g’ loadings had made dogfighting impractical. As late as June 1940, and throughout the period of the battle, official policy was to fly in close formation in three-aircraft vics – if flying as a squadron, as was usual, three vics in line astern with a fourth vic weaving back and forth across the rear of the column keeping a look out to protect it from an attack from behind (and using a lot more fuel than the rest of the squadron in the process).

That said, because everyone was flying in close formation, only two pilots were actually able to spend much time looking out – the leaders of the front vic and of the one that was patrolling behind. In practice, losses meant that the ‘tail end Charlie’ would frequently be a pair, or even a singleton, often a new boy, who would run short of fuel and be picked off on his way home.

The Germans called the British tactics *die Idiotenreihe* (the row of idiots) and the rigidity of the RAF’s attitude has been compared to using the Marquis of Queensbury Rules in a bar room brawl. The RAF’s fighter leaders of 1940 were, of course, pre-war pilots who had been thoroughly indoctrinated with the prevailing dogma and many of them lacked the flexibility to adjust their thinking. Inevitably,



*Hurricanes flying in tight vics, as required by the prevailing Fighter Command dogma, produced an inflexible formation with most of the pilots preoccupied with keeping station rather than looking out.*

however, experience taught hard lessons and Fighter Command's squadrons gradually adopted the far more practical loose 'finger four' formation used by the *Luftwaffe*, although the rigid vic remained in use in some quarters into 1941.

### ***Luftwaffe Tactics***

The Germans had learned a lot in Spain and their junior commanders were given the freedom to devise tactics to suit the situation. The most significant innovation was to abandon tight formations (like the RAF, the *Luftwaffe* had originally used a three-aircraft vic) for fighters in favour of a loose pair of aircraft (*Rotte*) or two pairs (*Schwarm*), with as much as 200 yards between the aeroplanes, staggered laterally (like the finger tips on an outstretched hand) and a little vertically. This allowed every pilot to scan the sky for hostile aircraft, rather than having to concentrate on not colliding

with his leader, and permitted a degree of mutual protection by being able to see enemy aircraft approaching his colleagues from behind.

Despite the utility and flexibility of the formation adopted by the *Luftwaffe*, its fighters were hobbled by rigid directives. Although German intelligence indicated that Fighter Command was being worn down, *Luftwaffe* bomber crews continued to encounter determined opposition in undiminished strength. Goering perceived this to be a failure on the part of his fighter pilots and they were instructed to stick close to the bombers, which only served to inhibit their freedom of action and wasted fuel while forfeiting the crucial tactical advantages conferred by height and speed in order to provide what amounted to a visual boost to the morale of bomber crews. Worse still, the single-seaters were eventually required to protect the twin-engined Bf 110s.

## PEOPLE

### Ground Crews

The groundcrews of both sides – ‘erks’ in the case of the RAF and ‘blackmen’ (*schwarzen Männer*) in the *Luftwaffe*, on account of their black overalls – were rather like modern Formula 1 pit crews. They were efficient, well-trained and, above all, motivated. As an RAF fighter came in to land at its home base its groundcrew would be looking to see if the red fabric patches over its gun ports were still intact. If some were and some were not, it indicated a problem for the armourers. Immediately an aircraft came to rest the crew would pounce on it, inspect it for damage, and refuel and re-arm it. While their pilot was still being debriefed they would carry out final checks and clean the machine (particularly its windscreen and canopy) which would be ready to go again half-an-hour after landing. During the most intense periods of the battle a Spitfire or Hurricane could be turned round in about 15 minutes. Bearing in mind that they were working, in the open, in the middle of the *Luftwaffe*'s primary target (Fighter Command's airfields were top of the German priority list until the second week of September), these men were the unsung heroes of the Battle of Britain, without whom the whole system would not have worked. Sadly, however, their contribution was not recognised by officialdom – they did not qualify for the Battle of Britain clasp.



*A Hurricane of No 17 Sqn receiving the attentions of its groundcrew.*

### **The Luftwaffe – Die Flieger**

The *Luftwaffe*'s aircrew were the cream of German youth. Well-educated, intelligent, fit and healthy and in every sense above average. They were an integral part of Hitler's new Germany. It has been said that, on the outbreak of war, Germany still had an Imperial Navy and a Prussian Army – only the Air Force was a direct product of National Socialism, having been created to promote the Nazi concept of modern warfare.

The invaluable practical experience gained in Spain had allowed the Germans to test their equipment and to develop and refine operating procedures and tactics. The air force's fighting units were well led by men who had flown in combat with the Condor Legion and at the operational command level by competent generals like Kesselring, Stumpf, Sperrle and von Richthofen. By contrast, the High Command, including some individuals on the *Luftwaffe* General Staff, was characterised by in-fighting, jealousy, sycophancy, personal ambition and greed.

### **The Royal Air Force – 'The Few'**

So far as command was concerned, the upper echelons of the British hierarchy were free of corruption, although there were inevitably some clashes of personality and the well-known dispute between Park and Leigh-Mallory was unfortunate and hardly productive. At unit level the RAF was not as well served as the *Luftwaffe* because its 'middle managers', the junior squadron leaders

and senior flight lieutenants who were in line to command the squadrons, lacked the Spanish experience and, as noted above, some tended to be hidebound by the outdated teachings of 'the manual'.

At the working level, there were about 3,000 aircrew in Fighter Command, the equivalent of an Army Brigade Group, or the complement of a capital ship. Of these, some 500 had not been born in Britain.

Contrary to popular belief, the Battle of Britain was not 'fought on the playing fields of Eton'. Although twenty-two of Fighter Command's men actually were Old Etonians, barely 200 of its pilots were the product of the British public school system. The majority had learned to fly in the Volunteer Reserve and the Auxiliary Air Force; they were part-time pilots who had been trained in their own time at weekends. Like the *Luftwaffe's* aircrew, these young men were the brightest and best of their respective societies.

Experience among junior pilots was often minimal, and declined as the battle progressed, and the calibre of a few Squadron Commanders was less than ideal. A peacetime 'flying club' approach was still evident in the attitude of some of the regular officers who were appointed as COs, particularly in France in the early weeks of the war. As late as October 1940 Bob Stanford-Tuck was sent to 'turn around' 257 Squadron because poor leadership had led to very low morale amongst its pilots.

The average age of a British fighter pilot was 21 years. It was generally considered that if a new pilot lasted three operational missions he had a good chance of survival. But even the most experienced men demonstrated that this was not necessarily true. In all 537 RAF pilots were killed during the battle and 791 of the survivors did not see the end of the war. These figures do need to be seen in perspective, however. While these sacrifices were grievous, Bomber and Coastal Commands lost more men on operations than Fighter Command during the Battle of Britain, particularly in night-time attacks on Channel ports where invasion preparations were taking place. Later in the war, of course, Bomber Command, would sometimes lose more men in a single night than were lost to Fighter Command during the entire Battle of Britain.

**Editor's Note.** Unfortunately, the expert audio technician and his hi-tech equipment (the editor and a small domestic tape-recorder) did not perform as reliably as they have on previous occasions and for this due apology is made. The upshot is that the questions that were asked following the presentation were taped, but there is no recording of Dr Fopp's responses or of further contributions from the floor. That said, in the Editor's humble opinion, the only topic raised that was of any real significance concerned the impact, or otherwise, of ULTRA on the conduct of the battle. This was largely dealt with by Seb Cox, the Head of AHB, who basically reiterated what he had said on a previous occasion – the 2002 AGM in the discussion that followed Dr Alfred Price's presentation on the specific events of Battle of Britain Day, 15 September 1940. To quote from *Journal 29*, p18:

‘From ULTRA we knew where units were stationed and, from the activation of beacons, it was possible to forecast who might be going to operate. While it was clearly possible to derive useful information from sensitive sources, however, I have never been able to establish exactly *how* this sort of information might have found its way to CinC Fighter Command because the supposition is that Dowding was not party to ULTRA. This conclusion is based on a note written by the Prime Minister in the autumn. This was chiefly a complaint about the number of people already on the access list but Churchill specifically asked why Dowding was *not* on it. Whether he was or not, however, I simply do not believe that information of immediate tactical value would be on the CinC's desk every morning at 8.00 am, as has sometimes been suggested. The whole process of decrypting and so on simply makes that unrealistic.’

**SUMMARY OF THE MINUTES OF THE TWENTY-THIRD  
ANNUAL GENERAL MEETING HELD IN  
THE ROYAL AIR FORCE CLUB ON 16 JUNE 2010**

**Chairman's Report.**

AVM Baldwin, Chairman, noted that the recently distributed Journal 47 had contained the minutes of the 2009 AGM and a record of Mr Seb Cox's masterly summary of his long research into the life of Sir Arthur Harris and of the history of WW II Bomber Command. The journal also contained the winning 2009 Two Air Forces Award paper along with other articles and book reviews.

The Society had held two seminars during the year; the first, in October 2009 at the RAF Museum, Hendon, had covered activities in the Middle East, from Arabia to Pakistan, through Mesopotamia in WW I and Iraq in WW II, and concluding with an exhilarating description of present-day Harrier operations in Afghanistan. A second seminar, held at Hendon in April 2010, considered the many relationships between the RAF and other air forces, focusing on cultural and organisational aspects. These included Polish and Czech participation in the Battle of Britain, and the influence of CFS on other air forces. The Society was yet again grateful for the use of the splendid facilities at the RAF Museum.

The next seminar, to be held at the BAWA in Bristol on Thursday 21 October 2010, would examine the aircraft and engines produced by Bristol and their use by the RAF under the title 'The Bristol Connection'. Gp Capt Heron was preparing a busy programme in conjunction with local historians. The spring 2011 seminar, to be held on 20 April, would probably cover RAF ground operations, including airfield construction.

The finances of the Society remained stable and healthy, with nearly £29,000 in the accumulated fund at the year end. The Society was supporting Miss Giffard, a PhD student at Imperial College, London, who was examining the history of jet engine development, and some £1,700 had been paid to the first recipient of the Henry Probert Bursary. Since 2005, in furtherance of its aims, the Society had expended some £12,500 on grants for projects ranging from the St Omer Memorial to the preservation of the Dennis Richards Archive. Annual subscriptions would be maintained at £18.

All Society journals up to No 36 (a total of 49 including hardbacks) were now online and could be downloaded from the RAF Museum's website, and a further six journals would be added shortly. Members were encouraged to recruit new members where possible. Application forms were available on the Society website or that of the RAF Museum.

Concluding, the Chairman thanked the committee for their continued hard work, and expressed his appreciation of the wise support and encouragement of the President, Sir Michael Beetham, and the Vice-President, Sir Frederick Sowrey.

### **Secretary's Report.**

Gp Capt Dearman, Secretary, reported that since the last AGM, thirty-five new members had joined the Society, of whom four were serving in the RAF. However, twenty-one had died and twenty-eight had resigned, leaving total membership at about 720. Journal sales had amounted to £200. Journals were no longer being sent to those few members still paying the old subscription rate of £15. The Society continued to meet its aims of placing its proceedings in the public record, and supporting appropriate scholarship and projects associated with RAF history.

### **Treasurer's Report.**

Mr Boyes, Treasurer, tabled the 2009 accounts and noted that for financial year, a loss of £5,923 had been incurred. This almost exactly matched the surplus achieved in 2008, and it was likely that this pattern of alternation would continue. Investment income had continued to be very poor at a mere £233, while the deficit on seminars had been about £2,100. The Society had made grants of £1,500 to the jet engine study, £1,000 towards saving the Dennis Richards Archive, and £500 to Sir Michael Beetham's biographer. The accumulated fund stood at £28,554. Proposed by Wg Cdr Cummings and seconded by Air Cdre Tyack, a motion that the accounts be accepted was carried. Proposed by Gp Capt Heron and seconded by Wg Cdr Jefford, a proposal that J R G Auber Ltd be reappointed independent examiner was carried.

### **Appointment of Executive Committee.**

The chairman noted that all the executive committee members



had offered themselves for re-election and that AVM Peter Dye, recently appointed Director General of the RAF Museum vice Dr Michael Fopp, had agreed to be an ex-officio member. A proposal by AVM Johnson, seconded by Air Cdre Tyack, that all members be re-elected was carried. The executive committee members so elected were:

AVM N B Baldwin CB CBE	Chairman
Gp Capt J D Heron OBE	Vice-Chairman
Gp Capt K J Dearman FRAeS	Secretary
Dr J Dunham PhD CPsychol AMRAeS	Membership Secretary
Mr J Boyes TD CA	Treasurer
Wg Cdr C G Jefford MBE BA	Editor & Pubs Manager
Air Cdre G R Pitchfork MBE MA FRAeS	
Wg Cdr C J Cummings	

The ex-officio members of the committee were:

J S Cox BA MA	Head of AHB
AVM P Dye OBE BSc(Eng) CEng ACGI MRAeS	DG RAF Museum
Gp Capt A J Byford MA MA RAF	DDefS(RAF)
Wg Cdr C Hunter MMDS RAF	JSCSC

### **Discussion.**

Mr Bateson noted that many RAF personnel records were not available at the National Archives. Mr Cox explained that personal details could not be released during the lifetime of the subject, and that the delay in the general release of records to the public would lengthen due to increasing longevity.

Wg Cdr Ryan was concerned to ensure that what remained of stored RAF silver should be transferred to the custody of the RAF Museum. He was urging CinC Air Command to write to all stations seeking their support for the survey of remaining silver so that an accurate audit could be completed.

Steven Mason suggested an award to the Guild of Aviation Artists; however, this would not be consistent with the Society's constitution.

The President, Sir Michael Beetham, presented the Two Air Forces Award to Gp Capt A J Byford.

*In 1996 the Royal Air Force Historical Society established, in collaboration with its American sister organisation, the Air Force Historical Foundation, the Two Air Forces Award, which was to be presented annually on each side of the Atlantic in recognition of outstanding academic work by a serving officer or airman. It is intended to reproduce some of these papers from time to time in the Journal. This one was the winning RAF submission in 2009. Ed*

## **‘EXECUTIVE FULLER!’ – THE ROYAL AIR FORCE AND THE CHANNEL DASH**

**by Gp Capt Alistair Byford**

*‘Their pilots fought bravely, tenaciously and untiringly, but they were sent into action with insufficient planning, without a clear concept of attack, without a centre of gravity and without systematic tactics’.*

Adolf Galland<sup>1</sup>

### **Introduction**

In February 1942, the *Wehrmacht* mounted an audacious air-sea operation to transfer a powerful *Kriegsmarine* battle-squadron through the English Channel from Brest, on France’s Atlantic coast, to the apparent safety of Wilhelmshaven in Germany. The break-out of the battlecruisers *Scharnhorst* and *Gneisenau*, and the heavy cruiser *Prinz Eugen*, was given the codename *Cerberus* by the Germans;<sup>2</sup> to the British, it became known as the ‘Channel Dash’, and it represented a public relations disaster that was hugely damaging to the reputation of the armed forces. Despite clear intelligence that a major operation was imminent, the German ships remained undetected for fourteen hours after breaking-out from Brest and were subsequently able to brush off a series of gallant – but ineffectual – British attacks with dismissive ease. *The Times* characterised this as the greatest national humiliation since the Dutch burned the fleet at Chatham in 1667;<sup>3</sup> certainly, it was the first time a hostile naval force of any significance had entered the Channel since the time of the Spanish Armada. However, like many of the *Wehrmacht*’s operations, *Cerberus* was a tactical success but a strategic failure, as the battlecruisers were a far greater threat to crucial trans-Atlantic convoys at Brest than they could be at Wilhelmshaven, where the concentration of all of the *Kriegsmarine*’s

capital units at one location was to make the task of containment and eventual destruction far easier for the Royal Air Force (RAF) and Royal Navy (RN). Nevertheless, Britain's failure to act decisively in waters that it considered its own was a huge embarrassment; in conjunction with the fall of Singapore just two days later, the Channel Dash arguably marked the nadir of Britain's military fortunes in the Second World War, calling into question the competence of Churchill's government and providing a striking example of how a tactical action of seemingly limited significance may have strategic – and even grand-strategic – implications.

The Channel Dash has considerable contemporary relevance. First, it is a timely reminder during a period of intense focus on air-land integration that air-sea cooperation also cannot be taken for granted; *ad hoc* coordination is rarely successful and the best results will be achieved if empathy and understanding are established over a period of time. It also raises important issues about command and control, the effective coordination of operations within a joint framework and particularly, the balance between operational security and the clarity of communication that is required to enable mission command and permit the effective decentralized execution that is essential in fast-moving, high-tempo military operations.

### **Hitler's Decision**

On 23 March 1941, the *Scharnhorst* and *Gneisenau* docked at Brest at the conclusion of Operation *Berlin*, a three-month cruise during which the two battlecruisers had sailed 17,800 miles and sunk or captured twenty-two merchantmen, illustrating in stark terms the threat that these powerful vessels posed to Britain's Atlantic supply lines. They were joined on 1 June 1941 by *Prinz Eugen*, which had escaped to Brest after her consort, the battleship *Bismarck*, was sunk on 27 May. Repeated RAF raids were mounted against Brest over the next nine months. 3,413 tons of bombs were dropped, despite the implementation of a comprehensive range of active and passive defensive measures, including sophisticated camouflage and concealment techniques, an effective smoke-screen system and the deployment of an intense concentration of anti-aircraft guns.<sup>4</sup> Although the RAF lost 127 aircraft, it was able to inflict significant damage on all three ships: *Prinz Eugen* received a direct hit that killed

sixty of her crew and the *Scharnhorst* and *Gneisenau* were put out of commission for four months and six months respectively, the latter as a result of a gallant torpedo attack executed by a Beaufort of Coastal Command in April 1941, the pilot, Flight Lieutenant Kenneth Campbell, being awarded a posthumous Victoria Cross.

The constant raids convinced the German high command that it would only be a matter of time before the RAF was successful in sinking the vessels, especially as Hermann Goering, the head of the *Luftwaffe*, refused to sanction an increase in fighter cover over Brest. Although he cited the *Luftwaffe*'s commitments on the newly opened Eastern Front as an excuse, his real motivation probably lay in the fierce inter-service rivalry that he enjoyed with *Gross-Admiral* Raeder, the *Kriegsmarine* commander. Meanwhile, Hitler was fixated on the illusory threat of a British invasion of Norway, so the danger posed by the RAF's bombing raids only added to his growing conviction that the battlecruisers must be brought back to Germany as soon as they were seaworthy, where he hoped they could be more easily defended and where they would be readily available for redeployment into Scandinavian waters. Consequently, at a conference at his Rastenberg Headquarters on 12 January, Hitler ordered the ships to evacuate Brest, comparing them to 'a patient with cancer who is doomed unless he submits to an operation'.<sup>5</sup>

Once Hitler had made this decision, two courses of action were available. The *Kriegsmarine* preferred to route the squadron out into the Atlantic and through the Denmark Strait passage, well to the north of Great Britain, but there was also the option to use the short – but apparently much more dangerous – direct route through the English Channel. Hitler chose the bolder alternative with little hesitation. Although this was partly because he was concerned that the Brest squadron might not be capable of an extended Atlantic passage after being bottled-up in harbour for a protracted period of time, his decision was largely based on intuition. Drawing on previous experience, Hitler believed that if the British high command was taken by surprise, it would lack the agility to act decisively in response to a rapidly changing situation;<sup>6</sup> in short, he felt that if he seized the initiative he would be able to operate within his opponent's decision cycle, and events were to prove that he was absolutely right.<sup>7</sup> Naval Command West, under Admiral Alfred Saalwächter, was directed to

plan the operation; execution would fall to Vice-Admiral Otto Ciliax, flying his flag on *Scharnhorst*.

### **The British Plan**

British contingency planning to prevent a break-out began as soon as the ships' arrival at Brest was confirmed by photographic reconnaissance on 28 March 1941. It was quickly apparent that responsibility for enforcing a blockade would fall mainly to the RAF, because of the Royal Navy's pressing commitments elsewhere. Capital ship cover had to be maintained at Scapa Flow, in case of a raid by German heavy units into the Atlantic via the North Sea; and battleship escorts were also needed for the 'WS' convoys sailing to the Middle East with reinforcements for the 8th Army, as these were vulnerable to the Brest squadron as they routed through the Bay of Biscay. The sinking of the *Bismarck* did not materially affect this operational calculus, because her sister-ship, the battleship *Tirpitz*, was about to be commissioned at Wilhelmshaven, so the RN was still faced with geographically separate threats from capital ships to both the north and west. This meant that it had to spread its heavy units to cover both eventualities and only light naval surface forces – the destroyers and Motor Torpedo Boats (MTBs) commanded by the Flag Officer Dover, Vice-Admiral Sir Bertram Ramsey – would be available to contest any German force in the Channel. As Ramsey's command was likely to be totally overmatched by the German squadron and its attendant flotillas of escorting destroyers and E-boats,<sup>8</sup> a joint operation involving the maximum use of air power represented the most realistic means of destroying or crippling the German ships.

The recent loss of 'Force Z' (the battleship *Prince of Wales* and battlecruiser *Repulse*) to Japanese air attack off the coast of Malaya had reinforced the Admiralty's opinion that it could not risk its own battleships in the Channel in the teeth of German air power; conversely, it also heightened expectations about what the RAF might achieve against the German vessels, although the circumstances were very different. Whereas the Japanese had employed a specialist wing – the 'Genzan Air Group' – trained and equipped in anti-shipping techniques, to attack ships with weak anti-aircraft defences in conditions of total air superiority and excellent weather, the RAF



*British commanders: Air Vice-Marshal 'Jack' Baldwin, acting Commander-in-Chief Bomber Command (left), Air Vice-Marshal Trafford Leigh-Mallory, Air Officer Commanding No 11 Group, Fighter Command (centre) and Vice-Admiral Bertram Ramsey, Flag Officer Dover (right).*

would have to attack with whatever aircraft and crews could be made available, in poor winter weather, against modern ships that were much better armed and would be heavily defended by a thick screen of highly capable fighter aircraft. However, the transparent weakness of Ramsey's naval forces meant that air power was still the most potent potential form of attack, so the Air Staff took the planning lead. The operation to stop the *Scharnhorst* and *Gneisenau* was given the codename FULLER: activation would be implemented by transmission of the order *Executive Fuller*.<sup>9</sup>

The production of a properly integrated air plan proved to be problematic, however, because no RAF officer was given overall responsibility for the operation and the three commands involved – Bomber, Fighter and Coastal – ‘were virtually autonomous within their own spheres’,<sup>10</sup> a legacy of the decision that had been made in 1936 to structure the RAF into single-role commands. This had proved to be a useful means of organizing pre-war expansion and enabled Fighter Command to provide an effective air defence of Great Britain (notably in the Battle of Britain) and Bomber Command to conduct its own strategic offensive – but these campaigns were both effectively a linked series of isolated, single-role operations. There were continual difficulties whenever the commands were required to

closely coordinate their activities in any joint endeavour that required a broad spectrum of air power capabilities. In contrast to the RAF system of mono-functional commands, the *Luftwaffe* was divided into multi-role *Luftflotten* or air fleets, which meant that properly integrating a coordinated air effort was less challenging. The *Luftwaffe*'s contribution to Operation *Cerberus* was provided by *Generalfeldmarshal* Hugo Sperrle's *Luftflotte 3*, which included all of the air assets required as integral elements of its own order of battle, including single- and twin-engined fighters, bombers and reconnaissance, 'sea-service' and electronic warfare aircraft.

British air planning was also hindered by excessive secrecy. Only a very few senior officers in each command were allowed to know what FULLER meant and this had a profound affect on the RAF's speed of response when the operation was activated, as these men could not always be located quickly enough to issue the appropriate orders and brief what was required. The result was that many of the aircrews had no knowledge of their mission, even after being ordered into the air.<sup>11</sup> With only sketchy information available, it is not surprising that British air operations were characterised by misunderstandings and a piecemeal application of the air effort, as the true significance of events was often not clear to the participants involved at the time.

It was expected that the main onus for stopping the German ships would fall to Coastal Command, as Bomber Command was neither trained nor equipped to attack moving targets at sea. Coastal Command possessed three squadrons of relatively modern and capable Beaufort torpedo-bombers specialised exactly for this task;<sup>12</sup> it was hoped that these would be able to execute a concentrated attack to saturate the defences, protected by a heavy fighter escort. In the event, a failure to coordinate the movement of the squadrons, poor weather (there was widespread snowfall in February 1942) and a logistics catastrophe – one squadron arrived without some of its torpedoes – meant that the planned, three-squadron attack degenerated into 'a series of uncoordinated raids by aircraft in ones and twos, spread over three hours in steadily worsening weather conditions'.<sup>13</sup> Coastal Command's other role was to provide a dusk to dawn reconnaissance screen to provide early warning of any German movements, centred on three patrol lines in the central and western Channel: 'Stopper', 'Line SE' and 'Habo'. Hudsons equipped with Air-to-Surface Vessel

(ASV) radar were nominated for this task. As these would be vulnerable to German fighters when operating close to enemy territory in daylight, Fighter Command was allocated the visual maritime reconnaissance mission in what were known as 'Jim Crow' patrols, but these were not expected to be significant, as it was thought that the Germans were unlikely to risk a passage of the Channel in daylight. This preconception was reinforced by an otherwise highly prescient intelligence appreciation submitted by the Admiralty on 3 February, which accurately predicted that a German operation was imminent and that the selected route would be up the Channel – but in the hours of darkness.

In the event of a break-out, Bomber Command was directed by the Air Ministry to attack the ships 'to the maximum practical effect' and, as a result of the Admiralty's intelligence appreciation, 300 bombers were allocated to Operation FULLER on 4 February, to be held at two hours' notice. This represented the core of Bomber Command's available frontline force and meant that raids on Germany would effectively have to be suspended. Bomber Command was in a very difficult position during this period, as it was struggling to expand while establishing itself as a viable force capable of inflicting real damage on the enemy heartland. Losses had been heavy while results were indifferent and its Air Officer Commanding-in-Chief (AOCinC), Sir Richard Peirse, had been dismissed, after ordering a particularly disastrous raid on the night of 7/8 November in highly unfavourable weather conditions.<sup>14</sup>

The acting AOCinC, Air Vice-Marshal 'Jack' Baldwin, was therefore keen to underscore the command's worth while acting as its caretaker, pending the arrival in post of the new chief, Air Marshal Sir Arthur 'Bomber' Harris. Baldwin felt that this was much more likely to be achieved by continuing with raids on area targets in Germany rather than through a putative attack on a heavily defended naval battle-squadron manoeuvring at speed, where the chances of achieving any sort of success would be slim. At his instigation, the Air Ministry approached the Admiralty on 8 February to suggest that the bomber force allocated to FULLER should be released. The Admiralty's response was robust: it was convinced that a German break-out was imminent and reaffirmed its opinion that the destruction of the *Scharnhorst* and *Gneisenau* would be far more significant, in terms of



the overall course of the war, than a few extra bombing raids on Germany. This assessment was passed to Bomber Command by the Air Ministry, but Baldwin decided unilaterally to withdraw 200 aircraft from the FULLER commitment and put the remaining 100 bombers (No 5 Group) back to normal (four hours) stand-by. Moreover, he did not inform the Air Ministry, the navy, or the other RAF commands of his decision. The result was that although Bomber Command would eventually mount a significant effort against the German ships, the first aircraft could not be despatched until three hours after the *Executive Fuller* order was received towards noon, so the attacks had to be prosecuted after the weather had deteriorated and dusk was falling; had the bombers been able to attack even an hour earlier, some may well have found the *Scharnhorst* when she was stationary and vulnerable, following a mine-strike at 1431 hours.

Fighter Command's main contribution would be delivered by No 11 Group, led by Air-Vice Marshal Trafford Leigh-Mallory. Its role in FULLER, apart from providing the 'Jim Crow' patrols, was to provide fighter cover for all other air and naval operations.<sup>15</sup> A direct telephone link was established between No 11 Group headquarters at Uxbridge and the naval command at Dover Castle to facilitate cooperation, but events were to prove that inter-service and even inter-command integration was inadequate, although this was more of a function of organization and culture rather than the mechanics of the communications set-up. Fighter Command was also faced with a qualitative challenge: the 'F' model of the *Luftwaffe's* Messerschmitt Bf 109 was at least comparable with its best fighter, the Spitfire V, while the Focke Wulf Fw 190 was superior in all respects. Both German types had a clear advantage over the Hurricane IIs and twin-engined Whirlwinds that were also fielded by Fighter Command.

### **The German Plan**

The German plan for Operation *Cerberus* demonstrated that – regardless of the shortcomings in the strategic direction of the war effort – the *Wehrmacht* was still capable of tactical and operational excellence, underwritten by highly effective joint planning. The most important decision was to leave Brest in darkness and risk running the Channel in daylight. The German planners calculated – quite correctly – that achieving surprise in the departure phase was more important



*The German operational commanders: Vice-Admiral Otto Ciliax (left), was the German naval commander. He was not a popular officer, unlike the flamboyant air commander, 'Dolfo' Galland, General der Jagdflieger (right). In November 1942, Galland would become the youngest general in the Wehrmacht at the age of 30.*

than the risks involved later in the passage, on the basis that the *Luftwaffe* would be able to beat off any subsequent daylight air and surface attacks. Essentially, the plan was to seize the initiative at the outset and then maintain it by generating a tempo that the British would be unable to match.

This put much responsibility onto the shoulders of the designated air commander, *Oberst* Adolf Galland, the flamboyant fighter ace and youthful *General der Jagdflieger*. He admitted to Hitler that he would need 'complete surprise and a little luck into the bargain' to deliver success – but he was also determined to make his own luck.<sup>16</sup> Despite the high-level antipathy and in-fighting between the two Service chiefs, Goering and Raeder, Galland was determined to foster the closest possible level of understanding with his naval counterparts at the operational level and, in the event, 'co-ordination worked without

friction'.<sup>17</sup> His air plan was codenamed *Donnerkeil* ('Thunderbolt') and would be executed from headquarters at Le Touquet and Caen in France and Schipol in the Netherlands, with control being transferred from one to the other as the ships passed *en route*. This was a maximum effort for the *Luftwaffe* and twelve aircraft from the Fighter Training School at Paris were even included in the total of 250 day and thirty night fighters put at Galland's disposal. He planned to provide constant cover over the fleet by cycling squadrons through the task: a standing air patrol would employ a minimum of sixteen fighters at any one time, increasing to up to thirty-two fighters during the periods of squadron relief, which amounted to ten minutes in every half hour. Additionally, on-call reserve squadrons were made available at four bases along the route, in case the scale of British air attack threatened to overwhelm the defences. After dusk, standing cover would be limited to two night fighters at any one time, to ensure deconfliction and effective radar control. Most of the fighter pilots would be expected to fly at least four sorties.

Galland decreed that operational success would not be measured by numbers of enemy aircraft shot down, but solely by the level of protection afforded to the warships. Consequently, RAF aircraft leaving the target area were to be avoided, but attacking aircraft were to be engaged at all costs – if necessary, through ramming.<sup>18</sup> Galland delegated one of his senior subordinates, *Oberst* Hans Ibel, to sail with the squadron as the *Jafü*, or on-scene fighter controller, and the *Luftwaffe*'s own short-wave radio equipment was installed on all of the ships to guarantee seamless air-sea communication. In contrast to the ambiguous British command structure, Galland was empowered by the authority of a 'Führer Order' to take control of all German air assets participating in *Donnerkeil*, including the bomber force, which was retained at readiness throughout the operation to counter any prospective movement south by British naval units. Finally, to ensure that the complex procedures and communications plan would work, between 22 January and 10 February over 450 sorties were flown in an elaborate mission rehearsal exercise known – somewhat optimistically – as 'The Beginning of Spring'.<sup>19</sup>

Other elements of the German plan displayed the same meticulous attention to detail. British coastal radar would have to be jammed if tactical surprise was to be retained, but a sudden increase in jamming

would, in itself, alert the British that a major operation was in train. Consequently, General Martini, the *Luftwaffe*'s Director of Communications, carefully raised the level of jamming over a two-week period, subtly increasing the duration and intensity over time to desensitize the British operators. This was highly effective and in the event, the heavy jamming from *Luftwaffe* coastal stations, supplemented by two specialist Heinkel He 111 electronic warfare aircraft, was successful in masking the German ships, while British watch officers who expressed suspicion at the higher than usual level of electronic noise were branded as 'scaremongers'.<sup>20</sup> No detail was too small to be overlooked: additional light *Flak* guns manned by *Luftwaffe* gunners were placed on the decks of the ships in extemporized mountings to increase the volume of anti-aircraft fire and a mine-sweeping schedule was arranged at night and conducted in sections, so that no pattern or swept route was readily apparent. The Germans were also fully aware that the British ran French intelligence agents in Brest, so an elaborate deception operation was mounted to indicate that the squadron would break-out west for a destination in the South Atlantic; rumours were spread around town, tropical helmets were ostentatiously brought on board and French dockers were tasked to load oil barrels clearly marked 'for use in the tropics only'.<sup>21</sup>

### **The Break-Out**

Galland had acknowledged the role that luck plays in military operations, regardless of the thoroughness of planning. Following a two-hour delay imposed by another RAF raid on Brest, the German fleet slipped its moorings at 2115 hours on the night of 11 February and immediately experienced its first slice of good fortune, when a mixture of bad management and unreliable equipment allowed it to pass through all three Coastal Command patrol lines without being detected. 'Stopper' was unmanned for three hours when the Hudson heading outbound to take station had to return to its base at RAF St Eval in Cornwall after being damaged by a German night-fighter. A spare aircraft was available, but its ASV was unserviceable – later found to be a result of a blown fuse – and the second replacement Hudson failed to start, this time because of a damp sparking plug. The crew eventually managed to find a serviceable aircraft and arrived on

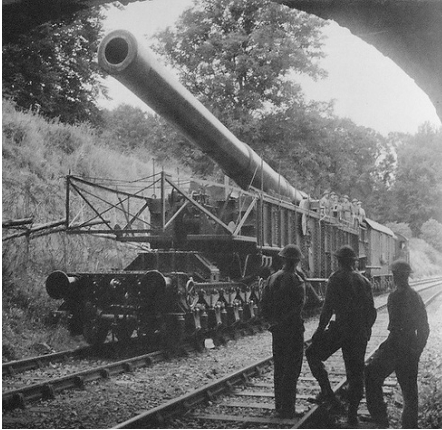


*A Lockheed Hudson of Coastal Command.*

station at 2238 hours, but by this time the German squadron had already passed the patrol line. The Hudson at 'Line SE' also had a problem with its ASV. After ninety minutes, the crew broke radio silence to report the fault and was ordered back to base, but no replacement cover was provided. Finally, the Station Commander at RAF Thorney Island, near Portsmouth, ordered the Hudson covering 'Habo' to recover early, as he was concerned that mist on the airfield might turn to fog and make landing difficult. The Hudson duly left its station at 0615 hours, just as the German squadron was approaching the point where it would have come within the 30-mile range of the aircraft's ASV.

What was as damaging as Coastal Command's inability to detect the warships was its subsequent failure to inform Flag Officer Dover – and the other RAF commands – of the extent to which its patrol coverage had been compromised. Consequently, all of the commanders assumed that the German squadron was still in harbour and the forces allocated to FULLER were stood down to normal readiness. At this stage, the German squadron had already been at sea for over ten hours and had steamed some 300 miles.

The first real indication that something unusual was happening came when RAF radar-operators noticed the high level of German air-activity over the Channel, even though effective noise-jamming was masking the 'blips' generated by the ships. Additional Spitfires were dispatched to supplement the standing 'Jim Crow' patrol and these



*The 13.5-in Mk V rail-gun 'Boche-buster' was unable to live up to its uncompromising name during Operation FULLER.*

finally spotted the German squadron at 1042 hours. However, due to the secrecy pervading FULLER, the fighter pilots were under strict orders not to break radio silence, although one of the pilots was Group Captain Victor Beamish, who in his previous appointment as Senior Air Staff Officer at No 11 Group had signed off the FULLER directive, which included a proviso that permitted radio-telephony (R/T) to be used 'in an emergency'.<sup>22</sup> Nonetheless, a sighting report was not raised until after the Spitfires landed and, as Fighter Command had not been expected to be the first agency to locate the German fleet, further valuable time was lost while it was determined who else needed to be notified within the chain of command. Eventually, *Executive Fuller* was declared by the Admiralty at 1125 hours, some fourteen hours after the ships had left harbour.

The initial response was a series of piecemeal and uncoordinated attacks mounted by whatever force elements came to readiness first. The long-range guns of the Army's Coastal Artillery were immediately available and the South Foreland battery was equipped with a new, K-type radar, which was able to burn through the jamming and track the German fleet as it passed Cap Gis Nez. However, the maximum visibility was only five miles, so although radar-predicted full salvo firing began at 1219 hours, the fall of shot could not be verified visually. By now, the German ships had worked up to 30 knots and quickly moved out of range, suffering no damage from the thirty-three rounds fired. Next, five MTBs of the Dover and Ramsgate flotillas attacked, but it was obvious that they would be unable to break through the strong screen of destroyers and E-boats screening the three big ships without additional support, and they were

reduced to launching hopeful torpedo shots at extreme range: unsurprisingly, all of these missed.

In one of the few acts of British initiative, Wing Commander Constable-Roberts, Flag Officer Dover's air liaison officer, had ordered the six obsolete Swordfish biplane torpedo bombers of the Fleet Air Arm's No 825 Naval Air Squadron, based at RAF Manston in Kent, to be armed and brought to immediate readiness after hearing the first reports of unusual activity from the coastal radar stations. These old aircraft were not expected to be able to survive a daylight raid on the German squadron; they were only ever intended to be used in a flare-dropping role to support a night MTB attack, in anticipation that the Germans would run the Channel in darkness. Nevertheless, because the other forces earmarked for FULLER had been stood down at dawn, there were no other options available for an immediate response. Ramsey was fully aware of the vulnerability of the Swordfish and, after some soul-searching, made an agonized telephone call to the First Sea Lord, Sir Dudley Pound to request advice. Pound replied: 'The navy would attack the enemy whenever and wherever he be found' and Ramsey reluctantly ordered the attack to go ahead.<sup>23</sup>

Although No 11 Group promised three squadrons of Spitfires as a fighter escort and another two squadrons in a *Flak*-suppression role, poor communication between Flag Officer Dover and Headquarters No 11 Group meant that only the ten Spitfires of No 72 Sqn, commanded by Squadron Leader Brian Kingcombe, arrived at the rendezvous overhead Manston. Like most other RAF units, No 72 Sqn had not been briefed about the nature of the mission and Kingcombe had no idea about the scale of opposition that would be encountered. As the German ships were already passing abeam Ramsgate, the Swordfish could not afford to wait for the rest of the escort and had to press on, but they were intercepted by German fighters with twelve miles still to run. Although Kingcombe's Spitfires quickly engaged the Bf 109s and Fw 190s, the six Swordfish were all hacked out of the sky by either the fighters or the barrage of anti-aircraft fire from the ships, as they attacked at low level and a maximum attack speed of just eighty knots. No damage was inflicted on the warships and only five of the eighteen Fleet Air Arm aircrew involved survived to be rescued by the withdrawing MTBs; the mission had lasted just under



*The Swordfish was too vulnerable to be effective in daylight operations.*

twenty minutes from the time of take-off until the last Swordfish crashed into the sea. Ramsay wrote: 'In my opinion, the gallant sortie of these six aircraft constitutes one of the finest exhibitions of self-sacrifice and devotion to duty the war had ever witnessed'. Even the usually austere Ciliax was moved to acknowledge 'the mothball attack of a handful of ancient planes, piloted by men whose bravery surpasses any other action by either side that day'.<sup>24</sup> The commanding officer, Lieutenant Commander Eugene Esmonde, was awarded a posthumous Victoria Cross; ironically, he had visited Buckingham Palace the day before the Channel Dash to receive the Distinguished Service Order for the leading role he had played in crippling the *Bismarck* eight months previously.

The final throw of the dice for British naval forces was represented by six elderly destroyers of the Harwich flotilla, led by Captain Mark Pizey in HMS *Campbell*. This force had been stood down in the morning and was consequently off station, practising gunnery in the North Sea, when it received the *Executive Fuller* transmission. Pizey realised that he was unlikely to be able to intercept the German squadron in time, but he did manage to deliver one salvo of torpedoes by steaming south at full speed across two unswept minefields:



unfortunately, all the shots missed and counter-fire from *Gneisenau* and *Prinz Eugen* severely damaged the *Worcester*, although she eventually managed to limp back to port. In a good illustration of the way that the ‘fog and friction’ of war affected both sides in the grey winter light and poor weather, two RAF Wellingtons bombed and near-missed one of the destroyers, HMS *Walpole*, as she was also making her way back to harbour, but they were driven off by the Messerschmitt Bf 109s of *Jagdgeschwader 2* before they could do serious damage. *Walpole* prudently withheld her fire as the German fighters then provided a close (and somewhat disconcerting) escort for the British ship, in the mistaken assumption that it was a *Kriegsmarine Zerstörer*, until they reached the limit of their endurance and peeled off to return to their bases in France.<sup>25</sup> Meanwhile, the German destroyer *Hermann Schoemann* was firing frantically at a *Luftwaffe* Dornier Do 217, which repeatedly bombed her and then raked her with machine-gun fire.<sup>26</sup> Captain Wright of *Mackay* reported that ‘the mixture of aircraft in our vicinity was extraordinary ... some aircraft thought we were friendly; some of our own thought we were hostile’. We, on our part, opened fire on aircraft later recognised as friendly’. He added, with characteristic understatement: ‘The aircraft on both sides must have found the situation rather confusing’.<sup>27</sup>

The three Beaufort squadrons of Coastal Command had been expected to pose the greatest threat to the German squadron. No 217 Sqn was first into the fight, but could only muster four serviceable aircraft to fly to Manston to meet its fighter escort. Their leader, Squadron Leader Carson, had not been briefed before departing Thorney Island and did not know what his target was, or even what the codeword FULLER meant. Headquarters No 16 Group, Coastal Command, intended to pass the details to him in Morse over wireless-telephony (W/T) when the Beauforts reached Manston, but was not aware that No 217 Sqn’s Beauforts had been converted to radio-telephony (R/T). Eventually, after circling the airfield for some time in silence, Carson landed and made his way to Manston’s Operations Room to ask the Station Commander if he knew what his mission was. After getting airborne again, he failed to make radio contact with the other three Beauforts, which were still patiently waiting in the overhead; nevertheless, they followed as he set course towards the battle-squadron’s last reported position. The four aircraft finally found



*Beauforts of No 42 Sqn. (MAP)*

the German ships at 1540 hours and began their attacks, joined eventually by three more Beauforts that had been made ready at Thorney Island in the interim. These had also been kept in ignorance about FULLER and been forced to land at Manston to be briefed. By now, the visibility was extremely poor and no torpedo hits were scored: one aircraft was shot down by the fighter screen. Most of the other Beauforts were badly shot-up, but all managed to make it back to Manston, including Pilot Officer Etheridge, whose aircraft suffered further severe damage from the Ramsgate anti-aircraft batteries, which ‘appeared to be shooting at everything coming up the Channel’.<sup>28</sup>

No 42 Sqn’s preparations had also been chaotic. Its move south from Leuchars had been delayed by poor weather and only nine of its fourteen aircraft were armed. Consequently, the other five aircraft were ordered to land at North Coates, a Coastal Command airfield, to be loaded with torpedoes, but the heavy snowfall on the East Coast meant they had to divert to Coltishall, a fighter station. In theory, a specialist Mobile Torpedo Unit was available to transport their weapons from North Coates to Coltishall, but what was subsequently christened the ‘Immobile Unit’ took so long to bring to readiness and deploy that this plan had to be abandoned and only the original nine aircraft could be used.<sup>29</sup> These rendezvoused at Manston with eleven Hudsons of No 407 Sqn, Royal Canadian Air Force and twenty Spitfires as fighter escort, but neither of the bomber formations had been briefed about FULLER and a farcical situation developed, as

each squadron attempted to formate on the other in the hope that they would be led to a suitable target. Eventually, the Beauforts' leader, Squadron Leader Cliff, lost patience and set course for the Channel to see what he could find.

Six Hudsons followed Cliff, while the other five continued circling Manston for half an hour, before running low on fuel and returning to their base at RAF Bircham Newton in Norfolk. The Hudsons soon lost contact with the Beauforts in heavy rain, but picked up some blips on their ASVs and dived through the low cloud to deliver an attack on some German *Zerstörers* and E-boats, losing two of their number to the heavy *Flak* barrage.<sup>30</sup> Meanwhile, Cliff was taken aback when he stumbled across the powerful battle-fleet and its fighter umbrella, steaming east at nearly thirty knots: he later complained to No 16 Group – not unreasonably in the circumstances – that ‘I was expecting a convoy. Why was I not told about the bloody great battleships?’<sup>31</sup> In the ensuing confusion, three crews mistook the retreating Harwich destroyer flotilla for elements of the German squadron and attacked the British ships, but fortunately all missed, as did the four aircraft that correctly identified and launched their torpedoes against the German vessels.

It was a similar story for No 86 Sqn, the last Beaufort squadron to go into action following a staged deployment from its home base at St Eval. The leader waited for the promised fighter support until dusk was beginning to fall, when he decided he would have to complete the mission without an escort. Two of the Beauforts either flew into the sea or were shot down by German fighters on the way to the target, and none of the survivors was able to find the German squadron in the worsening weather.

Because of its initial lack of readiness, RAF Bomber Command's response was slow and further delays were caused by the requirement to re-arm the aircraft that were available. The 100 bombers retained at readiness for FULLER had been loaded with 500 lb semi-armour piercing (SAP) bombs, the only weapons likely to inflict fatal damage on heavily armoured warships. However, these bombs had to be dropped from a minimum of 7,000 feet in order to fuse properly and by noon, the cloud-base was less than 1,000 feet. The decision was therefore made to load aircraft with general purpose (GP) bombs as they were brought to readiness, as these could be dropped at low-level.

This meant that the German ships were unlikely to be sunk, although significant blast damage might still be caused to their superstructures. This decision was partially countermanded when it was realised that the 100 aircraft already armed with SAP could not be de-bombed, rearmed with GP and still take off in time to catch the German squadron before nightfall. Accordingly, these were dispatched with the original weapons in the hope – which was to be unfulfilled – that they might find a break in the clouds.

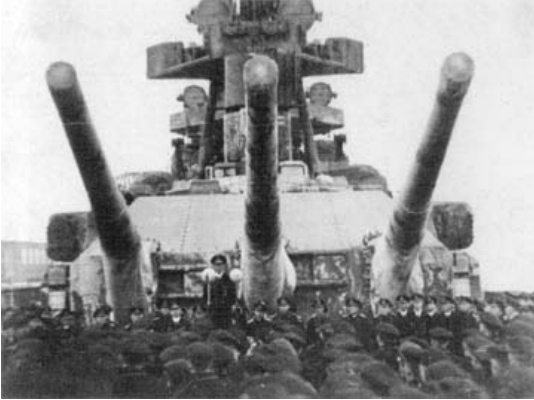
Two hundred and forty-two bombers eventually took off in three waves. Ninety-two Wellingtons, sixty-four Hampdens, thirty-seven Blenheims, fifteen Manchesters, thirteen Halifaxes, eleven Stirlings and ten Bostons were employed in what was the largest daylight bombing operation of the war to date,<sup>32</sup> but only thirty-nine of the bombers were able to find the German ships in low cloud, rain and gathering darkness: actual conditions were reported as ten-tenths cloud cover at six hundred feet with visibility less than 1,400 yards in drizzle and rain.<sup>33</sup> In these circumstances, the heavy, four-engined, Halifaxes and Stirlings were simply too unwieldy to manoeuvre into a position to attack and only the medium and light bombers claimed to have bombed the warships. The experience of No 214 Sqn, based at RAF Stradishall, was typical. It was preparing for a night raid on Germany when it received the declaration *Executive Fuller*. Twelve of its Wellingtons took off at 1445 hours, but formation keeping proved impossible as the cloud base dropped to less than 500 feet and the squadron quickly split into individual elements. Only one aircraft claimed to have seen the German ships and the Wellington flown by the squadron's commanding officer, Wing Commander MacFadden, failed to return. The unit's Operations Record Book (Form 540) commented laconically that 'the squadron had a very unsuccessful day and lost the Commanding Officer'.<sup>34</sup>

Bomber Command lost fourteen other aircraft, predominantly to the *Luftwaffe's* fighter umbrella, as the poor weather also hampered the anti-aircraft gunners on the ships, who found it difficult to track attacking aircraft as they emerged through the mist and rain. Another bomber crashed while attempting to land back at its base. Unfortunately, but not surprisingly, only minor splinter damage was caused by these gallant but uncoordinated attacks, although the fighting was so intense that the sailors had to cool the ships' *Flak* guns

by pouring buckets of water over them and at least one gun-barrel burst.<sup>35</sup> Ciliax acknowledged the gallantry of the Bomber Command crews in his report: 'From about 12.45 until 6.30 pm massed and individual attacks from aircraft of all types. Impressions: Dogged aggressive spirit, very plucky flying'.<sup>36</sup>

Fighter Command flew 398 sorties during the operation. Although – with the benefit of hindsight – the poor coordination of fighter escorts appears culpable, the context has to be taken into account; arrangements were inevitably *ad hoc*, given the secrecy and lack of available information available, and the short planning time following the late declaration of *Executive Fuller*. Commendably, most of the leaders of the fighter escorts acted on their own initiative if they failed to make contact with their designated attacking force, making their own way to the scene of action to try and disrupt or disturb the German fighter screen. Undoubtedly, the losses to bomber aircraft conducting piecemeal attacks over several hours would have been far higher if the fighters had not flown to the 'sound of the guns'. Post-war analysis indicates that Fighter Command shot down sixteen German aircraft for the loss of seventeen of its own aircraft, a commendable effort given the technical superiority generally enjoyed by the German fighter force, although in line with Galland's directive, the *Luftwaffe's* priority targets were the RAF's bombers rather than its fighters. Twenty-one Spitfire squadrons were employed and these generally held their own, losing just five aircraft between them, but the four Hurricane squadrons lost five aircraft and No 137 Sqn was particularly roughly handled, losing four of the eight Whirlwind long-range fighters that it committed to battle. These losses were a simple reflection of the relative capabilities of the aircraft involved; in air combat, even ostensibly small qualitative advantages invariably have a disproportionate affect on the outcome.

Just as it appeared that the German ships would escape entirely unscathed, they ran into a series of minefields that had been laid by the Hampdens and Manchesters of Bomber Command's No 5 Group. Ninety-eight mines had been dropped between 3 and 9 February in anticipation of a German break-out and a further thirteen were laid in the path of the battle-squadron on 12 February itself.<sup>37</sup> *Scharnhorst* hit two mines off Flushing and was forced to stop for repairs; in accordance with the *Cerberus* directive, the rest of the ships pressed



*Vice-Admiral Ciliax addresses the crew of Scharnhorst at Wilhelmshaven at the successful conclusion of Operation Cerebrus.*

on without her, but she was eventually able to get under way again and managed to make harbour the following morning, albeit with serious damage. *Gneisenau* also struck one of the air-dropped mines at Terschelling and was forced to stop for half an hour for repairs, but her damage was much lighter. The mine-strikes caused concern

and confusion within the German force and Ciliax was forced to transfer his flag twice, in anticipation that one or both of the battlecruisers might have to be left to their fate, much to the derision of the respective ships' companies – he was a highly unpopular commander. However, the German squadron was shrouded in the darkness of the long winter night and remained undetected by the British while it was potentially vulnerable to attack. By 0900 hours on 13 February, all three big ships had berthed safely in Wilhelmshaven, allowing Ciliax to signal Admiral Saalwächter: 'It is my duty to inform you that Operation *Cerberus* has been successfully completed'.

### **The Reckoning**

Despite the intensity of the fighting, casualties on both sides – while not insignificant – were relatively minor in the context of an existential war of national survival. The British lost a total of forty-two fighters and bombers, shooting down sixteen *Luftwaffe* aircraft in return: eleven of the German pilots were killed. No British ships were lost, although HMS *Worcester* was severely damaged and twenty-seven of her crew were killed by enemy shell-fire. On the German side, in addition to the mine damage to the capital ships, the torpedo boats *T13* and *Jaguar* received light damage from bomb splinters and machine-gun fire, suffering one killed and two wounded; another

sailor on *Prinz Eugen* was also killed by bomb splinters.

Paradoxically, the very success of the Channel Dash resulted in the *Scharnhorst*, *Gneisenau* and *Prinz Eugen* being neutralised as an immediate threat to Britain's supply lines, the German Naval Staff itself characterising the outcome as a 'tactical victory, but a strategic defeat'.<sup>38</sup> The ships were no longer a menace to the Atlantic convoys at Wilhelmshaven, instead being earmarked for employment in Hitler's 'zone of destiny' in Norway, while on the night of 26/27 March – a month after *Cerberus* – the St Nazaire raid was successful in blocking off the last French port capable of handling the *Kriegsmarine*'s capital ships, effectively removing any lingering threat to the Atlantic. Moreover, the German ports did not provide the expected safe haven from British attack and all three ships were crippled or destroyed in the aftermath of the Channel Dash: *Scharnhorst* was in dock for six months due to the mine-damage and was then caught by the Home Fleet and sunk off the North Cape when she did sail; *Gneisenau* received a direct hit during an RAF bombing attack on the night 26/27 February, just a fortnight after the Channel Dash, killing 116 of her crew and causing so much damage that she was never returned to service, instead being filled with concrete and used as a static fort; and *Prinz Eugen* had her stern blown off by a British submarine three days later, taking no further effective part in the war, but surviving as a hulk to be sunk in a post-war nuclear test in the Pacific.

Therefore, in strictly strategic and material terms, the outcome of Operation *Cerberus* was highly advantageous to Britain; but contemporaneous perceptions were very different. Whereas all Germany rejoiced and the operation was celebrated by the propaganda machine as an unprecedented triumph, in Great Britain, the sense of national shame was profound and this had inevitable political consequences. Churchill was taken aback by the scale of popular anger; it seemed that by this stage of the war, while the British public was inured to a seemingly unbroken run of defeats on land, it was not prepared to accept humiliation in a domain that it considered to be its birthright. An editorial in *The Times* asserted that: 'Vice-Admiral Ciliax has succeeded where the Duke of Medina Sidonia failed. Nothing more mortifying to the pride of our sea power has happened since the seventeenth century',<sup>39</sup> while the *News Chronicle*

characterised the operation as a story of ‘individual courage and steadfast devotion to duty’, but ‘not one that reflects much credit on those primarily responsible’.<sup>40</sup>

The government came under blistering attack in the Commons from all sides of the House, where the Channel Dash was described as a ‘major blunder’<sup>41</sup> and, unusually, the Admiralty and Air Staff were openly criticised in Parliament. Churchill was forced to convene a formal commission of enquiry, but ironically, the furore about Operation FULLER was politically beneficial in that its reverberations masked the impact of the fall of Singapore two days later, on 15 February 1942. This was a disaster of an entirely different order of magnitude, with 150,000 British and Commonwealth troops surrendering to a much smaller Japanese force in the largest capitulation in British military history. In his memoirs, Churchill noted that, by comparison, the Channel Dash was ‘an episode of minor importance as I judged it’, but acknowledged it as ‘arousing even greater wrath and distress among the public’ and accepting that ‘it is certainly not strange that public confidence in the Administration and its conduct of the war should have quavered’.<sup>42</sup> The damage to the reputation of the armed forces in an alliance context was also significant. Churchill conducted an elaborate correspondence with President Roosevelt to convince him that the Channel Dash did not represent another strategic defeat and was duly grateful for the President’s assurance that he would couch a radio address to the American nation in emollient terms.<sup>43</sup>

### **The Post-Mortem**

The Board of Inquiry was convened under Mr Justice Bucknill on 16 February 1942 and delivered its findings in early March;<sup>44</sup> these were not published due to security considerations, but the Deputy Prime Minister, Clement Atlee, made a statement to the House on 18 March, explaining that ‘the general findings do not reveal that there were any serious deficiencies in either foresight, co-operation or organisation between the Services concerned and their respective Commands’.<sup>45</sup> This was greeted with widespread scepticism and, at a secret session of the House of Commons on 23 April, Churchill was forced to give more details in an attempt to quell further dissent. He began by acknowledging that he had been ‘impressed by the shock



which the passage of these two ships through the Channel gave to the loyal masses of the British nation<sup>46</sup> and won over the House by using the details of the Admiralty's intelligence appreciation to assert that the German operation had not come as a surprise; consequently, he argued, British forces were as well-prepared as could have been expected, but there were simply not enough of them, because of commitments elsewhere. Most of the torpedo-bombers were required in the Mediterranean, the majority of destroyers had to be used for convoy escort duties in the Atlantic and the few capital ships available, after the requirements of the Mediterranean and the Far East had been met, could not be employed in the Channel because of the danger of air attack.<sup>47</sup> While Churchill's statement was convincing enough to win the debate and his administration survived to fight another day, he was certainly disingenuous in suggesting that the actions of the limited forces that were available were as well organised and led as they could have been.

### **An Inevitable Failure?**

Given the scarcity of available resources, it is unlikely that Operation FULLER could ever have succeeded without benefiting from a mixture of good fortune and the closest possible inter-Service and inter-command cooperation. Unhappily, a chain of bad luck, poor decision-making and incompetence delayed the detection of the break-out and this ensured that the British reaction would be uncoordinated and reactive, with weak force elements being committed to battle as they became available; the piecemeal attacks that resulted were easily countered by the powerful, concentrated and well-integrated German force. It has even been argued that British planners tacitly accepted Operation *Cerberus* as a *fait accompli*, as they acknowledged that insufficient forces were available to prevent a break-out, but also knew that this would not represent an entirely undesirable strategic outcome.<sup>48</sup> While this may have been an acceptable military perspective, if this really was an accepted, but unspoken, belief held by the Air Staff and Admiralty, then it was politically naïve and represented a complete misreading of the likely public reaction.

Although the inadequacy of the available forces available was largely a consequence of strategic realities, the incoherence between the RAF and the RN, and between the RAF commands, was far less

excusable. This was partially structural, because of the organisation of the system of command, but was also a result of agency, particularly the personalities involved. The initial point of failure was the lack of an overall authority responsible for the execution of FULLER; as the Bucknill Report noted, this compromised any realistic prospect of the achievement of unity of purpose. This was compounded by the lack of trust and consequent lack of communication that existed between the commands. The demarcation of responsibilities between Coastal Command and the Navy had been an enduring source of friction and, while a Joint Headquarters was established later in the war and a high level of integration ultimately achieved, the issue was never completely resolved. Ironically, the release of the Bucknill Report in full, in 1946, was used as ammunition in another, post-war, inter-Service battle for control of land-based maritime air assets. The personalities involved were also unhelpful. While Ramsey was an outstanding naval commander, he was sceptical about the support that he could expect from the RAF. In 1940 he had commanded Operation DYNAMO, the Dunkirk evacuation, where he had been disappointed with the RAF's contribution. Although this assessment was incorrect and unfair,<sup>49</sup> it meant that he was predisposed to doubt the RAF's commitment to maritime operations. He was highly critical of the RAF in the aftermath of FULLER, particularly of the role of Leigh-Mallory and No 11 Group and he was especially bitter about having to order the Swordfish to attack without their full escort.<sup>50</sup> Inter-Service cooperation was also hindered by the character of the AOCinC Coastal Command, Air Marshal Sir Philip Joubert de la Ferté, who was unable to maintain the generally harmonious relationship with the Navy that had been established by his predecessor, Air Marshal Sir Frederick Bowhill.

However, the most toxic relationships existed not between the RAF and the RN, but between different RAF commands and commanders. Joubert and Leigh-Mallory were both 'career officers of the old-fashioned type'<sup>51</sup> and the tripartite participation of elements of Bomber, Coastal and Fighter Commands without the nomination of one as *primus inter pares* was extremely unhelpful. Each essentially represented the personal fiefdom of its commander and there was a marked reluctance to pool resources for a unified purpose. In the wake of FULLER – and the criticisms implicit in the Bucknill Report –

Joubert proposed, logically, that Coastal Command should take the lead in maritime operations involving units from the other commands. However, this was perceived as empire-building by Leigh-Mallory, who strongly resisted it. The No 11 Group AOC – described by a senior subordinate as ‘a pompous, ambitious fuddy-duddy’<sup>52</sup> – had already demonstrated during the Battle of Britain (as the AOC 12 Group) that he was hardly a team player. Now, he insisted on perpetuating the inadequate, three-pronged approach to joint maritime operations that had been adopted for FULLER. The Air Staff was not inclined to impose a solution, and it was not till Joubert was replaced by John Slessor that a satisfactory inter-command arrangement was eventually brokered that enabled subsequent operations to be successfully coordinated. The misplaced secrecy that so hindered air operations was also entirely symptomatic of the organisational preference to centralise control – at all costs – that pervaded the highest echelons of RAF command at this stage of the war.

Although Bomber Command had been the most reluctant participant in Operation FULLER, ultimately it made the greatest contribution to the favourable strategic situation that was finally achieved. It was the incessant bombing attacks – mounted from the date of the *Scharnhorst* and *Gneisenau*’s arrival in March 1941 to the very eve of their departure – that made Brest untenable for the German ships and precipitated the decision to withdraw them to Wilhelmshaven, thus simplifying the Royal Navy’s strategic dilemma by corralling the entire German fleet into a single location; and it was Bomber Command’s indirect air mining operations that inflicted the only significant damage of the operation on the German ships, immobilising them in the aftermath of the operation and negating them as an immediate threat.

In the final analysis, the ultimate failure of FULLER may be attributed to the British high command’s lack of agility; as foreseen by the Germans, after being surprised, the British were simply unable to regain their balance and seize the initiative, a point underscored by Ciliax himself in his post-action report:

*‘The British were surprised, which led ... to desultory and precipitate actions by their forces. During a period spanning one and a half hours after the first attack, no English aircraft*

*succeeded in reaching the Squadron due to our excellent fighter cover.*<sup>53</sup>

**Notes:**

- <sup>1</sup> Galland, Adolf; *The First and the Last* (London, Methuen, 3rd edn, 1973) p167.
- <sup>2</sup> Appropriately enough, as in Greek mythology, Cerberus was the three-headed dog that guarded the gate to Hades.
- <sup>3</sup> Potter, John Deane; *Fiasco: the break-out of the German Battleship* (London, Heinemann, 1970) p200.
- <sup>4</sup> Middlebrook, Martin and Everitt, Chris; *The Bomber Command War Diaries: An Operational Reference Book* (London, Penguin, 1985) p235.
- <sup>5</sup> Roskill, Stephen; *The War at Sea, 1939-45*, 3 vols (London, HMSO, 1954) Vol 1, p150.
- <sup>6</sup> Galland, *op cit*, p144.
- <sup>7</sup> Coram, Robert; *Boyd: The Fighter Pilot who Changed the Art of War* (New York, Little Brown and Company) p25. Boyd characterises the decision-cycle as the 'OODA loop', with the steps running from 'Observe', through 'Orient' and 'Decide' to 'Act'.
- <sup>8</sup> The British acronym for 'Enemy Boats', the German fast attack craft also and more correctly known as S-boats, for the German *Schnellbooten*.
- <sup>9</sup> TNA AIR 14/823 Operation 'Fuller', April 1941-October 1942. IHH/241/3/733 BC/S22200/22.
- <sup>10</sup> Kemp, Peter; *Escape of the Scharnhorst and Gneisenau* (London, Ian Allan, 1975) p26.
- <sup>11</sup> *Ibid.*
- <sup>12</sup> Thetford, Owen; *Aircraft of the Royal Air Force since 1918* (London, Putnam, 4th edn, 1968) p87.
- <sup>13</sup> Kemp, *op cit*, p26.
- <sup>14</sup> Middlebrook and Everitt, *op cit*, p238.
- <sup>15</sup> TNA AIR 16/403 'Fuller', April 1941-April 1942. AHB Reference and Fighter Command File Reference: IHH/240/4/149 FC/S24043.
- <sup>16</sup> Galland, *op cit*, p144.
- <sup>17</sup> *Ibid.*, p146.
- <sup>18</sup> *Ibid.*, p150.
- <sup>19</sup> *Ibid.*, p146.
- <sup>20</sup> Kemp, *op cit*, p35.
- <sup>21</sup> Robertson, Terence; *Channel Dash: The Drama of Twenty-four Hours of War* (London, Quality Book Club, 1958) p60.
- <sup>22</sup> Kemp, *op cit*, p60.
- <sup>23</sup> *The Channel Dash Association's* website at <http://www.channeldash.org/swordfish17.html> accessed 18 Aug 09.
- <sup>24</sup> Potter, *op cit*, p189.
- <sup>25</sup> Robertson, *op cit*, p147.
- <sup>26</sup> Potter, *op cit*, p116.
- <sup>27</sup> Robertson, *op cit*, p147.

- <sup>28</sup> *Ibid*, p141.
- <sup>29</sup> Robertson, *op cit*.
- <sup>30</sup> Potter, *op cit*, p139.
- <sup>31</sup> *Ibid*, p192.
- <sup>32</sup> Middlebrook and Everitt, *op cit*, p235.
- <sup>33</sup> Kemp, *op cit*, p71.
- <sup>34</sup> Potter, *op cit*, p143.
- <sup>35</sup> *Ibid*, p168.
- <sup>36</sup> *Ibid*, p146.
- <sup>37</sup> Roskill, *op cit*, p150.
- <sup>38</sup> *Ibid*, p159.
- <sup>39</sup> *Ibid*.
- <sup>40</sup> Robertson, *op cit*, p191.
- <sup>41</sup> *Ibid*, p170.
- <sup>42</sup> Churchill, Winston; *The Second World War, Vol 4, The Hinge of Fate* (London, The Educational Book Company, Chartwell Edn., 1951) p63.
- <sup>43</sup> Churchill, *op cit*, p90.
- <sup>44</sup> TNA ADM 116/4528 Escape of German battle cruisers *Gneisenau* and *Scharnhorst* and heavy cruiser *Prinz Eugen* up the Channel: Operation 'Fuller' and Board of Enquiry. 1941-1942.
- <sup>45</sup> Robertson, *op cit*.
- <sup>46</sup> Churchill, *op cit*, p90.
- <sup>47</sup> *Ibid*, p91.
- <sup>48</sup> Robertson, *op cit*, p190.
- <sup>49</sup> Roskill, *op cit*, p67.
- <sup>50</sup> Robertson, *op cit*, p188.
- <sup>51</sup> Potter, *op cit*, p192.
- <sup>52</sup> *Ibid*.
- <sup>53</sup> *Ibid*, p146.

***THE RIGHT OF THE LINE* by JOHN TERRAINE – A RE-ASSESSMENT 25 YEARS ON**

**by Dr John Peaty**

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As is now widely accepted among military historians, when it comes to our understanding of the British Army in WW I, if you will forgive the pun, Terraine altered the landscape.

For an historian of the British Army of WW I to write a history of the RAF in WW II might be considered brave or foolhardy. For an historian of the British Army in WW I to write what was regarded at the time and still is regarded as *the* history of the RAF in WW II is a phenomenal achievement.

In 1980 Lord Trenchard asked John to write a book about Bomber Command. John declined but after reflection decided to write a book about the RAF's overall contribution to victory. The book was published in 1985. It was widely praised by reviewers, who rightly termed it magisterial and monumental. It won the Yorkshire Post Book of the Year award. Twenty five years on, it is still the best single volume history of the RAF in WW II that we have.

I concur with Dr Gary Sheffield's appreciation of the book in his tribute to John in a RUSI Journal as follows:

‘Perhaps the most satisfying book is his study of the RAF in the Second World War, *The Right of the Line*. This book is regarded as the standard work, and gained something of a cult following among airmen. Solidly based on the RAF's in-house Staff Histories, which in turn were based on primary sources, this book is the work of a man who deeply admired the RAF. However, *The Right of the Line* lacked the emotional commitment of his work on the Western Front, and is better for it. Some saw this book as an attempt to carry on the debate on

Haig and the Western Front by other means, and Terraine made telling comparisons between the two world wars. Surprisingly, Terraine was critical of the area bombing campaign, although Haig's strategy had a similar logic to Harris's.<sup>1</sup>

The two main aims of the book are stated by John in his Forward (pp xi-xii). First, to show that the RAF found itself, without option, shouldering the burden of war when the Army was in eclipse and the RN strained to its limits: 'The place of honour and greatest danger...the vanguard, on the right of the line' (the significance of John's title was lost on his American publisher who retitled it *A Time for Greatness*). Second, to place both the war and the RAF's part in it firmly in the perspectives to which they truly belong – WW II being the last in a sequence of modern wars comprising the American Civil War (which prefigured 1942-43) and WW I (so many of whose lessons had to be painfully relearned in WW II)<sup>2</sup>.

It is a weighty book in every sense. Its 841 pages are stuffed full of facts and figures. Consequently, though full of penetrating insights and superb prose, it is not as good a read as his previous books. But I consider it his finest book.

The book could not be termed a work of startlingly original scholarship. It is however a remarkable work of synthesis. Unlike John's previous books, it is fully referenced: the references running to 88 pages.

It is heavily dependent on the Monographs and Narratives produced by the Air Historical Branch after the war. Even the title itself is taken, with acknowledgement, from J M Spaight's Monograph *The Expansion of the RAF*.<sup>3</sup> John was privileged in that he was able to study these in the AHB and not have to trek to the PRO. In his Forward (p xiv) he acknowledges his debts to these documents and to the staff of the AHB whilst proclaiming his independence, a claim

<sup>1</sup> RUSI Journal, April 2004, p74.

<sup>2</sup> The connection between the American Civil War and 1942-43 may not be clear from this extract, but the context explains that Terraine saw the American Civil War, WW I and WW II as a continuum of 'modern' war, ie conflicts that involved mass industrialisation, new technologies and large citizen armies, initially amateur but increasingly professional (as in 1942-43) and so on. **Ed**

<sup>3</sup> TNA AIR41/8.

which he fully substantiates in the book.

I first met John on 16 March 1987 when he gave a lecture on the RAF in WW II at only the second meeting of the RAF Historical Society. I am honoured that, like John, I was a founder member of the Society: my membership being the result of my father showing me the introductory letter in *The Telegraph*, in the days before I became – like John – a devoted reader.

That evening John was introduced by Air Mshl Sir Freddie Sowrey. I think Sir Freddie's introduction deserves quoting in full:

‘. . . an historian who is perhaps best known for his work on World War I and he needs little introduction to us. His volumes on that war stand four-square on their style and accuracy, and also on their judgement. His linking through to the last war, which I think appears between the lines of *The Right of the Line*, gives him a perspective on the use of air power which is invaluable to us. John Terraine could also perhaps be credited as the fertile soil on which this Society grew, because it was after his lecture at the RUSI [in 1985] that a straw poll was held to see whether there was likely to be support for a Society such as ours, when we knew that there was incipient response but nothing had been put practically to the test. He speaks to us tonight, not only as a historian, but as a patron and a member.’<sup>4</sup>

There are lots of things right with the book.

First and foremost, the detailed and sympathetic treatment of the Cinderella of the RAF during the war – Coastal Command. John mischievously titles one section ‘An Obstacle to Victory’, which is how Harris described Coastal Command. He is clearly fascinated by the anti-U Boat war and the rediscovery of techniques used in WW I, so much so that he went on to write a book (which turned out to be his last) specifically on the subject.

John carefully examined Lack of Moral Fibre (pp520-37) and got it right, unlike Max Hastings in his otherwise admirable *Bomber Command*. John had the advantage of using the Lawson Report held in AHB. In Bomber Command the LMF rate was less than 0.4% of aircrew and not the 10% of Hastings. Characteristically, John's

<sup>4</sup> RAFHS Proceedings No 2.



discussion of LMF takes place with reference to British Military Discipline during WW I, specifically the British Army's treatment of cowardice.

The book is full of references to WW I. For example, John compares the Battle of Berlin with Passchendaele (p552). I find the frequent mention of WW I both right and proper, believing with John that the First World War produced important lessons which were forgotten and had to be relearned the hard way in the Second. However, I also think that, to be frank, John was not averse to dishing his critics by using what happened in the Second World War as *ex post facto* justification of what had happened in the First.

There are lots of things wrong with the book.

First and foremost, as John's often forgotten sub-title (*The RAF in the European War*) warns us, is the omission of the RAF's war in the Far East. Air Commodore Henry Probert, the head of the AHB who provided great assistance to John and became a friend (writing a warm appreciation of John and the book for the Western Front Association in 1996), felt strongly about this and rectified the omission with his own excellent book on the RAF's enormous and ground-breaking contribution to victory in the Far East.<sup>5</sup>

Denis Richards, doyen of RAF historians, is often quoted by John. However, Denis disagreed with John over his view of the Smuts Report (John believed the RAF was created primarily to bomb the enemy rather than defend the UK against attack directly – Denis believed that both were of equal importance in the creation of the RAF) and of the Bomber Offensive (John believed it was inevitable and bravely done but area attacks were bad – Denis believed that John had neglected the achievements of the 18 month long Combined Bomber Offensive, which were considerable – such as tying down German resources at home, denying fuel to the *Luftwaffe*, thus hindering training, – and made D-Day possible).

Inevitably, in a work of such size, there are factual errors. My favourite appears on page 310. John has the great air power theorist Giulio Douhet instructing at the Italian Air Force War College on the outbreak of war with Italy in June 1940. A lovely thought but Douhet had been dead for 10 years! Perhaps John meant to say that Douhet's

<sup>5</sup> Probert, Henry; *The Forgotten Air Force* (Brassey's, London, 1995).

writings were being taught at the College? Anyhow, a palpable error missed by both John and AHB.

Many readers believe John's attitude to Harris and Bomber Command inconsistent with his attitude to Haig and the BEF. Many readers are surprised at John's criticism of the attritional strategy of Bomber Command, believing it to be a logical development of Haig's strategy. John did not care for attempts to compare Haig and his campaign with Harris and his campaign, as I can personally testify. After John's lecture to the RAFHS, I got to ask the last question. My question was provocative. John's reply was short and to the point. It was also very uncomplimentary about a famous historian. So much so that John's answer was edited for the published proceedings. My question was: 'Although he didn't mean it as a compliment, one historian who shall be nameless but whose initials are AJP, referred to Sir Arthur Harris as the Haig of the Second World War. Would you agree?' John's published answer was: 'Well, no I wouldn't. It's not a sensible comparison..... Sir Arthur Harris was engaged in a very long and very arduous and very important campaign but you could not say that he was engaging the main body of the Third Reich at any point, and Sir Douglas Haig was engaging the main body of the German Empire for 2 years between 1916 and 1918. It's a different ball game altogether.' John was of course absolutely correct in what he said but I think he had deflected the thrust of my question.

Inevitably, after the passage of 25 years, the book has a somewhat dated feel.

While John addresses the 'D word' (Dresden), he does not address the 'A word' (Auschwitz). As we all know, sadly, for many people today – not all of them young – these two words just about sum up their knowledge of WW II.

The AHB Monographs and Narratives – John's main sources – have dated: hardly surprising given the long passage of time since they were researched and written.

The book appeared before the Official Histories of Intelligence and of the War in the Mediterranean had been completed.

Ironically, given John's justified criticism of most books about the British Army in WW I, the Germans, while present, do not figure prominently in the book. Moreover, we know a great deal more today about the Germans during the war than we knew 25 years ago.

Thanks to the work of the RAFHS he helped to found, not least the annual symposia held at the RAF Staff College at Bracknell, we now know a lot more about every aspect of the RAF during the war. For instance, the crucially important subject of training, which was neglected by John.

John was a great admirer of Tedder, writes of his undoubted greatness (p686) and accepts the Tedder version of Normandy. Personally, I have always thought Tedder the RAF's equivalent of Monty and Dickie.

John's account of Normandy is very anti-Monty and he blames Monty entirely for the breakdown in army/air relations. It is also heavily reliant on D'Este's book,<sup>6</sup> which has been overtaken by recent scholarship.

John was not a fan of Portal, who 'does not warm the heart' (p684), a strange criticism coming from the great defender of a man not noted for his warmth. He was critical of Portal's opposition to long-range fighters and, when challenged on this point prior to publication, added an appendix detailing his criticisms.

Recent scholarship argues that the Bomber Offensive did more damage to the German war effort than was generally believed when John wrote.

John is very sympathetic to the problems faced by the RAF, very appreciative of its efforts and very praiseworthy of its achievements.

However, to his credit, John is at times very critical and does not pull his punches. For example, near the beginning of the book he declares: 'Logic was never a strong suit of the RAF' (p4).

Some of his most trenchant criticisms are directed at the Bomber Offensive. He regards the attacks on German cities to destroy civilian morale and munitions production as misconceived and ineffective. As for the morality of such attacks, his position is not so clear-cut. He entitled a section on Portal's plan to escalate the offensive in autumn 1942 'Prescription for Massacre' (pp503-11). He wrote: '...what can one say of Portal's statement of future intent? What is one to think of the calm proposal, set down in a quiet office, to kill 900,000 civilians, and seriously injure a million more? One thing emerges with absolute clarity: this was a prescription for massacre, nothing more nor less.

<sup>6</sup> D'Este, Carlo; *Decision in Normandy* (Collins, London, 1983).

Here is the proof that the attack on morale did, indeed, spell the threat or the reality of blowing men, women and children to bits' (p507). He called area bombing 'a most displeasing spectacle' (p683). Yet John twice quoted, with approval, Noble Frankland's robust defence of the morality of bombing in 1940-41 expressed in his 1961 RUSI lecture. Was John being consistent? Frankland did not think so. After the book was published, they engaged in a debate in the letters page of the TLS.

Although it has not (so far as I am aware) been commented on by any reviewer, a close reading of the text reveals that threaded throughout the book is a damning critique of the quantity and quality of manpower devoted to the air effort during the war, at the expense of the ground effort. I think John is so critical because of the WW I perspective that he brings to the subject. Anyhow, I think it might be of interest and value to examine and explore John's critique.

John sets out as he means to go on in his Foreword. After discussing WW I, he writes:

'... having raised and maintained a mass army for the first time in their history by splendid and heroic efforts, the British then recoiled from the whole feat with disastrous results when war loomed again. The RAF profited from this recoil by presenting itself as an alternative to mass warfare. How amazed its founders and its champions must have been when they saw the mass air force of nearly one and a quarter million men and women which the war brought forth! 1939-45 was the time of vast air fleets, the big aircraft with large specialised crews, and the host of people on the ground required to direct and service them. The 1939-45 RAF was not, in other words, by any means the air force that it had expected to be.' (p xii)

During the war Army/RAF relations were considerably damaged by the increasing dependence of the Army on air support. John quotes the critical comments of Tedder (p645). This dependence reflected 'the growing reluctance of British infantry to accept casualties' (p592), which in turn reflected 'a progressive dilution of the Army's front-line elements, arising out of a widespread misinterpretation of the nature of the war, and a consequently flawed manpower policy' (p578). The reluctance to accept casualties was vividly demonstrated at Cassino and in Normandy. With regard to Cassino, John quotes the

critical comments of Slessor and Bidwell (pp592-3). With regard to Normandy, John quotes the critical comments of among others Horrocks, Essame and Montgomery and concludes that the infantry was deficient in both offensive spirit and morale (pp640-1). John believes that the situation was in part caused, and in part compounded by, a lack of good quality personnel.

The infantry was at the 'bottom' of a long list of priorities for manpower. The RAF was 'top...without doubt. Not only did it hive off the equivalent of two divisions against its future needs...but the general quality of its intake, skilled, educated and self-reliant, was precisely what was now lacking in the infantry' (p641). Not only was the quality of the RAF's aircrew high but so also was the quality of its groundcrew. 'The technical character of the service...meant that for most of its groundcrew duties it had to seek and select men of a different type from those suitable for the needs of the Navy or the Army at that time – a type implicit in the very use of the words "trades" and "tradesmen". These were men with skills, and implicit in that was a generally higher level of education than one would normally expect to find in the mass of sailors and soldiers' (p5).

Among Britain's leaders there was a reluctance – even refusal – to acknowledge the need for a mass army and to concentrate manpower where it was most needed: the Army. John quotes some of Churchill's private remarks and public speeches dismissing the need for a mass army, including the broadcast of 9 February 1941 in which Churchill said that 'this is not a war of vast armies' (p604). Huge manpower resources were devoted to the RAF instead. Subsequent transfers from the RAF to the Army were both belated and insufficient (pp603-5).

There is no doubt that huge manpower resources were devoted to the RAF. The inter-war theorists of air power (including Trenchard in Britain) had made much of its economical attributes. Yet John calculates that the RAF and Ministry of Aircraft Production absorbed over 37% of fixed capital expenditure (ie government expenditure on installations, accommodation, production plant, etc) during the rearmament and wartime periods, ie the third service consumed over a third of resources: 'no economy there' John rightly says (p602). At the end of 1942, even after a substantial cut in their demands had been made, the RAF and MAP were still allotted half of the manpower allocated to the Forces and Munitions. John quotes (p603) the Official

Historian Postan,<sup>7</sup> who writes: ‘the combined allocation of MAP and the RAF, at 750,000, was still as great as that of the Navy, the ship-building industry, the Army and the Ministry of Supply put together, while the allocation of MAP, at 503,000, was nearly 75% of the combined quotas of the Ministry of Supply and the Admiralty.’

John devotes an appendix (A Mass Air Force) to the enormous growth in RAF personnel during the war. Starting with a strength of 175,692, the RAF grew almost seven-fold to reach a peak strength of 1,185,833 on 1 July 1944. It is pertinent to note – and an indictment of British manpower planning – that the RAF reached its greatest strength three and a half weeks after D-Day, when the Army was starting to suffer heavy infantry casualties and beginning to run short of infantry reinforcements.

There is no doubt that during the war, and especially during the second half, the British Army exhibited a growing reluctance to continue attacks and incur heavy casualties: a reluctance commented on unfavourably by airmen at the time. One thinks particularly of the reluctance of Freyberg at Cassino and Montgomery at Caen and the criticisms of Slessor and Tedder respectively. One of the reasons for the growing reluctance, a more pressing reason than the shadow of the Somme and Passchendaele (although, as John shows, the shadow certainly existed), was an awareness of ‘a mounting difficulty in obtaining adequate replacements and reinforcements’ (p603). One of the main reasons for the mounting difficulty was the quantity and quality of manpower devoted to the RAF instead of to the Army. Put simply, the RAF criticised the Army for its shortcomings, yet those shortcomings were in large part caused by the RAF.

As John rightly says, the impressive RAF manpower figures reflected ‘a fault in British manpower policy, reflecting a fault in the national war-making disposition’ (p603). Too many manpower resources had been put into the RAF at the expense of the Army. Britain’s leaders – Churchill above all – mistakenly thought that air power provided a short-cut to victory: a means of avoiding having to raise a mass army, engaging in continental land operations and incurring massive casualties. John believes that

<sup>7</sup> Postan, M M; *British War Production* (HMSO, London, 1952).

‘...a persisting inclination to deploy men anywhere but in the arm which always bore the brunt of casualties – the infantry – ensured that the Army’s strength on the battlefield remained low, though its total numbers were high. By 1943, it was becoming clear that though the level of British mobilisation for war was unmatched and unprecedented, it was by no means discreet. Production targets – above all, aircraft production – had been set for which Britain’s population was simply unable to provide a sufficient workforce, and actually *fight* the war at the same time. There was, in other words, an acute manpower crisis.’ (p604)

John is correct. By the autumn of 1943 Britain’s manpower had been fully mobilised for the war effort: it was not capable of further expansion, only of redistribution. As the events of 1944-45 were to prove, too much manpower had been devoted to Munitions – especially MAP – and not enough to the Armed Forces; and within the Armed Forces, too much manpower had been devoted to the RAF and not enough to the Army. John is also correct that, within the Army, too much manpower had been devoted to the supporting corps and special forces and not enough to the infantry (pp641-2). John’s singling out of Churchill is also correct. It is clear that Churchill must bear the primary responsibility for the Army’s manpower crisis. He was opposed to the creation of a mass army and to continental land operations. He was the leading advocate of the Bomber Offensive. He was the leading advocate of special forces, which seriously diluted the infantry. Yet at the same time he was vigorously opposed to the expansion of the supporting corps at the expense of the infantry. However, given the low manpower priority awarded to the Army by Churchill for much of the war, considerable dilution of the infantry was inevitable. Being an infantryman is an extremely demanding job and only a relatively small proportion of men are equal to its physical and mental demands.

John correctly believes that the manpower crisis was exacerbated by the RAF’s hoarding of manpower. Such a criticism was made in spring 1944 by Sinclair, the Secretary of State for Air, no less. John quotes (p604) Sinclair’s letter in which he criticises the fact that there were 2,000 aircrew unemployed (a figure that was increasing by 200 a

month) and the fact that there were the equivalent of two divisions on the deferred list (ie awaiting training as aircrew). As John pertinently notes, within six months of D-Day the Army had to disband two divisions in NW Europe through the lack of reinforcements. Because of the demands of the NW Europe campaign, RAF manpower was cut back in the period 1944-45. In May 1944 2,000 men were transferred to the Army (1,500 RAF Regiment and 500 tradesmen). These went to the Guards. Only a third were volunteers; the majority had to be compelled. In July the RAF was ordered to transfer another 20,000 (of whom only half were actually transferred by June 1945). Officially, the reluctance to volunteer was because of: an unwillingness to leave chosen service; dismay at the prospect of retraining; loss of opportunity to use trade experience; anxiety regarding relative rates of release. John perceptively adds another reason: fear of going to the infantry where the chance of becoming a casualty was greatest. Transfers of men from the RAF to the Army were fine in theory. But in practice fewer men were transferred than promised, of lower quality than promised and more slowly than promised. As John rightly says: ‘Incorrect long-term policies are not cured by last-minute patch-work’ (p605).

Harris claimed that bombing ‘saved the flower of the youth of this country and of our allies from being mown down by the military in the field, as it was in Flanders in the war of 1914-1918.’ John calls this argument ‘specious’, making the point that the British Army did very little heavy fighting in the middle of WW II, unlike in WW I. He continues: ‘In no way did bombing save the flower of youth; on the contrary, it only ensured that the concentration of casualties would be in that section of the population – usually referred to as the “natural leaders” – which could least be spared. The truth is that in every war *somebody* has to deal with the enemy’s main body; in the Second World War it was the Russians’ (pp548-9).

In his Conclusion John deals with the melancholy subject of casualties. The majority of the RAF’s losses comprised the 55,573 aircrew lost by Bomber Command. For John this figure:

‘has special significance; in the First World War the officer losses of the British Empire included 38,834 killed, and this slaughter of the nation’s *elite* was widely regarded as the most



tragic and damaging aspect of that war. It was to avoid such a thing ever happening again that Britain turned her back on a Continental policy, and looked to the Air Force rather than the Army for salvation. Yet, as stated earlier, by and large RAF aircrew were exactly the same type of men as the officers of 1914-18; it is salutary to see how the pursuit of a “cheaper” policy brought in its train only a much higher cost.’ (p682)

To conclude this piece I can do no better than to quote and endorse John’s eloquent and moving tribute at the end of his book:

‘And what of the aircrew, the flyers, the ones who left their burnt bones scattered over all of Europe? In those young men we may discern the many faces of courage, the constitution of heroes: in lonely cockpits at dizzy altitudes, quartering the treacherous and limitless sea, searching the Desert’s hostile glare, brushing the peaks of high mountains, in the ferocity of low-level attack or the long, tense haul of a bombing mission, in fog, in deadly cold, in storm...on fire...in a prison camp...in a skin-grafting hospital...My title shows what I think of them: there is no prouder place, none deserving more honour, than the right of the line.’ (p686).

## ARTHUR TEDDER – AIR POWER MAESTRO

### Gp Capt Andrew Thomas

*'Air power is the most difficult of military force to measure or even to express in precise terms.'*

Winston Churchill

Churchill's opinion notwithstanding, air power came properly of age in World War II. By the end of the conflict it was the predominant means of delivering military force, either tactically in support of land and maritime operations, or strategically in the form both of mass and precision raids against high value targets.

It had not always been so. Though military air power had grown rapidly during the Great War, it was seen primarily as an adjunct to more traditional forms of military operations. It took the perceived failures of the Army and Navy Air Arms to counter the threat posed by the German Gotha bomber raids on London in 1917 to bring about the creation of the world's first independent air service. The Royal Air Force was formed in April 1918 by the amalgamation of the Royal Flying Corps and the Royal Naval Air Service, but the war ended before the new Service could properly develop its own concept of operations. However, the basic air power characteristics of speed, reach and flexibility had been established, if not fully exploited. The coming of peace did not bring inter-Service harmony or cooperation. The RAF's 'parent' Services spent the immediate post-war years desperately trying to dismantle it and return its constituent parts to their own control. And even when these attempts failed and the RAF secured its future and achieved a degree of toleration by the Army and Navy, arguments for and against military air power continued to bedevil a defence planning process already crippled by the severe economic conditions of the 1920s and early 1930s. One pernicious effect of the inter-service bickering and lack of resources had led the RAF to concentrate its doctrinal effort on the strategic use of air power, at the expense of cooperation with naval and particularly land forces. Lord Trenchard, the 'father' of the RAF and its early chief, was an early and vociferous exponent of strategic bombing (though not of direct attacks on civilian populations); he had studied the effects of British bombing attacks on towns in Germany in the Great War and estimated that the psychological damage wrought was twenty times

greater than the material. This chimed with the public's own fears, fed by works such as H G Wells' prophetic *The War in the Air* (and later by *The Shape of Things to Come*). Moreover, Prime Minister Baldwin had set the seal on the bomber threat when he had warned the country in 1932 that 'the bomber will always get through'.

Thus, when re-armament started in earnest in 1934, the initial RAF focus of effort was on the building-up of offensive capability. Air defence was considered technically very difficult and deterrence, by threatening retaliatory bombing, was the accepted doctrine. However, technical advances, particularly the development of radar, radio-telephony and the high-performance monoplane fighter, soon made the provision of effective air defence more viable (aided by the Treasury's realisation that fighters were much cheaper than bombers in terms of aircraft and personnel costs). The result was the creation of the world's first integrated air defence system, a system that, when directed with great skill by its commanders, was to win the Battle of Britain in 1940.

But the build-up of a long-range bomber fleet still remained a very high priority, despite the fact that the claims of the air power theorists for supposed 'strategic' bombing could not be achieved using the available contemporary or near-term technology. Aircraft performance was relatively poor, bomb loads were small, navigation equipment was rudimentary and so the ability to prosecute a true strategic campaign would have to wait until 1942/43, when improvements in technology had overcome the earlier deficiencies. However, the concentration on strategic air power meant that resources for other types of military aviation were severely restricted, though the naval problem was partially redressed in 1937 when the Navy got control of carrier-based air assets through the separation of the Fleet Air Arm, complemented by the maritime patrol aircraft of RAF Coastal Command. Unfortunately, support for the Army had still not been properly addressed when the country found itself at war with Germany in 1939. Many airmen believed (perhaps as a legacy of earlier disputes) that the close support of ground troops was a misuse of the air force which should be engaged against more distant targets and that such support was the business of the artillery. As a result, the so-called 'Army Co-operation' squadrons concentrated on reconnaissance, artillery spotting, communication, and liaison duties.



*Major Arthur Tedder as OC 70 Sqn at Boisdinghem circa 1917. (RAFM PC98/113/13)*

This failure to provide close air support was to be starkly exposed by the German *Blitzkrieg* in France in May and June 1940.

It is against this background that Arthur Tedder rose to high command.

The son of a senior civil servant, Arthur Tedder went up to Magdalene in 1909 from Whitgift School in Croydon to read History. He led the life of a typical undergraduate of his day; he was reasonably assiduous in his studies, enjoyed his rowing and his social life, and was perceived to possess a slightly sarcastic sense of humour. His biographer, Vincent Orange, reckoned that by the end of his Magdalene years, Tedder was an ‘amiable chap with many interests but few achievements’. However, it is worth recording in the light of his subsequent career that he was thought intellectually-gifted enough to become the College’s first research student in History and indeed he won the Prince Consort Prize in 1913 for his dissertation on the Restoration Navy. Like many young men of his era, he had joined the TA whilst at Cambridge and when the outbreak of war in 1914 found him serving with the Colonial Service in Fiji, he resigned and hurried home to join his Regiment (the Dorsets). However, a serious knee injury precluded him from front-line infantry duties and he transferred to the RFC in 1916 and trained as a pilot. He flew scouts (fighters) on the Western Front, before transferring to the Middle East in 1917. Successively a Flight Squadron then Wing Commander, Tedder had developed into an experienced leader and organiser and, through his command of the post-graduate 38th Training Wing in Egypt (which embraced Schools of Aerial Gunnery, of Aerial Fighting, of Artillery Observation and of Navigation and Bomb Dropping), he was admirably attuned to the technical requirements of his profession. He may not have ended the

war with the gallantry decorations of some of his contemporaries, but he was well versed in the requirements for command.

During the locust years of the 1920s, when what had been the world's largest air force was reduced to little more than an airborne colonial gendarmerie, Tedder rose steadily up the ranks of his Service, alternating operational command with training and staff appointments. After commanding a brace of bomber squadrons, and having been briefly deployed to Turkey in 1922/23 during the Chanak Crisis, Tedder served in a series of relatively unglamorous posts, but ones that called for real intellectual grasp. He attended both the RN Staff College and the Imperial Defence College, and then served on the staff at the Directorate of Training, the RAF Staff College and as Officer Commanding at the Air Armament School. By now a group captain, he became Director of Training in 1934, a vital role in an organisation that was evolving from being 'the best flying club in the world' into a potent modern air force, training and equipping to match the growing strength of Germany. On promotion to air commodore in 1936, he was appointed Air Officer Commanding RAF Far East which gave him command over all air force units from Burma to Hong Kong via Malaya, Singapore and Borneo, and in 1938 he returned to the UK as an air vice-marshal to become Director General of Research & Development (R&D) in the Air Ministry under Air Chief Marshal Sir Wilfrid Freeman, who had overall responsibility for Research, Development and Production. Freeman was one of the lesser known heroes of the RAF and his great task (and accomplishment) had been to harmonise the Service's need for first-class technical equipment with the capabilities of the aircraft industry; and he specifically requested that Tedder should become his principal lieutenant.

Tedder did not bring the technical skills of the engineer or logistician to R&D, but he had other vital strengths. He understood operations, he understood training, he understood the myriad facets of air armaments and he understood how to be an effective commander. In a period of extremely rapid technological change, he forged close links with the aircraft industry and with the operational users of their products. New designs and new concepts flowed regularly from the aircraft makers as they tried to satisfy the RAF's varied requirements and in many ways Tedder's job was to pick winners from a very mixed field. For example, he was an early champion of jet propulsion

(then in its infancy) and, more importantly for the outcome of the war, was a strong supporter, with Freeman, of the Mosquito project that produced the finest light bomber and night-fighter of its era. He strove to ensure that quantity was not achieved at the expense of quality. However, this approach was to run counter to that taken by Lord Beaverbrook, who was appointed by Churchill as Minister for Aircraft Production in May 1940. A hard-driving press magnate with little aviation knowledge, Beaverbrook sought above all else to maximise production. Whilst this had undoubted short-term advantages, particularly with regard to the provision of fighters for the Battle of Britain, it had baleful medium and long-term effects. Inadequate and obsolescent aircraft were produced in large numbers for far too long and too many airmen were to pay the price of this approach in the first few years of the war. Beaverbrook's regime produced other casualties, including Freeman and Tedder. The former moved on to be Vice-Chief of the Air Staff whilst Tedder, despite blocking attempts by Beaverbrook and a lack of enthusiasm by Churchill, returned to Cairo in December 1940 as the Deputy AOCinC of the Middle East Air Command, a vast area stretching from Egypt and the Levant to Iraq and the Persian Gulf in the east, to the Sudan and Kenya in the south and north to Greece and the Balkans. Succeeding to full command in June 1941, he found himself in charge of all air forces in what was to be, for the next 2-3 years at least, the pivotal theatre of British operations against Germany.

It was as though his entire career had prepared him for this exacting challenge. He had wide experience of the operational command of units large and small, as well as of training and research, areas that were particularly important in a Service where the ability to exploit technology was (and still is) paramount and where, despite popular myth, no amount of press-on spirit can compensate for technical and training deficiencies. An overseas command in the 1940s was in effect a complete air force. In contrast with the UK-based functional commands – Fighter, Bomber, Coastal etc – RAF Middle East (RAFME) comprised fighter, bomber, reconnaissance and maritime units, supported by organic maintenance and training organisations. Roles ranged from the tactical to the strategic. However, when Tedder arrived, the Command's equipment, which had been just good enough to deal with the Italian forces, was

woefully inadequate for the trials to come. For a few months the RAF forces enjoyed success against the *Regia Aeronautica*, but this happy state of affairs came to an abrupt end when the Germans invaded Greece in April 1941 and many squadrons were siphoned off in the ill-fated attempt to save Greece, culminating in the debacle of Crete in May 1941. With British forces trying desperately to protect Egypt from Rommel's newly arrived *Afrika Korps*, and with the Mediterranean, apart from Malta, under complete Axis control, the auguries were not good. Re-supply was very problematic and most aircraft arrived by way of the arduous 'Takoradi Route', a gruelling 4,000 mile ferry flight from the Gold Coast via Nigeria, French-Equatorial Africa, Sudan and so up to Cairo. Add to this a marked reluctance by the Government and Air Ministry to release the latest aircraft (the first Spitfire did not arrive until 1942), which condemned RAFME to operate second-line equipment for much of its life. The magnitude of the problems facing Tedder as the newly installed AOCinC are not difficult to appreciate.

However, the realities of the German presence in North Africa did serve to focus attention within Tedder's sprawling command, and whilst there were distractions to contend with, such as the defeat of the Vichy French in Syria and the suppression of Rashid Ali's revolt in Iraq, major operations were directed against the threat posed by Rommel to Egypt. Tedder had a multi-faceted set of problems. Perhaps more aware than his Army and Navy colleagues, Tedder realised the nature of the war about to be fought. On assuming command, he stated that: 'In my opinion, sea, land and air operations in the Middle East Theatre are now so closely inter-related that effective coordination will only be possible if the campaign is considered and controlled as a combined operation in the full sense of that term.' He needed to prosecute the air war against the better-equipped *Luftwaffe*, he had to provide air support to the army and carry out maritime operations on behalf of the Navy. The latter task initially caused him some concerns. Naval commanders demanded dedicated squadrons for the maritime role, but Tedder was adamant that this ran against his cherished principle of flexibility; an aircraft supporting the fleet one day could be bombing enemy airfields or troop concentrations the next. He held that the key to the effective use of air power was the correct prioritisation of the various threats and

that, once that had been achieved, the allocation of air resources to targets was the responsibility of the air commander.

It was now that Tedder began to show his true greatness as a senior commander. He recognised the overriding requirement to convince the Army and Navy that the RAF could and would provide the air support they needed, whilst at the same time preserving his core belief that air power had to be exercised by professional airmen. The success he achieved in squaring this particular circle was the mark of the man.

The problems with Navy were ameliorated by the allocation of aircraft 'primarily' (though not solely) for naval support and, most importantly, under RAF control. But it was in his relations with the Army that Tedder showed his true talent. He convinced the generals that the key to proper support was air superiority, to be measured not in terms of allied aircraft overhead, but in the inability of enemy air forces to interfere with friendly operations. Air superiority was not to be gained by standing patrols (very wasteful in assets), but in an aggressive counter-air campaign against airfields, logistics and of course the enemy in the air. Under Tedder's direction, the HQ of the Desert Air Force (the formation tasked with operations in the western desert) was co-located with that of 8th Army, allowing their commanders to establish a close and effective working relationship. Tedder himself was already working alongside his Army counterpart in Cairo. Planning of operations became a joint affair, but with the important proviso that the actual conduct of the air war in support of the agreed plan was under RAF control. New tactics were introduced, like the 'Tedder Carpet', which involved successive waves of bombers providing a rolling barrage of bombs ahead of advancing friendly forces. Mobility was greatly improved, so that whole squadrons could leap-frog forward to captured airfields to ensure the pace of any advance was maintained.

Tedder was keen to get first-hand knowledge of the operations he commanded; he had an easy way with the operational crews and would often visit forward bases and, sitting cross-legged in the sand amongst the crews, would seek the views of the men at the sharp end. He also re-organised and re-energised the maintenance and administrative organisations, realising that these were as vital to successful air campaigns as pilots and aircraft. Dynamic leaders were installed in these areas and Tedder determined that the RAF would not



succumb to the rear base mentality that pervaded the staff in Cairo. Montgomery was to have a similar catalysing effect on the 8th Army.

The land war continued to sway back and forth, with Rommel's mercurial genius severely testing the Army's tactics, morale and leadership. However, the air forces increasingly got the measure of the enemy and operational success followed, fitfully at first, then with increasing assurance. Tedder's forces maintained an aggressive offensive approach and as a result, first local then theatre-wide air superiority was established, despite the handicap of often inferior equipment. Rommel's lines of communication were interdicted, his *Panzers* and transport assets were attacked, his fuel supplies were decimated and his troops learnt that they would have to fight with the air increasingly dominated by the RAF. Tedder's judicious employment of air power compensated for deficiencies elsewhere, particularly during the pivotal battle of Alam el Halfa that finally stopped the *Afrika Korps*' final thrust towards the Nile Delta in September 1942. Rommel himself attributed his defeat here to the great superiority of his opponents in the air '...non-stop and very heavy air attacks by the RAF, whose command of the air had been virtually complete, had pinned my army to the ground and rendered any smooth deployment or any advance by time-schedule completely impossible.' And he was acutely aware that his forces would be at the mercy of allied aircraft for the rest of the campaign.

The scene was set for the British victory at El Alamein in October/November 1942. Fighter aircraft of the Desert Air Force had maintained constant air patrols over enemy airfields after a four-day bombing campaign had destroyed most of the opposing air forces. Supported by overwhelming air power, the Allied forces wore down the German/Italian forces and by early November had broken through in pursuit of a rapidly retreating enemy. Montgomery was swift to acknowledge the crucial role played by Tedder's air forces: 'The moral effect of air action on the enemy is very great and out of all proportion to the material damage inflicted. In the reverse direction, the sight and sound of our own air forces operating against the enemy have an equally satisfactory effect on our own troops. A combination of the two has a profound influence on the most important single factor in war – morale.' Moreover, he had also grasped what was perhaps the central tenet of Tedder's philosophy on the use of air



*The Cover of Time for 9 November 1942 was a clear indication that Tedder's expertise and influence was now recognised internationally.*

US Army Air Forces struggled to provide effective air support, a situation that was resolved by the decision taken at the Casablanca meeting of Churchill and Roosevelt and their staffs in January 1943 to appoint Tedder as the Air Commander for the whole Mediterranean theatre, commanding all the RAF and USAAF units and standardising operating procedures. Tedder had by now codified his approach in his 'Ten Inviolable Rules of Air Power'. He stressed, *inter alia*, that air power must be independent of land and sea forces, that the Air and Army HQs must be adjacent to each other and located as far forward as possible, that a simplified chain of command was essential for speedy response and that intelligence and mobility were of paramount importance. These principles became the fundamentals upon which Allied tactical air policy would be based, and they were incorporated into the training and doctrine of both the RAF and USAAF tactical air forces ('Tactical Air Force' was now the agreed term for air forces

power; he wrote that: 'Air power is indivisible. If you split it up into compartments, you merely pull it to pieces and destroy its greatest asset, its flexibility.' His observation that 'I don't suppose any army has ever been supported by such a magnificent air striking force' stands as a fitting epitaph to the Desert Air Force.

The whole geo-strategic picture of the war had been altered by the entry of the USA in December 1941. Understandably pre-occupied initially by the Pacific, the American forces entered the European theatre in November 1942 with the TORCH landings in Algeria and Morocco. Initially, the



*Left, Sir Arthur Tedder as CinC Mediterranean Allied Air Forces in Italy, December 1943 and, right, with Eisenhower in England in February 1944 as Air CinC and Deputy Supreme Allied Commander, SHAEF. Note the trademark pipe in both pictures.*

acting in support of the Army) and laid the foundations for the successes of Allied tactical air power until the end of the war.

Tedder was to remain in command of the Allied Air Forces throughout the rest of the Desert Campaign and the invasions of Sicily and Italy, where allied tactical air power continued to dominate the battle area, before returning to London in January 1944 to become, at Eisenhower's request, the Deputy Supreme Commander of the forces being assembled for Operation OVERLORD, the invasion of France. During his time in command in North Africa he had established very close relations with Eisenhower and the leading US airmen, all of whom had a high regard both for his professional acumen and for his cooperative approach. He was one of only a few British commanders with whom the Americans felt entirely comfortable. In contrast, throughout much of his career he had to contend with the often at best lukewarm support from Churchill. Perhaps Beaverbrook's earlier reservations had influenced Churchill or maybe Tedder's rather sharp sense of humour and a perceived (by some) degree of arrogance was held against him; moreover, he was not one of those officers who allowed themselves to be dazzled by Churchill. Whatever the reason,

he was never a Churchill favourite and his selection as Eisenhower's deputy speaks volumes for his abilities; he won his position on merit alone.

His new role brought him into close contact with Sir Trafford Leigh Mallory, who was the Allied Air Commander for OVERLORD. Leigh-Mallory was a somewhat less flexible character than Tedder and he was not able to establish particularly close relations with the Americans. As a result, much of the air planning for D-Day and the Normandy battles was overseen by Tedder. In particular, Tedder devised the 'Transportation Plan', which utilised the RAF and USAAF strategic bomber fleets in a tactical role to strike at German lines of communication, effectively isolating the Normandy battlefield, and severely disrupting the Germans' ability to move troops and materiel. In formulating this plan, Tedder had to overcome Churchill's understandable concerns about the likely level of French civilian casualties, and the opposition of the 'Bomber Barons', Harris and Spaatz, to what they saw as the diversion of their commands from their primary roles in the offensive against German industry. In the event, the transportation campaign proved extremely effective, and even Harris later acknowledged that it had been a highly appropriate and effective use of his assets.

After D-Day, the slow progress made by Montgomery in securing his objectives around Caen led to real friction between the erstwhile colleagues. Tedder was concerned at the failure to secure sufficient ground to allow the planned establishment of airfields for the forward deployment of tactical squadrons (so vital to the support of the ground forces) and believed that the situation was sufficiently serious to warrant Montgomery's replacement by a more dynamic ground commander. The crisis eventually eased when the US Armies broke out of the Normandy bridgehead at the end of July, but relations between Montgomery and Tedder (and the Americans) never fully recovered. With almost total air supremacy, the advance through France gathered pace, and the decisive contribution of the Allied tactical air forces to the destruction of the German armies in the Falaise Gap was testament to all that Tedder had preached about the role of air power in support of ground forces. If it is true that, as the senior Air Ministry official Sir Maurice Dean averred 'between 1919 and 1939, the RAF forgot how to support the Army', it is equally true



*Berlin, 8 May 1945. General Zhukov reading the terms of the German capitulation with Sir Arthur Tedder on his right.*

that under Tedder's guidance, it had brought tactical support to an acme of effectiveness. Many German commanders were later to attest to the decisive role played by the tactical air forces in their final defeat in the West.

As the European war moved towards its conclusion (and despite a last attempt by Churchill to replace him in November 1944 with one of his favourites, Alexander) Tedder found himself playing an increasingly political role. In January 1945 he led a mission to Moscow to discuss with Stalin how the final operations might be co-ordinated between the Western and Eastern Allies. And as the war finally drew to a close, it was Air Chief Marshal Sir Arthur Tedder who, on Eisenhower's behalf, and together with the Russian General Zhukov, accepted the surrender of Germany from Field Marshal Keitel on 8 May 1945.

Tedder's war was over. He had played a pivotal role in developing air power doctrine and tactics, which he had successfully put into practice, resulting in the formation of the tactical air forces that had dominated the final years of the European war. This was no mean achievement, for as Montgomery was to observe: 'if we lose the war in the air, we lose the war and we lose it quickly'. And Tedder was one of the crucial players within the Anglo-American military coalition, with the vision to see the bigger picture irrespective of

service or country; some observers saw him as the linchpin of the Allied high command in Europe between 1943 and 1945. But his achievements were not without personal cost. His eldest son Richard had been killed in action flying a bomber over France in August 1940, and in January 1943, he was a horrified observer beside the wreckage of his wife's aircraft, which had crashed while trying to land near Cairo, killing all on board.

Wreathed in honours and glory, Tedder was promoted to 5-star rank in September 1945 and in January 1946 he was created Baron Tedder of Glenguin and became the Chief of the Air Staff. Retaining his strong links with Cambridge, he was elected Chancellor of the University in 1950. The 'amiable chap with many interests but few achievements' had become one of the outstanding men of his time.

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## THE WIRELESS OPERATOR IN WW II

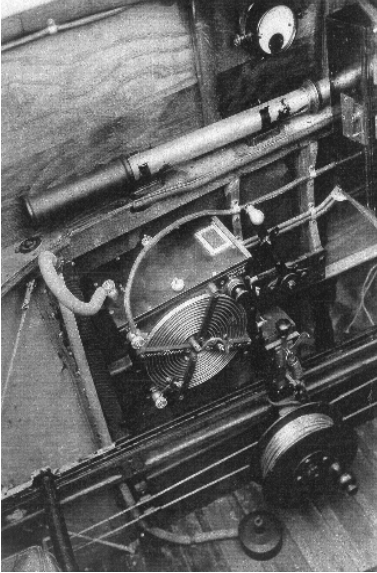
by Wg Cdr Jeff Jefford

Advances in aviation technology, and the changes in tactics and techniques that they brought about, had a significant impact on the role of the wartime wireless operator. These developments aside, however, he was always the member of a crew who was responsible for communications and, regardless of whatever else he was required to do, the bedrock of his trade was his ability to send and receive Morse. Before attempting to summarise the evolutionary process that transformed the pre-war wireless operator into the post-war signaller, it is worth making two points. First, although one tends to regard the wireless operator as aircrew, this was not the case until the end of the 1930s. That is not to say that pre-war wireless operators did not fly. Many did, but only on a voluntary, part-time basis. Until 1939 all pre-war wireless operators and wireless operator mechanics were ground tradesmen who flew only incidentally. Secondly, the waters are muddied further by that fact that once (some) wireless operators had been formally acknowledged as aircrew, they were, until 1944, all dual-qualified as air gunners, so they had two strings to their bows and were subject to two sets of rules and regulations.

### **In the Beginning**

While this paper is primarily concerned with the WW II era, it is appropriate to begin with some pre-history. Although wireless was still in its infancy when war was declared in the summer of 1914, within a year sufficient progress had been made to make it a practical tool. That said, within the RFC the use of wireless was largely confined to crews involved in artillery co-operation and its scope was limited by the available equipment which provided only a one-way air-to-ground facility. Nevertheless, by using a selection of predetermined one-, two- or three-letter Morse groups it was possible to control a number of guns and to refine their fall of shot. Ground-to-air messages were sent by a variety of visual signals, Aldis lamps and pyrotechnics to begin with but eventually Popham panels.

In the early days the Morse key was operated by the observer, but with the passage of time, this responsibility was increasingly assumed by the pilot and by 1917 he was being required to demonstrate in



*A Type 52 wireless, the 'Sterling' set, installed in the rear cockpit of a DH 9.*

training his ability to handle Morse at eight words per minute (wpm). While this system sufficed for short range bombardment in the immediate vicinity of the trench lines, it was less satisfactory for long-range work when the aeroplane was too far away for the crew to be able to see the visual signals being displayed by the battery. By the summer of 1918 a two-way W/T (ie wireless telegraphy – Morse) facility was becoming available along with, and of at least equal significance, the gradual introduction of R/T (ie radio telephony – voice). These developments clearly showed the way ahead, but a great deal of technical development was still required to overcome the practical limitations

of the early equipment and neither of these facilities had become anything like universally available before the Armistice.

While the RFC's use of wireless had been largely confined to short-range artillery work and the RNAS had also used W/T to control naval guns, the Navy had also employed long-range two-way wireless in order to maintain contact with its flying boats and, to an even greater extent, its airships, some of which, like the North Sea Class, had an endurance of over 20 hours. As a result, while the RFC's requirements could be satisfied by its 'amateur' 8 words per minute, the RNAS had needed a more capable system, so its crews would sometimes include a rating trained as a professional W/T Operator.

The fact that the RNAS had been employing W/T Operators caused a problem in April 1918 when that service was merged with the RFC to create the RAF. The ex-naval faction was quick to take advantage of a loophole in the regulations that permitted them to remuster, as aircrew, a number of technical ratings who would not have been recognised as such by the Army. Before the month was out the Air



Ministry had issued an edict imposing a moratorium on the promotion of any more W/T (and/or engineering) personnel as sergeant observers.<sup>1</sup> Nevertheless, reality gradually bit and in October it was conceded that suitably qualified wireless operators who were 'employed on continuous flying duties' could be remustered as a 'wireless operator observer (sergeant mechanic)'.<sup>2</sup> This was a universal ruling and would have applied to ex-soldiers just as much as to ex-sailors, but, since the RFC had made hardly any use of airborne wireless operators, the regulation had clearly been designed to cater for the maritime case.

This was a symptom of the fact that by late-1918 the Air Ministry had recognised that the conduct of military aviation had become a far more complicated business than it had been only four years earlier. Although pilots were being complemented by, mostly commissioned, observers, the latter were becoming increasingly specialised to reflect the different roles in which they operated. The upshot was a scheme that would have introduced seven distinct categories of non-pilot aviator. One of these, the 'Aerial Operator', only some of whom would have been commissioned, was to have been responsible for W/T work in large flying boats and the forthcoming multi-engined landplanes which were expected to be employed as bombers (the V/1500) or on maritime duties (the Vimy and DH 10). An Air Ministry Weekly Order (AMWO) explaining the new arrangements was drafted during October 1918 but it was still doing the rounds of the concerned staffs when the Armistice was signed, so the system was never implemented.

### **The Early Inter-War Years**

Once the dust of WW I had settled, the peacetime RAF of the early 1920s emerged as a small force whose *de facto* primary function was colonial policing, although it very slowly began to build up a metropolitan air force having squadrons dedicated to air defence, day and night bombing, army co-operation and a variety of maritime operations involving shore-based landplanes and seaplanes and carrier aviation. Despite the variety and complexity of these roles, it was concluded that the only professional aviators that would be necessary would be pilots.

With hindsight, it is clear that this had been a major error of

judgement and it is difficult to understand how such a conclusion was ever reached. When WW I ended the RAF had been employing roughly one commissioned observer for every three pilots<sup>3</sup> and, as we have seen, it had been on the point of endorsing seven specialised categories of non-pilot aircrew. Almost overnight, these arrangements, which reflected the lessons taught (but evidently not learned) during four years of practical air warfare, were abandoned when, in January 1920, the Air Ministry published the following statement:<sup>4</sup>

‘In view of the decision that practically all officers remaining in the Royal Air Force are to learn to fly, all pilots may in future be employed in any capacity as crew of an aircraft, ie as observers, gunners, photographers, etc. It should be noted, that as no provision has been made for observers in the permanent Air Force, all officers are to be considered available for the duties of observers, etc from the date of this Order.’

Despite this edict, which indicated that pilots were supposed to carry out the functions of any member of a crew, it was accepted that they would need to be assisted by air gunners. These men were to be volunteer ground tradesmen who would fly on a part-time basis. If there are any doubts that the Air Ministry’s decision to dispense with professional observers indicated a lack of appreciation of what was involved in operating an aeroplane, these were removed a year later when its next edict restricted the internal recruiting of aerial gunners to non-technical personnel of Trade Group V, that is to say, unskilled men who were required to meet only the minimum educational standard and who were on the lowest pay scale.<sup>5</sup> Fortunately, this proscription was short-lived and it was soon lifted to permit airmen of any trade to fly as gunners.<sup>6</sup>

Nevertheless, it is important to appreciate that the *only* recognised non-pilot aircrew trade was that of the aerial gunner. Home-based airmen who volunteered to fly as gunners were supposed to attend a six-week course at the School of Aerial Armament and Gunnery at Eastchurch but there were no such facilities elsewhere so airmen serving overseas were trained in-house by the units on which they served. That said, while the Air Ministry may have intended that pilots should do all of the other non-piloting jobs within a crew, there were not enough pilots to make that a realistic proposition. Besides which

most pilots were disinclined to get out of the drivers seat. In the absence of there being anyone else to do it, therefore, the part-time airmen gunners acted in a variety of other airborne capacities. There were no formal 'aircrew' courses for these other activities, however, so it was necessary to employ appropriately qualified tradesmen and/or to organise any necessary instruction at squadron level.

With the passage of time, the practical implications of trying to make do with air gunners began to manifest themselves with increasing clarity. As AOC Wessex Bombing Area, AVM Sir John Steel, pointed out at the end of 1926:<sup>7</sup>

'The decision to withdraw all officer observers from day bombing squadrons has made it necessary to teach air gunners in these units bomb aiming, air pilotage and photography in addition to their duties as gunners. To master these subjects and to carry out the necessary practices is a whole time job which cannot be undertaken by an airman who is filling a vacancy in the establishment for some other purpose.'

The part-time versus full-time issue aside, the rules governing the provision of gunners stated that those drawn from Trade Groups I to IV were 'not to exceed 25% of the authorised establishment' with the remaining vacancies, ie 75% plus, being filled by airmen from Trade Group V.<sup>8</sup> Since being a nominal gunner on day bombers actually involved discharging all of the functions of an observer, Steel expressed some reservations over the suitability of Trade Group V personnel for such demanding tasks. Indeed he appears to have been sufficiently concerned about this to have bent the rules because more than 60% (as opposed to less than 25%) of the gunners flying with his day bomber squadrons at the end of 1926 were actually skilled tradesmen.<sup>9</sup> Steel recommended that whoever occupied 'the back seat must devote his whole time to it and must be borne on the establishment for that purpose.' The nettle represented by the inadequacy of the part-time airman gunner had been clearly pointed out, but it would be 1939 before it was grasped with any determination.

While AVM Steel and his day bomber crews were making do as best they could, the problem was rather different on twin-engined night bombers where the front gunner, who was always supposed to



*During the 1930s trainee wireless operators passing through Cranwell were given a few hours of airborne time, typically in a Wallace or a Victoria, including this one, K2344. K2344 was with the Electrical & Wireless School in 1933-35, primarily to carry out autopilot trials (hence the empty cockpit in this photograph) but WOps were often taken up for a (frequently bumpy) ride.*

be a wireless operator, obviously needed to be competent in his basic trade. The establishment did provide for adequate numbers but the prevailing employment policy involved wireless operators emerging from basic training being posted directly to squadrons in order to gain a minimum of flying experience before moving on elsewhere.<sup>10</sup>

This was a cart-before-the-horse arrangement because a wireless operator mechanic (WOM) fresh out of Flowerdown<sup>11</sup> after his three-year apprenticeship, really needed to spend six-to-nine months at a ground station to consolidate his basic skills *before* he was in a position to gain full value from training in the air. The upshot was that a significant proportion of the very green wireless operators actually available on squadrons had their hands full just trying to cope with their primary trade so that little progress was being made with gunnery. The problem that this created is illustrated by the fact that in 1926 only 15% (just 5 out of a total of 34 – it was still a very small air force) of the wireless personnel nominated to fly as air gunners in

night bombers were actually qualified as such.<sup>12</sup>

### **The Expansion Era**

The next significant changes were provoked by political developments in Germany from 1933 onwards which made it necessary to implement a succession of RAF expansion plans. It had been Trenchard's intention that all of the key technical ground trades would be filled by apprentices, in this context Group I WOMs, although the RAF had always employed some less skilled airmen as 'straight' wireless operators, which was a Group II trade. To cope with the expansion, which would clearly outstrip the capacity of the selective schools handling the three-year apprentice entries, the Boy Entrant Scheme was introduced in 1934.<sup>13</sup> This provided for the direct recruiting of, among others, wireless operators who would attend a sixteen-week course.<sup>14</sup> At the same time the air observer was also reinstated, 56% of whom were expected to be drawn from wireless operators or wireless operator mechanics.<sup>15</sup> It was a step in the right direction, but only a small one as all of these men would still be primarily ground tradesmen who would fly only as part-timers.

By the late-1930s the RAF was gradually coming to terms with the fact that its long-standing policy of employing aircrew on a part-time basis would be quite unworkable if it were to be tested in war and, following the Munich crisis of 1938, it seemed increasingly likely that it would be subjected to just such a test. Better late than never, a new scheme was introduced which made all aircrew full-timers with effect from January 1939.<sup>16</sup> (The Royal Navy had done this back in 1935.<sup>17</sup>)

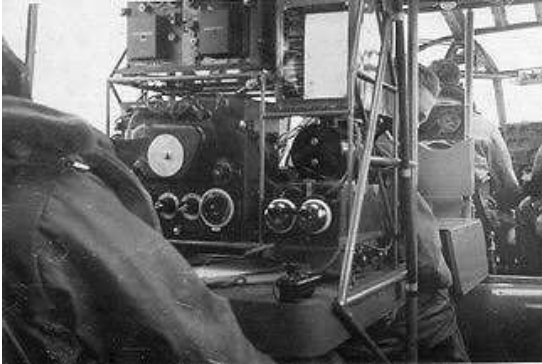
The new RAF scheme introduced a progressive concept which envisaged that all non-pilot aircrew would begin their careers as, what were now to be known as, 'wireless operators (air crew)', *all* of whom were to be internally recruited from boy entrant wireless operators. Having been additionally trained in gunnery (the intention being to phase out the previous distinction whereby some gunners had been wireless trained but others had not) they would fly as airmen for an initial period of three years. Most could then expect to continue to be employed as wireless operators (air crew) but about 25% were to be selected for further training as air observers, at which point they were to become sergeants. It was envisaged that, following a further period of productive service, those observers who were considered suitable



*This picture, taken in the Middle East alongside a Lysander and probably dating from the summer of 1939, is representative of a gunner of the inter-war years. Until 1939 it was not a pre-requisite that a gunner should also be a wireless operator, although this one clearly was, as indicated by his 'hand and thunderbolt' badge, above which he wears the winged bullet of the air gunner that was introduced in 1923. (RAF Museum 5860-1)*

would ultimately become pilots.

While the January 1939 scheme may have been sound, it represented an essentially long-term investment which would not yield any substantial dividends for several years. This would prove to be its undoing, as time was fast running out. In fact, rather than being able to indulge in the luxury of lengthy periods of training and consolidation, the demand for manpower created by the remorseless expansion of the Service was actually making it necessary to cut back on the length of time which could be devoted to instruction. As early as June 1938 the Air Ministry had been obliged to shorten the course attended by wireless operators and to warn units to expect that new arrivals would be less competent than their predecessors.<sup>18</sup> Since wireless operators were the seed corn from which the Service was expecting to grow its gunners, and ultimately its observers, this did little to ease the problem of providing additional aircrew, or to alleviate the training task at squadron level.



*The WOp's station in an Anson I. The radio is an R1082; standard equipment from the mid-1930s, it began to be superseded by the R1155 in 1940, a process that was substantially complete by 1942.*

## **The Early Years of WW II**

Needless to say, the idea of aircraftmen flying operationally did not long survive the outbreak of war and operational losses meant that it was quite impractical to wait three years for a wireless operator (air crew) to blossom into an observer. Within a matter of months the RAF would be

granting gunners immediate SNCO status. Furthermore, it was apparent that it was not necessary for all air gunners to be wireless operators, leading to the direct recruiting of air gunners. As a result, the peacetime aim of eradicating the distinction between dual-qualified wireless operator/air gunners and 'straight' air gunners had also to be abandoned.

In the early days of the war Air Chf Mshl Sir John Steel (among others) was somewhat confused by the distinction between a wireless operator (air crew) and a wireless operator (air gunner). This was a trifle unfortunate, since Sir John, who, as AOCinC Reserve Command at the time, was responsible for the recruiting of all such personnel. He eventually sought enlightenment from the Air Ministry who patiently explained that there was only one trade, not two, the second term being unofficial.<sup>19</sup> Nevertheless, since it was clearly a better descriptive title and already in widespread use, it was decided to adopt it. This decision was formally announced in February 1940, when it was stipulated that an airman's qualification as an air gunner was to be added (where applicable) in parentheses after his basic trade.<sup>20</sup> In other words, the category of wireless operator (air crew) had been superseded by that of the wireless operator (air gunner) – the WOp/AG.



*The 'AG' badge, of 1939 which provided the template for the flying badges all other non-pilot aircrew categories until 2003.*

Once the shooting had started there had been a marked increase in respect for gunners and a distinctive badge was introduced for them in December 1939. Like the observers flying badge, it had only one wing but in place of the 'O' there was an embroidered brown laurel wreath enclosing the letters 'AG' in white.<sup>21</sup> Since all aircrew wireless operators were dual qualified as gunners, this became the badge that was worn by WOp/AGs.

While the introduction of a badge had been appreciated, it had been no more than a cosmetic gesture. In fact, it had actually managed to focus attention on gunners, without having done anything of any substance to improve their circumstances – which were that they were flying on operations as mere aircraftmen. It took some time to overcome the inevitable reservations of the Treasury but with effect from 27 May 1940 all WOp/AGs, and straight air gunners, were granted the rank of temporary sergeant on completion of their training.<sup>22</sup> Sadly, this Order, which had also automatically elevated all serving WOp/AGs and gunners to SNCO status, was not actually promulgated until 27 June. As a result, practically all of the gunners who died flying in the Battles and Blenheims of the Advanced Air Striking Force during the fall of France did so as corporals or aircraftmen. The same was true of those who lost their lives during the early operations of Bomber and Coastal Commands.<sup>23</sup>

While the scheme introduced in January 1939 had had an immediate impact at home, its effects had taken longer to filter down to units stationed overseas. Most of the gunners serving abroad on the outbreak of war were still in-house-trained part-timers drawn from a variety of ground trades. They were eventually invited to choose between remustering as aircrew or reverting to their ground trades, mostly as WOps or WOMs. Like those at home, airmen who elected to become aircrew would automatically have become entitled to wear the 'AG' badge from December and most should subsequently have been made up to temporary sergeant with effect from 27 May 1940,



although it is known that in the Middle East this transformation was not completed until as late as September.

The next evolutionary step was the introduction of commissions, which proved to be a rather contentious issue. After some initial *ad hoc* arrangements, formal regulations providing for gunners to be officers were promulgated in February 1940, pre-dating the appearance of any commissioned observers by more than two months.<sup>24</sup> There was, however, no specific quota for officer gunners, the Air Ministry's immediate aim being to provide only the numbers required to fill the relatively few established officer posts, subsequent commissions being granted on an 'as required' basis to fill vacancies as they occurred. By late 1940, however, managing the Empire Air Training Scheme (EATS) had become an international affair which meant that London needed to consult the participating Dominions before creating or changing policy. The initiative was taken out of the Air Ministry's hands in December 1940, however, when the Australians unilaterally announced that they intended to commission 3% of their air gunners on graduation.

The problem with this proposal was that current (British) guidance assumed that an officer gunner would previously have demonstrated fighting qualities and leadership in operational service and required him to be capable of instructing in gunnery and advising Squadron Commanders on equipment and tactics. Clearly, this ruled out a newly qualified gunner and, since it did not reflect RAF practice, the Air Ministry advised against the Australian initiative. The other governments were drawn into the debate which was eventually resolved with the inevitable compromise. This took until July 1941 when it was agreed that up to 10% of WOp/AGs could be commissioned on graduation plus a further 10% after they had accumulated some operational experience. The proportions for straight air gunners were to be 5% and 15%.<sup>25</sup>

### **Refinements Introduced During 1941-42**

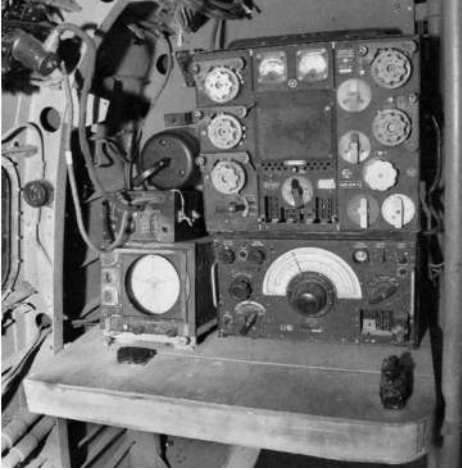
Meanwhile, by the autumn of 1941 the availability of air-to-surface vessel radar (ASV) had become sufficiently widespread within Coastal Command to have created a requirement for specialist operators. Rather than repeating the traditional exercise of making aircrew out of groundcrew, it was decided to try making technicians

out of an appropriate category of aviator. WOp/AGs who had already completed a flying tour were, therefore, offered the opportunity of volunteering for additional technical training after which they would be remustered as wireless operator mechanics (air gunner) (WOM/AG), retaining their aircrew status throughout.<sup>26</sup> In July 1943 the recruiting field was widened to include selected ground tradesmen, specifically wireless operator mechanics and wireless and electrical mechanics (WOMs and WEMs).<sup>27 28</sup>

In the spring of 1942 there was another significant change to the career structure of air signals personnel when a grading system was introduced.<sup>29</sup> All WOp/AGs were to be remustered as WOp/AGs Grade II with effect from 6 March. After a minimum of three months' operational service (which old hands would already have accumulated) a WOp/AG could take a trade test, which was primarily concerned with the 'WOp' aspects of his duties. Those who were successful were elevated to Grade I which attracted an increase in pay. Achievement of Grade I was also a pre-requisite for promotion to flight sergeant.

It soon became apparent that, despite the introduction of the ASV-qualified WOM/AG, all of Coastal Command's remaining WOp/AGs would also need 'to be conversant with the RDF organisation and procedures and to operate and maintain appropriate equipment'.<sup>30</sup> Furthermore, proficiency in these skills was to be rewarded by the not inconsiderable bonus of an additional shilling-a-day qualification pay. WOp/AGs who were not already qualified to carry out what were termed 'special wireless duties' were required to attend suitable courses at a Radio Direction Finding (later Signals) School and an OTU. To provide an additional incentive to unqualified WOp/AGs, annotation as an ASV operator was made an essential precondition for elevation to Grade I.

At much the same time, March 1942, the RAF had decided to dispense with the second pilot in a bomber crew and this same rationalisation exercise had also halved the requirement for dual-qualified WOp/AGs on the grounds there was only one wireless station in a bomber. It was also agreed that the dorsal and tail turrets should be manned by straight air gunners, which rather begged the question of which guns the remaining WOp/AG was supposed to man. This question was not raised at the time, but it soon would be (*see*



*The WOp(air)'s station in a Lancaster. The upper, large, square-fronted unit, studded with gnarly knobs, is the T1154 MF/HF radio transmitter; the oblong unit beneath it, with a semi-circular tuning dial, is the corresponding R1155 receiver. The Morse key is on the desk at bottom right. The circular screen on the left is the Fishpond display tapped from the H2S scanner.*

below). It is worth noting that this change in manning policy applied only to Bomber Command. As was often the case, Coastal Command went its own way, continuing to require the majority of its wireless operators to be fully qualified as gunners.

### **Late Wartime Changes Within The Fraternity Of Wireless Operators And Air Gunners.**

While the terms air gunner and wireless operator had become almost synonymous during the early years of WW II, the introduction of increasingly sophisticated equipment had demanded a much higher degree of technical expertise and this had led to a polarisation within what had once been a joint trade. By 1942 six subtly different categories and sub-categories had been defined – AG, WOM/AG and WOp/AG Grades I and II, plus the AG/FM(A) and AG/FM(E) – the aero-engine and airframe flight mechanics who flew in Coastal Command's flying boats and doubled up as gunners. This evolutionary process was not yet complete. In Bomber Command, for instance, turrets were being increasingly manned by straight air gunners who had little need for expertise in handling a wireless set. Conversely, the growth of Transport Command meant that the RAF was operating large numbers of aeroplanes which carried long-range communications equipment but lacked any armament at all. It was becoming clear that the traditional WOp/AGs were over-qualified so

<b>Sub-category</b>	<b>Skills</b>
WOp(air)	Wireless operator only
WOp(air)(E)	Wireless operator and emergency gunner
WOp(air)(G)	Wireless operator and air gunner
WOp(air)(ASV)	Wireless and ASV operator (but not a gunner)
WOp(air)(ASVG)	Wireless and ASV operator and air gunner

*Fig 1. Annotations to distinguish skills possessed by individual WOps(air).*

that, wherever they were employed, half of their skills tended to be superfluous. Once this anomaly had been recognised the long-standing dual-qualified trade was abolished.

With effect from 9 November 1943, all existing WOp/AGs were remustered to the new trade of wireless operator (air) [WOp(air)], accompanied by the grading system which had been imposed upon their predecessors.<sup>31</sup> Thereafter their primary responsibilities were to be confined to wireless and visual signalling. Depending upon their specific assignments, however, provision was made for them to continue to act as gunners if and when required. Thus, while all new recruits to the trade would initially be trained only in communications techniques, they remained liable for additional training in gunnery if this was a requirement of their subsequent employment.

Following this restructuring of the category, the responsibilities of WOps(air) assigned to Transport Command were largely confined to communications, while those posted to Coastal Command were still likely to be additionally employed as gunners and/or as ASV radar operators. The emerging discipline of electronic warfare meant that Bomber Command's WOps(air) also had a broad range of duties. Leaving aside the specialists who operated the jammers in No 100 Gp's dedicated Radio Counter Measures (RCM) aircraft, the WOp(air) in a Main Force bomber became responsible for dispensing 'Window' and monitoring radar equipment, notably 'Monica' and 'Fishpond'.

The degree of sub-specialisation within the overall trade of the WOp(air) eventually led to the application of a series of suffixes (*see Figure 1*). These, while obviously intended to show the degree of expertise possessed by an individual, were aids to the personnel staffs responsible for ensuring that the right men were posted to appropriate

jobs as much as professional distinctions.

### **A New badge**

Prior to this, all wireless operators had undergone a formal gunnery course which had entitled them to wear the 'AG' badge and those who were already qualified continued to do so. On the other hand, a WOp(air) graduating under the new arrangements would not automatically be awarded a gunners badge, which left him without any kind of aircrew emblem. There was clearly a need for yet another flying badge to distinguish the new category. Introduced in January 1944, it comprised a standard pattern single-wing with the letter 'S' within the laurel wreath.<sup>32</sup> The 'S' clearly stood for signals, although it was to be more than a year before this would be reflected in the official title of the wearer.

The peculiar requirements of Coastal Command were to lead to yet another recategorisation of signals personnel. Ever since aircrew categories had been redefined in 1942 it had been accepted that airmen of certain technical trades who were qualified as gunners would be entitled to wear the 'AG' badge. One of these was the WOM/AG but, as with WOp/AGs, experience had shown that, contrary to expectations, WOM/AGs were rarely called upon to fire guns in anger.

Furthermore, it was anticipated that the introduction of ever more complex electronic devices would make increasing demands on the technical skills of the WOM/AG who was expected to be the only man likely to be capable of carrying out running repairs on such equipment. The situation was rationalised with effect from 13 March 1944 when the category of WOM/AG was replaced by that of the wireless operator mechanic (air) [WOM(air)], although this change was effected in arrears, as it was not publicised until the following September.<sup>33</sup>

In essence these men needed to be as handy with a Morse key as they were with a soldering iron.<sup>34</sup> Like his WOp(air) colleague, a WOM(air) was to wear the recently introduced 'S' badge in place of the old 'AG' which was now awarded only to (and to be worn only by) 'straight' air gunners. In practice, however, WOMs(air) continued to be employed almost exclusively by Coastal Command (and its overseas equivalents) whose larger aircraft tended to have more gun

positions than professional gunners. To man, for instance, the waist gun positions of Liberators and Catalinas therefore, it continued to be necessary to train other crew members to act as emergency gunners when necessary. As a result, although gunnery skills were not listed among the essential attributes of a WOM(air) most, if not all, of them continued to be formally trained as gunners.

These changes had effectively resulted in communicators being completely divorced from gunners, the *decree absolute* having been marked by the introduction of the 'S' badge. Nevertheless, subsequent cohabitation was commonplace, especially within Coastal Command where, since 'signallers' were still required to function as gunners on occasion, it could be argued that the 'AG' was as appropriate an emblem as the 'S'. As with the flying 'O' and the illicit 'FE', many of the WOps and WOMs who had long since qualified for their gunners badges, declined to adopt the new pattern and some of the older hands continued to sport their 'AG' badges for the remainder of the war.<sup>35</sup>

### **The Training of Wartime Air Signals Personnel**

The basis of late pre-war wireless operator (air crew) training was a six-month course at No 1 (originally *the*) Electrical and Wireless School (E&WS) at Cranwell followed by a month's gunnery at an Air Observers School. Although a second such school, No 2 E&WS, had opened at Yatesbury in 1938, capacity was still insufficient to cope with wartime demand and by November 1939 Air Service Training and Scottish Aviation had been commissioned to run Nos 1 and 2 Supplementary Schools of Wireless Telegraphy at Hamble and Prestwick respectively. The bulk of the instructional staff at these civilian-run schools consisted of hastily recruited ex-GPO telephone engineers and telegraphists.<sup>36</sup>

By mid-1940 the training sequence for, what were now, WOp/AGs generally involved four weeks of 'square bashing' at a Recruit Centre, followed by sixteen weeks of ground instruction at Hamble or Prestwick (following the demise of the two supplementary schools in 1940, this stage was provided by No 10 (Signals) Recruit Centre at Blackpool), another eight weeks, including a brief introduction to airborne work,<sup>37</sup> at Cranwell or Yatesbury and six weeks (18 flying hours) at a Bombing and Gunnery School (B&GS). Once qualified as a wireless operator, incidentally, before embarking on the specifically

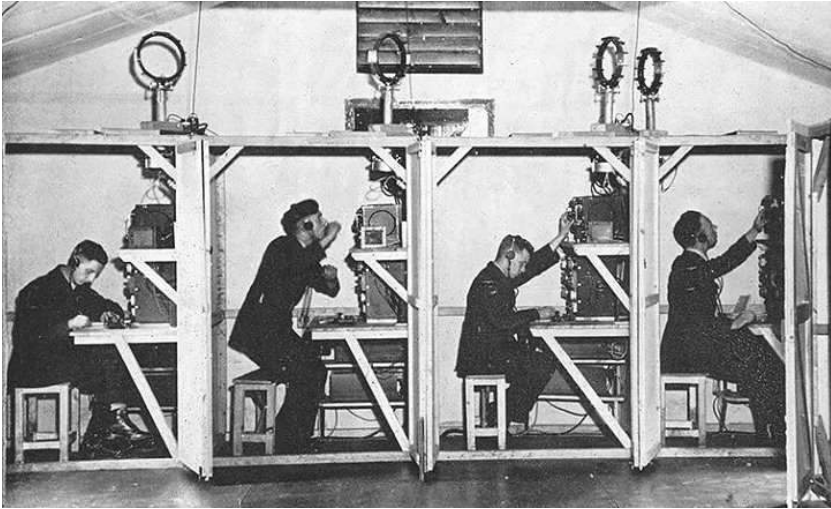


*Trainee WOs in one of the T/R1154/55-equipped Dominies of No 2 Radio School at Yatesbury. (Yatesbury Association)*

aircrew oriented phase, it was not unusual for a prospective WOp/AG to be posted to a station to build up practical experience working in its Signals Section.

In August 1940 the training units at Cranwell and Yatesbury became Nos 1 and 2 Signals Schools, a third (No 4) being opened at Madley in August 1941.<sup>38</sup> At much the same time the first of (eventually) ten dedicated Air Gunners Schools began to be formed in succession to the B&GSs, the first of them appearing in June 1941. In the meantime, Coastal Command's gradual acquisition of ASV radar from 1940 onwards had introduced a requirement for specialist courses which were provided by No 3 Radio School at Prestwick. In the summer of 1942 this unit was redesignated as No 3 Radio Direction Finding School and joined in the autumn by No 4 at Carew Cheriton.

The last major change in the organisation of wartime signals training occurred in 1943 when the Signals Schools and the Radio



*As with other aircrew categories, WOps had synthetic training devices. These are Harwell Boxes which could be fitted with a variety of radios to provide hands-on operating practice, including fault-finding and taking bearings with the manually adjusted loop aerial.*

Direction Finding Schools were all retitled to become Radio Schools. There would eventually be fifteen such units in the UK, all of which were involved in one or more aspects of the training of radio and/or radar mechanics and/or operators for ground as well as air duties. Each unit tended to deal with a particular aspect of signals work, only Nos 1, 2, 4, 10, 11, 12 and 14 Radio Schools being established as flying units. Of these, Nos 2 and 4, at Yatesbury and Madley respectively, handled the bulk of the basic wartime aircrew training commitment. Nos 10, 11, 12 and 14 were also involved to the extent that they provided, largely post-graduate, courses tailored to the peculiar requirements of Coastal Command, notably the operation of ASV.

Meanwhile, when Initial Training Wings (ITW) had first been established in 1939 no provision had been made for them to cater for WOps. As a result, compared to other aircrew categories, newly trained WOps had tended to be somewhat lacking in their awareness of general airmanship. Steps had eventually been taken to redress this situation in November 1941 when Air Crew Wings were established at



both Yatesbury and Madley. These provided ground personnel, already qualified as telegraphists, with what amounted to a quasi-ITW course. The syllabus included an academic content resembling that taught at a 'proper' ITW with the added bonus of a notional ten hours of airborne time (the legacy of the flying content of the original E&WS course).

This innovation was symptomatic of an overall improvement in the manning situation which permitted more time to be devoted to preparing WOps for service as aircrew. The training philosophy that was introduced towards the end of 1941 involved a prospective WOp/AG's being a fully qualified *and experienced* ground telegraphist before becoming aircrew.<sup>39</sup> This required a four-phase sequence which began with ten (later fifteen) weeks of initial training at No 10 (Signals) Recruit Centre<sup>40</sup> at Blackpool during which, in addition to enduring the usual 'boot camp' regime, the ability to cope with Morse at ten words per minute had to be demonstrated. The second phase comprised twelve (later fourteen) weeks of technical training at a Signals School (including Morse at up to 22 wpm<sup>41</sup>) followed by at least three (but sometimes as long as nine) months of active service as a ground operator at a station. The third phase involved eight weeks at an Air Crew Wing, the stamp of approval finally being applied on completion of up to eight weeks (but possibly as few as three) at an Air Gunners School.

Although this approach had the advantage of ensuring that the Service was well provided with ground operators, it was a very long-winded way to go about the provision of aircrew and the sequence was revised during 1943. At much the same time, dedicated ITWs were established to provide initial training facilities for air signals personnel, Nos 18 and 19 at Bridgnorth and No 20 at Bridlington.<sup>42</sup> Thereafter the standard training sequence involved: three weeks at an Air Crew Reception Centre (ACRC), eight weeks at an ITW, five or six months (depending upon previous qualifications) at a Radio School (either Yatesbury or Madley) and as long as eight, or even twelve, weeks at an Air Gunners School.

While the training organisation had been evolving there had been a number of changes in the nature of aircrew specifically employed in the fields of communications. As previously discussed, by late 1944 the functions of the wireless operator (air crew) of 1939, the WOp/AG



*As a wireless trainer, the Proctor was even more numerous than the Dominie; Yatesbury's No 2 Radio School had more than 100 of them on charge by VE-Day. (J D Oughton via P H T Green )*

of 1940 and the WOM/AG of 1942 were being discharged by the WOM(air) and the WOp(air) whose training sequences were broadly as follows.

WOMs(air). Like WOM/AGs, WOMs(air) were internally recruited from a variety of already qualified signals tradesmen. The general pattern of training began with preliminary processing at an ACRC followed by an ITW course. Appropriate instruction was provided at a Radio School to ensure that all of these personnel were technically skilled to a common Trade Group I standard. This phase was followed by airborne training and experience with the Air Crew Wing of the same, or possibly another, Radio School. In all, this process took between six and nine months, depending upon the candidate's previous qualifications. On graduation from Radio School they became 'S'-badged sergeants following which most, if not all, WOMs(air) spent between six and twelve weeks at an Air Gunners School.

WOps(air). The training of WOps(air) was broadly similar to that of WOMs(air), but, since many of these men were directly recruited as civilians, there was less variation between individuals. Following induction via an ACRC and eight-weeks with No 70 ITW at Bridgnorth, a typical WOp(air) received his professional

training at Yatesbury and/or Madley where he attended a twelve-week Technical Signals (Ground) course followed by a twelve-week Technical Signals (Air) course, the latter including about 20 hours of airborne time in Proctors, Dominies and/or Ansons. Having gained his 'S' badge, a WOp(air) could then expect to spend a month or so at an Observers Advanced Flying Unit [(O)AFU] consolidating his skills alongside navigators and air bombers who, having been trained overseas, were being acclimatised to European conditions and aids.

It should be stressed that, while there was always a planned sequence of wartime courses, as indicated above, the plan changed several times. Furthermore, the 'exigencies of the Service' often had an impact on an individual's progress through the system and deviations from the norm, including unscheduled periods 'on hold', were commonplace. Furthermore, in view of the length of the training sequence and the influence of such variables as failure rates in training, fluctuations in output due to adverse weather and loss rates on operations, it was impossible to govern precisely the numbers involved. While appropriate efforts were made to control the situation, it was necessary to err of the side of caution and at the end of 1943 Yatesbury, for instance, was holding more than 1,000 fully trained WOps(air).

The RAF never made any serious attempt to relocate air signals training abroad and the wartime UK-based system turned out 27,190 aircrew wireless operators of all kinds. Nevertheless, both Canada and the USA (under the Towers Scheme) offered additional training facilities for RAF WOp/AGs, the Canadians contributing 755 and the Americans another 662. But these overseas figures represented only a fraction of the overall output. For instance, while the Canadian schools may have trained relatively few wireless operators specifically *for the RAF*, their total output included 2,122 for the RNZAF, 2,875 for the RAAF and no fewer than 12,744 for the RCAF. Furthermore, as with all other aircrew categories trained under the EATS, many of the men wearing the uniforms of Dominion air forces actually flew operationally with the RAF. For example, aside from the RAAF men trained in Canada, the home-based Australian training system produced 2,984 RAAF WOp/AGs for its own use and another 4,174

specifically for service with the RAF.<sup>43</sup>

### Aftermath

In September 1944 Air Chf Mshl Sir Sholto Douglas was appointed to chair a Committee on the Composition of Air Crew which was charged with determining the number and status of the aircrew categories that would be required in the post-war air force. The committee concluded that the (currently) thirteen categories and sub-categories<sup>44</sup> of wartime aircrew would be unnecessarily complicated for peacetime purposes and it recommended that these should be reduced to just five. These arrangements were implemented in July 1946 when a variety of wartime specialisations were abolished leaving the initial peacetime categories of pilot, navigator, engineer, signaller and gunner. The status issue was addressed by the universally disliked '1946 Aircrew Scheme' (see *Journal 42*) which bundled the signaller with the engineer and gunner as the 'SEG' group and made them all 'sub-NCOs'. This very unsatisfactory situation was resolved in 1950 when the air signaller had his three stripes restored. Thereafter the air signaller was progressively superseded by air electronics officers and air electronics operators, a process that began in 1957 and was eventually completed in 1972 – but that is another story.

### Notes:

<sup>1</sup> TNA AIR/1/401/15/231/42. Amendment, dated 30 April 1918, to establishment AF/H/77.

<sup>2</sup> In this connection it may be worth pointing out that the 'hand and thunderbolt' arm badge, (re)assigned exclusively to wireless operators by AMWO 1066 of 19 September 1918, was not (as has sometimes been suggested) an 'aircrew' badge, as it was worn by ground personnel. Any wireless operators who managed to succeed in persuading the authorities that they were *bona fide* aircrew wore the flying 'O'.

<sup>3</sup> The Air Force List for January 1919 names 4,478 Observer Officers, plus another 1,035 flying 'O'-wearing Kite Balloon Officers, for a grand total of 5,513 commissioned non-pilot aircrew, compared to 15,817 officer pilots (ranked as lieutenant-colonels or below). In both cases, these represented the peak numbers recorded in any List of the period.

<sup>4</sup> AMWO 19 of 8 January 1920.

<sup>5</sup> AMWO 109 of 9 February 1921.

<sup>6</sup> AMWO 271 of 14 April 1921.

<sup>7</sup> TNA AIR8/1359. AVM Steel's observations are taken from an unreferenced and undated paper he submitted to CAS at the end of 1926. The subject was actually accident prevention but Steel considered that inadequate and/or inappropriate

manning was a contributory factor at a variety of levels and his Annex D dealt with non-pilot aircrew.

<sup>8</sup> Para 482 of King's Regulations and Air Council Instructions (1924 edition).

<sup>9</sup> See Note 7. Figures from Steel's Annex D.

<sup>10</sup> AMWO 491 of 9 September 1926.

<sup>11</sup> The Electrical and Wireless School at Flowerdown was responsible for the training of wireless mechanics and operators from its formation on 12 December 1919. The three-year apprenticeship scheme, which produced wireless operator mechanics, began with the First Entry in January 1922.

<sup>12</sup> See Note 7. Figures from Steel's Annex D.

<sup>13</sup> AMO A.195/1934 of 9 August introduced a new class of boy entrants who were to be employed within Trade Group II as armourers, wireless operators or photographers.

<sup>14</sup> On 7 August 1929 the Electrical and Wireless School had moved from Flowerdown to Cranwell where it continued to run the three-year apprenticeship scheme which produced WOMs (a Group I trade), alongside a twelve-month course for airmen (sixteen for boy entrants) that turned out Group II Wireless Operators.

<sup>15</sup> AMO A.196/1934 of 9 August (re)introduced the trade of the air observer.

<sup>16</sup> AMO A.17/1939 of 19 January.

<sup>17</sup> Admiralty Fleet Order 1739 of 18 July 1935. which had introduced air gunners and observers mates had specified that they would be 'borne for air duties and will be additional to the complement authorised for Seamen, Signal and Telegraphist duties in each ship'.

<sup>18</sup> AMO A.235/1938 of 30 June announced that it had been necessary to shorten the time devoted to the training of W/T Operators at the Electrical and Wireless School at Cranwell and stressed the consequent need for additional consolidation training on squadrons.

<sup>19</sup> TNA AIR2/4456. Letter from the Air Member for Personnel (AMP), Air Mshl Portal to AOCinC Reserve Command dated 24 November 1939.

<sup>20</sup> AMO A.94/1940 of 15 February.

<sup>21</sup> AMO A.547/1939 of 21 December announced the introduction of the air gunners badge, which was to become the model for all subsequent single-winged designs. This badge replaced the brass 'winged bullet' which had been worn since 1923 on the right sleeve of any airmen qualified as a gunner, but it did not replace the 'handful of thunderbolts' which continued to be worn on the upper sleeve by gunners who were dual-qualified as wireless operators.

<sup>22</sup> AMO A.416/1940 of 27 June.

<sup>23</sup> A glance through the casualty lists in W R Chorley's *Bomber Command Losses of the Second World War, Vol 1* (Earl Shilton, UK, 1992), illustrates quite clearly that until mid-June 1940 practically all gunner casualties (many of whom would have been WOp/AGs) had been corporals or below. The exceptions were a handful of the first commissioned gunners and a few sergeants who will presumably have been SNCOs in their own right within their parent trade.

<sup>24</sup> AMO A.62/1940 of 1 February.

<sup>25</sup> TNA AIR2/4700. Air Ministry letter S.69366/S.7 of 25 July 1941 from Charles Evans (Principal Assistant Secretary to the Permanent Under-Secretary of State for Air) to AOCinCs and a similar letter of the same date to the various Dominion Liaison Officers.

<sup>26</sup> AMO A.983/1941 of 27 November.

<sup>27</sup> AMO A.716/1943 of 22 July.

<sup>28</sup> While it risks muddying the waters, a few words of explanation on the designation of wireless trades may be appropriate. From 1922 onwards the RAF employed dual-qualified wireless operator mechanics (WOM), a Group I trade, and Group II wireless operators (WOp). However, AMO A.422/1938 of 1 December remustered all WOMs into the new Group I trade of wireless and electrical mechanic (WEM), who were to supervise Group II WOps and, the recently reintroduced, electricians, but it failed to specify the effective date. This led to considerable confusion which was eventually resolved by the publication of AMO A.146/1939 on 24 April which made it clear that the remustering from WOM to WEM was to be understood as having been with immediate effect, ie from 1 December 1938. The kaleidoscope was given a further shake by AMO A.442/1940 of 4 July which reintroduced the Group I trade of the WOM, so for most of WW II there were WOps, WOMs *and* WEMs.

<sup>29</sup> AMO A.424/1942 of 30 April.

<sup>30</sup> AMO A.551/1942 of 4 June.

<sup>31</sup> AMO A.1242/1943 dated 2 December, the details of which were amplified by AMO A.244/1944 dated 23 March.

<sup>32</sup> AMO A.3/1944 of 6 January. Apart from introducing the 'S' badge, this Order noted that the 'O', 'RO', 'AG', 'N', 'B' and 'E' badges were all still current (although the first two of these were no longer being awarded). A month later this Order was amended to state, yet again, that, regardless of which badges an individual may have, at some time, been entitled to wear, air crew currently employed as such were to wear *only* the badge of the category in which they were presently mustered or listed.

<sup>33</sup> AMO A.916/1944 of 21 September.

<sup>34</sup> It is some indication of the core skills required of the WOM(air) that these men were to be drawn from volunteers from the following trades: wireless operators, wireless operators (air), wireless and electrical mechanics, wireless mechanics and wireless operator mechanics. This list also conveys some impression of the confusing complexity which had developed within the overall trade structure by 1944. There had been two main reasons for this. First, the increasing complexity of equipment, which encouraged an increased degree of specialisation, and secondly, the need for economy. The latter consideration was more to do with time than money. It was not sensible to invest two or three years in producing multi-skilled, apprentice-quality tradesmen in wartime, especially as most of them were in uniform only 'for the duration' (although, in point of fact, and in marked contrast to the suspension of the Cranwell cadet scheme, apprentices continued to be trained at Halton throughout the war). It was far more practical to provide the majority of airmen with sufficient training to enable them to function productively, as quickly as possible, in a relatively narrow field and then to remuster them to progressively higher qualified trades as and when their expertise increased through experience and post-graduate instruction, their

progress being validated by examinations administered by the Central Trade Test Board. The inevitable result of this pragmatic approach had been a proliferation of trades; the fifty which had sufficed at the beginning of the war had become 235 by VJ-Day.

<sup>35</sup> Note that, since they declined to follow the RAF's lead over the introduction of WOps(air) and WOMs(air), the RAAF, RCAF and RNZAF did not adopt the 'S' badge during WW II, all of these air forces continuing to employ WOp/AGs.

<sup>36</sup> It had originally been intended to open two more supplementary schools but, as with observers, there was some dissatisfaction with the commercially trained product and civilian participation was eventually abandoned early in 1941 in favour of an all Service-run system.

<sup>37</sup> TNA AIR10/1931. According to the September 1939, 5th Edition of AP1388, the Standard Syllabus for the Training of Pilots, Air Observers & Air Gunners at Training Establishments (Peace and War), WOps with the potential to be gunners were to be identified in the thirteenth week of training. For them, 35 hours were allocated to air exercises at the Electrical and Wireless School but this included such ancillary activities as 'marching to and from the aerodrome' and the actually airborne time amounted to just 10 hours: five flights, totalling 4 hours, in a 'flying classroom' (typically, at the time, a Valentia) and five more (6 hours) in a 'single-engined aircraft' (in 1939, probably a Wallace), although these were to be regarded as the minimum and additional flying was to be arranged if practical.

<sup>38</sup> There were eventually seven Signals Schools altogether but only Nos 1, 2 and 4 were directly involved with air crew training.

<sup>39</sup> AMO A.804/1941 of 2 October announced details of the new approach to the training of WOp/AGs and gave some indication of the standards expected. So far as Morse was concerned, an AC2 was expected to achieve eighteen words per minute, an AC1 twenty and an LAC twenty-two.

<sup>40</sup> With responsibility for basic Morse training having already passed to, the recently established, Nos 19 and 20 ITWs, No 10 RC ceased to deal with prospective air crew wireless operators and in August 1943 the unit was redesignated to become No 13 Radio School.

<sup>41</sup> Although the basic Morse qualification test was at 18 wpm, most operators aspired to 25 or better. Morse at relatively high speeds required a degree of natural aptitude which, if lacking, accounted for the majority of suspensions from training.

<sup>42</sup> No 20 ITW moved to Usworth in the autumn of 1943. In the following spring Nos 18 and 19 ITWs moved to Bridlington where they were merged to create a new No 70 ITW.

<sup>43</sup> TNA AIR41/70. These figures have been derived from statistics compiled by AHB which were subsequently published in AP3233, Vol 1.

<sup>44</sup> The thirteen were: pilot; navigator; Nav(B); Nav(Radio); Nav(W); air bomber; flight engineer; WOM(air); WOp(air) Grade I; WOp(air) Grade II; air gunner; air gunner/FM(A) and air gunner/FM(E); a fourteenth, the meteorological air observer, was about to be introduced.

## THE 'HAND AND THUNDERBOLT' BADGE by Wg Cdr Jeff Jefford



Often referred to in later years as the 'handful of sparks' or simply the 'sparks' badge, the insignia still worn today by selected airmen is one of only two RAF 'trade' badges that have been authorised for use continuously since the formation of the Service on 1 April 1918, the other being the pilots 'wings'. Despite, or perhaps because of, its antiquity, however, the origins of this venerable emblem are somewhat obscure.

During WW I most RFC personnel on active service in France were stationed on airfields, typically located ten or fifteen miles behind the lines. There, beyond the occasional air raid, they lived in conditions of relative security and comfort that were a world away from the circumstances being endured by their less fortunate colleagues in, or in the vicinity of, the trenches. Aircrew were at risk, of course, but only for the relatively short periods while they were actually flying. There was, however, one group of RFC men who were frequently in harm's way – the wireless operators.

Radio technology was in its infancy in 1914-18 and consisted, for the most part, in air-to-ground-only transmissions using Morse in connection with artillery co-operation. Aircrew were trained to work at no more than eight words per minute and they were not required to send complex messages. Most of the instructions that they needed to pass to the ground were very succinct, consisting of single letters or two- or three-letter groups drawn from a universally understood code. Messages for the crew were sent via ground signals, the early use of pyrotechnics soon being superseded by 'panels' – strips of white cloth laid out on the ground to create patterns which had predetermined meanings.



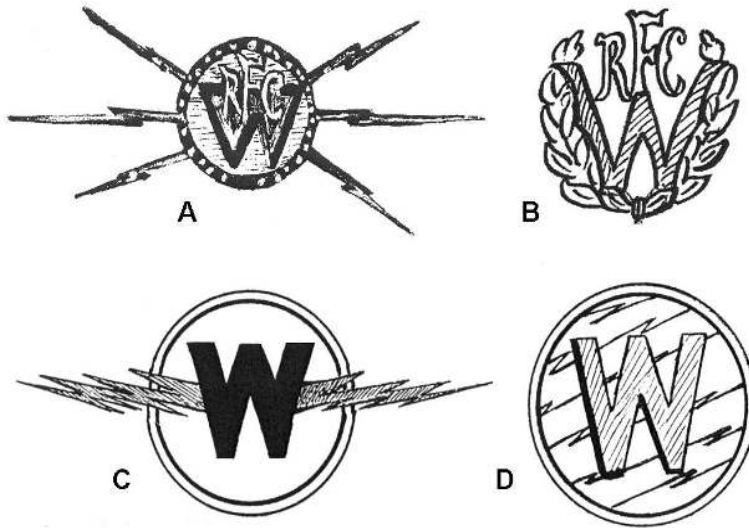
The men who laid out the ground signals and worked the radio receivers were RFC wireless operators who were attached to the battery with which their squadron was working. That meant that they were deployed forward in a high risk zone where they could become involved in an artillery duel in which they found themselves playing the role of the target.

In recognition of this, in January 1917, Lt Col Lionel Charlton, then of the Air Organisation staff at the War Office, minuted the Quartermaster General to point out that these men had to perform 'work which requires great skill and great personal responsibility, often under conditions which are very trying and dangerous.' He argued that this warranted a badge that would distinguish these men from the 'ordinary air mechanic who is seldom called upon to face [such] hardships and dangers' and submitted a possible design for consideration.<sup>1</sup> The initial response was guarded, as there were a number of other applications for special badges in the mill and an ingrained conservatism meant that there was a reluctance to sanction too many, apart from the practical issue of the cost of materials and manufacture.

Nevertheless, Charlton was authorised to pursue his case and the sketch of Badge A (*see Figure 1*), which, it was proposed, 'should be worn on the right arm' was despatched to HQ RFC whose views were sought. The question was mulled over for several months, during which the design was extensively revised and refined, resulting in several alternative options. In June Maj D Powell wrote to HQ RFC to announce that 'sanction has now been given' for wireless operators to wear a special badge.<sup>2</sup> The selected design was Badge D and HQ RFC was invited to submit suitable samples of fabric and colours.

Several examples were produced in different colours and these are still on file in the National Archives at Kew but accompanying documentary evidence suggests that the preferred option would have been a blue 'W' with the lightning flashes and circular border in yellow on a khaki ground.

This badge evidently fell out of favour and the next stage was a design featuring a single lightning flash crossed with a propeller which was submitted by HQ Administrative Wing at Farnborough in September 1917. No further action appears to have been taken until early 1918 when HQ RFC requested a progress report on its badge.



*Fig 1. Examples of possible wireless operator badges that were considered during 1917.*

Maj Powell responded to the effect that, as yet, ‘no sanction has been given in this matter.’<sup>3</sup> HQ RFC promptly pointed out that sanction had already been granted, in the previous June, and asked whether the badges were actually going to be made available. On 26 February an Org Staff minute explained that it had been decided to postpone the introduction of the badge until the ‘new Air Force’ had been formed and, since this was now imminent, it went on to invite the Comptroller General of Equipment to ‘decide which badge shall be adopted.’

Two days later it was announced that the badge would be ‘a grasped thunderbolt in red silk on a black ground’ which was to be worn immediately under the ‘bird’ on each arm by all wireless mechanics and operators.<sup>4</sup> In the event, since the eventual badge actually featured three thunderbolts, it might be seen as a reversion to a simplified version of the original design for Badge A.

This became public knowledge on 1 May 1918 when Air Ministry Weekly Order (AMWO) 162, which promulgated uniform regulations for the newly-established RAF, stated that ‘wireless mechanics will wear [...] the “Hand and Thunderbolt” immediately under the Bird.’ This edict was repeated in AMWO 728 of 25 July in the context of the



*This gunner, with a Vickers Gas Operated (VGO) machine gun in a Fairey Battle, is wearing the 'sparks' badge that marked him as a WOp or a WOM. The brass 'winged bullet' was superseded by the cloth 'AG' badge to be worn on the breast in December 1939, so this picture will have been taken no later than early 1940. (Chaz Bowyer)*

newly authorised light blue uniform, implying that, in conformity with other badges, the emblem would now also be manufactured in pale blue embroidery on a dark blue ground. So the badge had now been officially authorised, twice, but that is not to say, of course, that there actually were any available to be worn – in either colour.

As with a number of other regulations laid down for the early RAF, both of these Orders contained errors which had to be corrected in arrears. In this instance, it will be recalled that the original case for a special badge had been submitted on behalf of the wireless *operators*, who were liable to be deployed forward, and specifically not the *mechanics* who worked in the relative safety of an airfield. This was eventually put right on 19 September when AMWO 1066 directed that the 'Hand and Thunderbolt' badge was, in future, to be referred to as the 'Badge, Wireless Operators' and that it was to be worn *only* by wireless operators. The sting in the tail was that the Order went on to say that supplies of the badge in the red silk applicable to khaki uniform (still the only viable option at the time), would be available

‘shortly’ and that indents should not be submitted until instructions to do so had been issued. The fighting stopped a little over seven weeks later so it appears quite possible that some men may still not have been able to put up their badges before the Armistice. Furthermore, when the badges did become available they were in red silk on khaki, like all other RAF badges of the period, and not the black that had originally been specified by the Ministry.

There is, incidentally, evidence, in the form of examples in brass, of another badge allegedly dating from the WW I period, similar to the ‘hand and thunderbolt’ but with the hand replaced by an ‘O’, but these were illicit as official authority for their introduction is lacking (and they may actually be of a much later date).

Retained by the peacetime RAF, but worn only on the right sleeve from (probably) 1934 onwards, the hand and thunderbolt remained in use for both ‘straight’ wireless operators and dual-qualified wireless operator mechanics until 1938 when the new trade of the wireless and electrical mechanic was added, the common theme being a facility with Morse at, at least, 18 words per minute. The badge’s exclusivity began to break down in 1940 when radio operators and radio mechanics, for whom Morse was not an essential prerequisite, were also authorised to wear it<sup>5</sup> – at the time ‘radio’ implied what later became ‘radar’.<sup>6</sup> In 1951 it was redesignated to become the telecommunications badge and it remains in use today, still being worn on the right sleeve, by airmen of TG 1 (Avionics) and TG 4 (Systems Engineers).

**Notes:**

<sup>1</sup> TNA AIR/1/818/204/4/1303. Minute dated 10 January 1917.

<sup>2</sup> *Ibid.* Letter 20/Flying/Corps/132 (O.3) dated 19 June 1917.

<sup>3</sup> *Ibid.* Letter 20/Flying/Corps/132 (O.3) dated 19 February 1918.

<sup>4</sup> *Ibid.* Letter 20/Flying Corps/132 dated 28 February 1918

<sup>5</sup> AMO A.799/1940 of 24 October.

<sup>6</sup> Radar (RADio Direction And Range) was an American acronym coined in 1940 which did not begin to enter the RAF’s informal lexicon until 1942 and was not formally adopted until late 1943 when the term ‘RDF’ was finally abandoned in favour of ‘radar’ on the authority of AMO A.863/1943 of 2 September, although the associated ‘Radiolocation’ was not formally discontinued until as late as 25 January 1945 (by AMO A.80/1945).

## ERRATA

Regrettably, your Editor is clearly starting to lose it, as Journal 49 contained several typos and at least one error of fact.

p117 – second line of CV, ‘Nos 2,’ should be ‘Nos 23,’.

p159 – ten lines up from bottom, ‘Georg’ should be ‘George’

p159 – The review of *Churchill’s Navigator* stated that it had been published by Pen and Sword. That was an error, for which due apology is made. The book is actually published by Grub Street.

p165 – fifth line down, ‘though’ should be ‘thought’.

p165 – thirteen lines down, ‘Greig’ should be ‘Greig’s’

In addition, Richard Bateson has written to point out a couple of errors on p79. The Polish general was Ludomił Rayski (not Lodomil Raysky) and his period of internment in Scotland was 27 September-5 November 1940, so his release was after, rather than ‘at the height of’, the Battle of Britain.

## THE OLD ONES ARE THE BEST ONES

Lifted from a recent edition (No 46) of *Sparks*, the magazine of the RAF Yatesbury Association, the following exchange is said to have been overheard when a group of airmen was waiting interminably at the guardroom while its denizens completed some arcane bureaucratic procedure.

Anonymous, and very bored, airman: ‘They also serve who only stand and wait.’

SWO: ‘Who said that?!’

Anon: ‘Milton Sir.’

SWO: ‘Come out here Milton.’

## UPDATE ON FORTHCOMING RAF MUSEUM EXHIBITS

Society members will be aware that the Royal Air Force Museum routinely unveils new aircraft (either newly acquired or recently restored examples) together with special exhibitions throughout the year at Cosford and Hendon.

The Museum normally invites individuals with a close interest in, or a strong family connection with, the aircraft type to attend the formal unveiling. If any members are interested in the following events, scheduled for later in 2011, they are invited to contact Ajay Srivastava at the Royal Air Force Museum to register an interest at [ajay@rafmuseum.org](mailto:ajay@rafmuseum.org)

- EAP ZF534(Cosford)
- Sopwith Dolphin C3988 (Hendon)
- Comper Swift G-ACGL (Cosford)
- Fairy Battle L5343 (Hendon)
- Douglas A-20G Havoc 43-9436 (Hendon)
- Tornado F3 ZE887 (Hendon)



*The Museum's Havoc (Boston to the RAF), seen here under restoration in Australia, should arrive in the UK during 2011.*

## BOOK REVIEWS

**Stay the Distance** – The Life and Times of Marshal of the Royal Air Force Sir Michael Beetham by Peter Jacobs with a Foreword by Sebastian Cox. Frontline Books, 2011. £25.00

Being the biography of this Society's long-serving President, this book is close to our hearts. The author, Peter Jacobs, a serving wing commander, took on the task when the initial author, the late Air Commodore Henry Probert – the biographer of Sir Arthur Harris, who had already done much research into his second subject's early days – died suddenly at the end of 2007. Peter Jacobs first met Sir Michael in 1989 at Birchwood near Lincoln, when the latter unveiled a memorial to the two Lancaster squadrons that had operated from the site, then called RAF Skellingthorpe. Peter took on the task of producing a Roll of Honour for the Nos 50 and 61 Squadrons Association, recording the names, aircraft and date of some 1,976 aircrew (and some groundcrew) lost by the two squadrons during the strategic bombing campaign.

Fg Off Beetham joined No 50 Sqn as a 20 year old Lancaster captain in October 1943 and survived with his crew through that long hard winter when Bomber Command's losses were at their greatest. As a crew, several members of which still meet every June at Skellingthorpe, they participated in ten, of the sixteen, raids made on Berlin that winter and finished their tour of operations before their captain's 21st birthday – and before he had a driving licence! To me this chapter was an eye-opener: as an ex-OC 50 Squadron (in Vulcan days at Waddington, when our editor was my navigator plotter), I thought I had a feel for what our predecessors went through. I finished the chapter mightily humbled.

Sir Michael's RAF career began in 1941 and culminated in 1977 with his appointment as Chief of the Air Staff, in which capacity he served for over five years – second only in length to Lord Trenchard. The book chronicles his life throughout WW II and goes on, via post-war survey work in Africa, to command of one of the first Valiant squadrons. During his Valiant tour he took the lead in the development of practical air-to-air refuelling procedures, in the course of which he made several record breaking, non-stop flights to southern Africa, thus beginning the process of accumulating the experience that

would eventually pay dividends during the Falklands campaign in 1982. Then come chapters describing his time as Gp Capt Ops at HQ Bomber Command during the Cuba crisis in October 1962, as Station Commander at Khormaksar, then the RAF's largest base, during what became known as The Emergency, and culminating in his tour as CinC RAF Germany and ultimately as CAS, all interspersed with staff tours at MOD and High Wycombe. In his research into these later appointments, Peter Jacobs has drawn on the experiences of most of Sir Michael's Personal Staff Officers to capture what it was like to be just outside the great man's office door. All of these PSOs, incidentally, survived the experience to become Air Officers themselves!

As Sir Michael was coming to the end of his time as CAS in 1982, the Argentineans invaded the Falklands. Initially, as Acting CDS, he was instrumental in coordinating action across Whitehall and then had to fight hard to make politicians and, particularly, the Royal Navy's leadership understand that air power would have a major role to play in any campaign to defend our assets and in the resupply of the forces that would need to be deployed in order to regain the islands. Sir Michael's clarity of vision and determination shine through this chapter. Members will read – not always between the lines – of tensions at the top of the MOD and I for one finished this chapter with a much greater respect for the then Secretary of State for Defence, John Nott, than had previously been the case.

The book, a 284-page hardback, is well illustrated throughout and concludes with descriptions of the many, mostly RAF-connected, activities and enthusiasms in which Sir Michael has involved himself since he handed over as CAS. Marshals do not retire – they remain on the Active List for life – and if anyone should ask why, I encourage them to note Sir Michael's later career. At the top of the list must be his chairmanship, for sixteen years, of the Trustees of the RAF Museum. His work alongside the Director General, Michael Fopp, saw the Museum being put on a sustainable financial footing, the opening of the Michael Beetham Conservation Centre at Cosford and the initiation of the National Cold War Exhibition – all of which became the national gems they are today. Equally important must be his twenty-four-year, and continuing, presidency of the Bomber Command Association which is leading to the creation of a memorial,



in London's Green Park, to those 55,573 half-forgotten young men of Bomber Command. The remaining veterans are nearly there with their final project and Peter Jacobs has done them a great service in describing the life of their inspirational leader so conscientiously and clearly.

### **AVM Nigel Baldwin**

**Lawrence Of Arabia's Secret Air Force (Based on the Diary of Flight Sergeant George Hynes)** by James Patrick Hynes. Pen & Sword, 2010. £19.99.

Individual diaries from both world wars continue to be discovered and published, to our collective benefit. Although the stories of the great and the good have long seen the light of day, many of those that have recently emerged were written by individuals that would never have claimed greatness. However, their personal narratives offer a new perspective on major events and in some ways provide the freshness and colour that are so often missing from better known and, generally, better crafted accounts.

In this process much depends on the editor (and ultimately the publisher). There is generally a need to provide context (particularly if the author was a ranker) and some explanation to assist the modern reader. There are also errors and omissions to be resolved. At its best, the hand of the editor is invisible, but at its worst so much detail can be added that it overwhelms the narrative and the original author's voice is simply drowned out.

Unfortunately, *Lawrence of Arabia's Secret Air Force* veers towards the latter. On the one hand, it is a fascinating account of the life of a JNCO serving with No 14 Sqn in the Sinai during the First World War. This is a story that deserves to be told and sheds new light on a campaign that continues to fascinate. On the other hand, because the editor has seen fit to retell the story, while still including the original diary entries, many of the events are described twice. As a result, the narrative flow is lost as is any sense of immediacy. The editing process has also created a confused chronology. The irony is that a great deal of this extra text is superfluous and, although it would have made for a shorter book, removal would have been for the better. It has also to be said that the rigour of the research underpinning some of this material has to be questioned. For example, although reference

is made to other sources, such as Peter Wright and Roger Bragger's article 'Lawrence's Air Force' – published in *Cross & Cockade Journal*, Vol 34, No2 in 2003 – nowhere is it made clear that parts of the latter have simply been pasted into the text. The irony is that another article published in the same issue of the *Cross & Cockade Journal*, 'Biffy Borton's Bomber', answers some of the questions raised about Borton and the date of the arrival of the first Handley Page O/400 in the Middle East. Unfortunately, this is not the only occasion where the editor's lack of knowledge of the period is apparent.

Overall, this is a curate's egg of a book. The best bits are certainly the original diary entries. They stand by themselves and provide an important insight into the life of a technical NCO within the Royal Flying Corps. Too few such accounts have survived and this is an excellent addition to the corpus. The difficulty is that you have to wade through the editor's contribution. On balance, however, I would still recommend the book as an important addition to the story of flying operations in the First World War.

**AVM Peter Dye**

**The History of RAF Aerobatic Teams From 1920** by David Watkins. Pen & Sword; 2010. £30.00.

The title of David Watkins' *The History of RAF Aerobatic Teams From 1920* is self-explanatory. What it says is exactly what you get and the fact that it has been endorsed by Roger Topp and Peter Latham, both of whom have contributed Forewords, is an implicit guarantee of its worth. If further evidence of its authority is needed it is surely provided by the number of personalities who were consulted; the list of those acknowledged runs to approaching 300 names, many of whom contributed the personal vignettes which appear throughout the narrative.

After a brief dissertation on the overall history of RAF aerobatic teams and a cursory examination of the underlying philosophy – 'Why do it?' – the book goes on to chew its way remorselessly through all of the display teams that the RAF has ever fielded. The first such chapter, and the largest, works its way through squadrons in numerical order, going right back to the Hendon displays of the inter-war years. Until 1957 practically any post-war fighter squadron worth its salt

would put up a four-ship of Vampires or Meteors, but the heyday of the squadrons was in 1957-63 when, as the official RAF Display Team, the *Black Arrows*, the *Blue Diamonds*, the *Tigers* and the *Firebirds* took it in turns to thrill the public at home and abroad with spectacular routines performed by Hunters and Lightnings.



*No 45 Sqn's four-Venom team in 1957.*

All of this and much more is recounted in satisfying detail and I will be surprised if anyone is able to come up with any significant oversights. My test was No 45 Sqn which only ever ran a team for one season (on Venoms in FEAF in 1957), which performed in public on only one occasion. They don't get much more obscure than that, but the book passed the test with flying colours, even recording the change in membership when the team was briefly reconstituted late in the year for an in-house display to mark the end of the squadron's Venom era. The only thing lacking is a photograph (an omission which is remedied here), but you can't have everything.

Subsequent chapters deal with the teams fielded by the RAuxAF squadrons and the Flying Training Schools (all those *Vipers*, *Gemini Pairs*, *Linton Blades*, *Swords*, *Blue Chips*, *Yellow Jacks*, etc) with Cranwell, Manby, the CFS and, of course, the *Red Arrows*, all having chapters of their own. Canberra and helicopter teams are included, as are those mounted by several lesser known units such as the FEAF Towed Target Flight; even the four-man RAF team that flew *Luftwaffe* Fouga Magisters from Landsberg in 1960-61 gets three pages.

There is no index as such but the final chapter lists the individual members of each team by year from 1920 to 2010 which is more than adequate as a cross-reference. Photographs? Oh yes! More than 300 of them, all well-reproduced; about thirty of these are in colour including, quite remarkably, one of a Fury of No 1 Sqn taken in 1934. Howlers? Bound to be the odd one in a book of this size and, just to

prove that I did read it, I found one on page 33. When No 54 Sqn's Vampires flew to America in 1948 they made the first east to west (not west to east) crossing of the Atlantic by jet fighters.

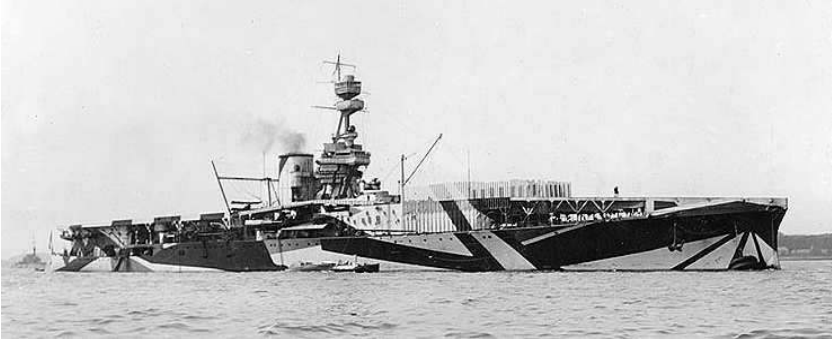
Watkins' book, which runs to a pretty hefty 475 pages, is a *tour de force* but, while my admiration for it must be evident, I have to say that it is not really a book that one can settle down to read from cover to cover. There is absolutely nothing wrong with the style of the writing, or with the presentation, but the nature of the content means that it is inevitably somewhat repetitive – once you have read about two or three four-ships of Hunters, you will have, more or less, read about them all. On the other hand, as a book to dip into, it is full of informative and entertaining anecdotes and, as work of reference, it is quite unique. If you ever flew in a team, I am 99.99% certain that you will find your name recorded here. Had I not been able to exercise my editorial prerogative (abused my privileged position?) to secure the review copy, I would certainly have bought one myself.

**CGJ**

**World War One Aircraft Carrier Pioneer** – the Story & Diaries of Jack McCleery by Guy Warner. Pen & Sword; 2011. £15.0

Editing a diary, and any associated correspondence, for public consumption is not as easy as it may at first appear. Broadly speaking, the more articulate and coherent the original, the less the editor should contribute. All too often an editor's interjections create distractions which disturb the flow of the narrative, frequently without adding anything of any real consequence – where additional information is considered essential it is usually best provided in footnotes or endnotes. At the other extreme, a diary, which may well contain some important insights, may be so poorly presented that it simply could not stand alone. In such cases the original material can provide little more than a skeleton which the editor has to flesh out to such an extent that he is, in effect, committed to becoming the *de facto* author himself.

Jack McCleery's writings fall firmly into the second category and Guy Warner has made an excellent job of telling his story for him. That is not even to suggest, of course, that McCleery was incapable of writing coherently, simply that he did not bother to do so. Why would he? He was not writing for publication. He was simply jotting down random thoughts in a personal journal and writing letters home to his



*HMS Furious in her second configuration with a ramped flying-off platform in front of the superstructure and a flat, but unsatisfactory, landing-on platform abaft.*

family. Many of the diary entries are very brief, and often quite banal (eg ‘Up at 5.45am and fetched N1272 from *Pegasus*. Very cold, but nice morning. Letters from Meta and Bunty’ and ‘Church in the evening. Sermon on Elijah and also some good hymns.’) and the letters are often concerned with minor domestic detail (eg periodic crises over laundry, including one that ran on for a while involving a shortage of underpants).

Nevertheless, Warner has reproduced the entire diary, and a fair selection of the letters home, verbatim interspersed with large chunks of amplification – and it works. It works for two reasons; first because the previously obscure McCleery was actually a remarkable pilot whose story deserved to be told and, secondly, because, in contrast to the original material, Warner’s own prose is faultless and this inspires confidence in his abilities as an interpreter.

In brief, McCleery joined the RNAS in late-1916 and the book traces his progress via the Crystal Palace, Eastchurch, Cranwell, Freiston, Calshot and the Isle of Grain to become a fully fledged landplane and seaplane pilot – and it is as good an account of a naval aviator’s training as I can recall reading. In June 1917 he was posted to HMS *Furious*, then in her first iteration as an aircraft carrier with a flying-off deck only in front of her superstructure. McCleery was specifically a seaplane pilot at this stage, flying Short 184s from this ramped foredeck.

The ship was being used by wheeled-aeroplanes at the same time

and McCleery was one of the group of men who, on 2 August 1917, grabbed hold of Dunning's, virtually hovering, Pup and hauled it down onto the deck to make the first ever landing on a ship under way. This was seen to be such a promising development that *Furious* was further modified to have a landing-on deck aft of the superstructure. Sadly this was a failure because of the inevitable turbulence. After thirteen landings, only three of which did not result in significant damage, the experiment was abandoned, but *Furious* continued to fly Camels and 1½ Strutters (McCleery's type by 1918) from the sharp end with recoveries being made ashore or, if necessary, by ditching. This culminated in the famous Tondern raid on 19 July in which six (out of seven launched) Camels destroyed two Zeppelins in their lair in what was the world's first carrier air strike.

All of this, and much else besides, is recounted by Warner who thus provides us with what amounts to a very readable account of the evolution of early carrier aviation. While McCleery was a witness, and indeed a participant, in much of this, his own writings do not actually tell us a great deal about flying, but his observations on life at sea and his responsibilities as a seaman are illuminating. Being an aviator did not excuse a pilot from standing his turn as Officer of the Watch, nor did being an officer mean that he was above working the derrick on the hangar deck. Knowing little of naval warfare myself, I was surprised to learn of the frequency of close encounters with mines during the ship's several forays into the North Sea – as many as half-a-dozen being observed in the course of a two-hour watch. Also of interest is McCleery's initial resentment at being rudely turfed out of the RNAS and into the RAF and his subsequent acquisition of khaki and light blue air force uniforms to add to his wardrobe of naval rigs.

He remained with *Furious* until he was demobbed in February 1919. As a seaborne pilot in WW I, he had been one of a very select band of men and, in addition to Dunning, other notables with whom he had rubbed shoulders included Busteed, Bell-Davies, Rutland and Dickson (a particular friend, who flew on the Tondern raid and who would eventually become MRAF Sir William Dickson, the first CDS).

The narrative of this, well-indexed, 293-page hardback is supported by about sixty photographs featuring personalities, ships and aeroplanes, all taken from McCleery's album and very well reproduced. Few, if any, of these pictures, will have been seen before.

A very successful exercise in mining some relatively unpromising material to produce an informative and readable book. Recommended.

**CGJ**

**Lifeline In Helmand** – RAF Battlefield Mobility In Afghanistan by Roger Annett. Pen & Sword, 2010. £30.00

In a previous review I bemoaned the fact that among the plethora of books about the conflict in Afghanistan, there were very few dealing with the RAF's contribution. This shortfall has been redressed by Roger Annett in his 286-page hardback *Lifeline In Helmand*.

Annett will be familiar to readers of this journal from his earlier titles *Drop Zone Borneo* and *Drop Zone Burma*. Both of these accounts are a little unusual in that they do not deal with the more exciting aspects of aerial warfare, focusing instead on relatively mundane, but nonetheless vital, aspects of an air campaign. As reflected in its sub-title, *Lifeline To Helmand* maintains that theme.

At the book's core is the work of 1310 Flight, operating the Chinook helicopter in Helmand and sometimes elsewhere. The flight is manned in rotation by crews from RAF Odiham and in the period covered, this task fell to C Flight of No 27 Sqn so the story is told through the eyes of 'The Boss', 'Frankie', 'Chomper', 'Mr B', 'Ginger' and 'Morts'. About the only person who seems to use his real name is Warrant Officer John Edbrooke, the Engineering Officer. We follow C Flight through its pre-deployment training and preparations and then into Theatre, where the reader learns about the various tasks, locations and issues which govern the crews' daily routine. The book is well illustrated, with both colour and monochrome photographs, and detailed maps, which are essential if the narrative is to be fully appreciated. The RAF, as with most organisations, has its own constantly evolving lexicon of acronyms and jargon and most readers will find it useful to have a thumb lodged permanently in the Glossary.

Annett's book is not confined to helicopter operations, however, since it addresses many other areas of the support required to sustain the overall campaign. The Hercules' role as a tactical transport and the strategic capabilities of the C-17 Globemaster are both covered, as are the work of the Army's 47 Air Despatch Squadron and of the RAF's

Air Mobility Wing. There is coverage of the Chinook's role in emergency casualty evacuation, which embraces the tasks of the front line medical staff, including medical evacuation from Theatre to the UK. Readers will be all too familiar with the ceremonies which take place at Lyneham and in Wootton Bassett whenever the remains of the fallen are repatriated and the work of preparing and carrying out this task makes sobering reading.

I should probably declare an interest, as I have been assisting the author with some research for his next project. Nonetheless, I can recommend this book to anyone with an interest in the conflicts in which our armed forces are currently involved. The breadth of its coverage provides a sound appreciation of the RAF's support role in Afghanistan. The final chapter, written a year or more ago, reveals the unremitting pressure borne by the current generation of service personnel – by the time that this review appears, the number of deployments that have been made by some members of the Chinook community will be approaching double figures.

**Wg Cdr Colin Cummings**

**Note to all authors.** It doesn't really help to convert old-fashioned proper English (Oh alright – British) money into French. For example, a book that was recently reviewed for this Society noted that the cost of attending a reunion dinner in 1927 had been 10/6d. This figure had been translated into new-fangled metric, but that does not mean that those who attended had been fed and watered for 52·5p. I offer two suggestions: apply the change in RPI over the period, which would convert 10/6d into roughly £25, or, compare the cost to a day's pay, which in 1927 was four shillings for an LAC aircrafthand and about thirty bob for a flight lieutenant. Either option provides a reasonable impression of what the contemporary damage really was. **Ed**



## **ROYAL AIR FORCE HISTORICAL SOCIETY**

The Royal Air Force has been in existence for almost ninety 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 under the 30-year rule. These studies are important 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 Service 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 London, with occasional events in other parts of the country. Transcripts of lectures and seminars are published in the Journal of the RAF Historical Society, which is distributed 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 £18 per annum and further details may be obtained from the Membership Secretary, Dr Jack Dunham, Silverhill House, Coombe, Wotton-under-Edge, Gloucestershire. GL12 7ND. (Tel 01453-843362)

### THE TWO AIR FORCES AWARD

In 1996 the Royal Air Force Historical Society established, in collaboration with its American sister organisation, the Air Force Historical Foundation, the *Two Air Forces Award*, which was to be presented annually on each side of the Atlantic in recognition of outstanding academic work by a serving officer or airman. The RAF winners have been:

1996	Sqn Ldr P C Emmett PhD MSc BSc CEng MIEE
1997	Wg Cdr M P Brzezicki MPhil MIL
1998	Wg Cdr P J Daybell MBE MA BA
1999	Sqn Ldr S P Harpum MSc BSc MILT
2000	Sqn Ldr A W Riches MA
2001	Sqn Ldr C H Goss MA
2002	Sqn Ldr S I Richards BSc
2003	Wg Cdr T M Webster MB BS MRCGP MRaES
2004	Sqn Ldr S Gardner MA MPhil
2005	Wg Cdr S D Ellard MSc BSc CEng MRaES MBCS
2007	Wg Cdr H Smyth DFC RAF
2008	Wg Cdr B J Hunt MSc MBIFM MinstAM
2009	Gp Capt A J Byford MA MA

### THE AIR LEAGUE GOLD MEDAL

On 11 February 1998 the Air League presented the Royal Air Force Historical Society with a Gold Medal in recognition of the Society's achievements in recording aspects of the evolution of British air power and thus realising one of the aims of the League. The Executive Committee decided that the medal should be awarded periodically to a nominal holder (it actually resides at the Royal Air Force Club, where it is on display) who was to be an individual who had made a particularly significant contribution to the conduct of the Society's affairs. Holders to date have been:

Air Marshal Sir Frederick Sowrey KCB CBE AFC  
Air Commodore H A Probert MBE MA

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