ROYAL AIR FORCE

HISTORICAL SOCIETY

JOURNAL

29

First published in the UK in 2003 by the Royal Air Force Historical Society

ISSN 1361-4231

Typeset by Creative Associates
115 Magdalen Road
Oxford
OX4 1RS

Printed by Advance Book Printing
Unit 9 Northmoor Park
Church Road
Northmoor
OX29 5UH

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**Ex Officio*

BATTLE OF BRITAIN DAY

Address to the Royal Air Force Historical Society by ***Dr Alfred Price*** *following its Annual General Meeting held at the RAF Club on 12th June 2002.*

The Royal Navy commemorates the Battle of Trafalgar. The Army commemorates Waterloo. The Royal Air Force commemorates the action on 15 September 1940, Battle of Britain Day. Each of these, in its way, was a decisive battle.

As everybody in this room knows, the Battle of Britain opened in July 1940 with attacks on coastal shipping. In the second week in August, the attack shifted to airfields. That phase of the action lasted until 7 September when the *Luftwaffe* shifted its objectives to targets in and

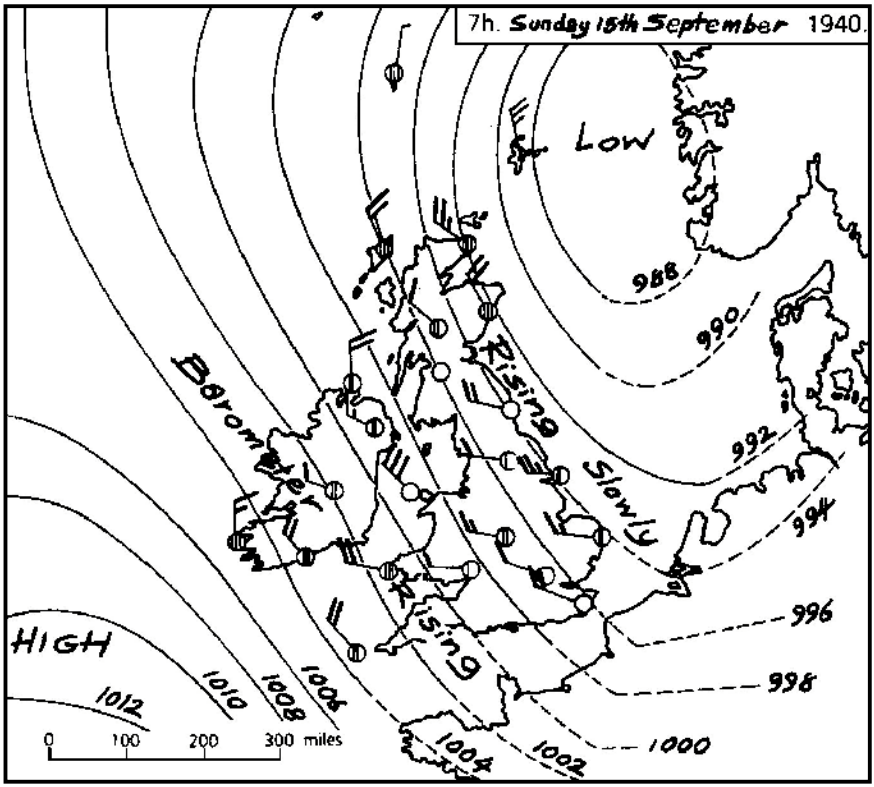


Fig 1. Synoptic chart for 0700hrs on 15 Sep 40.

around London. In the week that followed there were three more raids on London. Then, on Sunday 15 September, came the action that effectively decided the Battle of Britain.

Any good briefing has to start with the Met picture; Figure 1 is the weather chart for 0700 hrs GMT on 15 September. As you can see, there was an area of high pressure over the Bay of Biscay, and an associated trough of low pressure off the south coast of Norway. Over England the wind was from the north west, and throughout the morning it rose steadily. That afternoon RAF Bicester would record a wind of 96 mph from the north west, at 18 000 feet. The Met Office at Bracknell has estimated that from 1100 hrs the wind at that altitude would have had a similar strength and direction.

That powerful wind, almost on the nose of German aircraft flying on the main penetration route from the Pas de Calais to London, would have had a profound effect on the entire action. In terms of historical importance it can be likened to the rain shower on the morning of 17 June 1815, which forced Napoleon to delay his attack until the afternoon on the crucial day of the Battle of Waterloo.

Since the four previous major daylight attacks by the *Luftwaffe* had all been aimed at London, AVM Park required no great prescience to judge that the next one was also heading for the capital. He arranged his defence accordingly.

Figure 2 shows the dispositions of the opposing forces at the time of the initial contact, 1150 hrs. First over the coast were about sixty Me 109s on a free hunting patrol. Behind them came a formation of twenty-five Dornier 17s, with about thirty Me 109s flying close cover and another thirty giving open cover. Last over the coast, but catching up rapidly and soon to overtake the twin-engined bombers, were twenty-one Me 109 fighter-bombers with a similar number of fighters in escort.

Including units requested from No 10 Group in the west and No 12 Group in the midlands, Fighter Command scrambled twenty-three squadrons with a total of 254 Spitfires and Hurricanes to meet this attack. The shadowed circles indicate units still in the climb at this time, the simple circles indicate units at altitude and in position. Near the top of the map are the five squadrons of the No 12 Group ‘Big Wing’ on their way south. It would be the first time the wing would go into action at its full strength of five squadrons.

Three squadrons of Spitfires had been ordered to patrol over

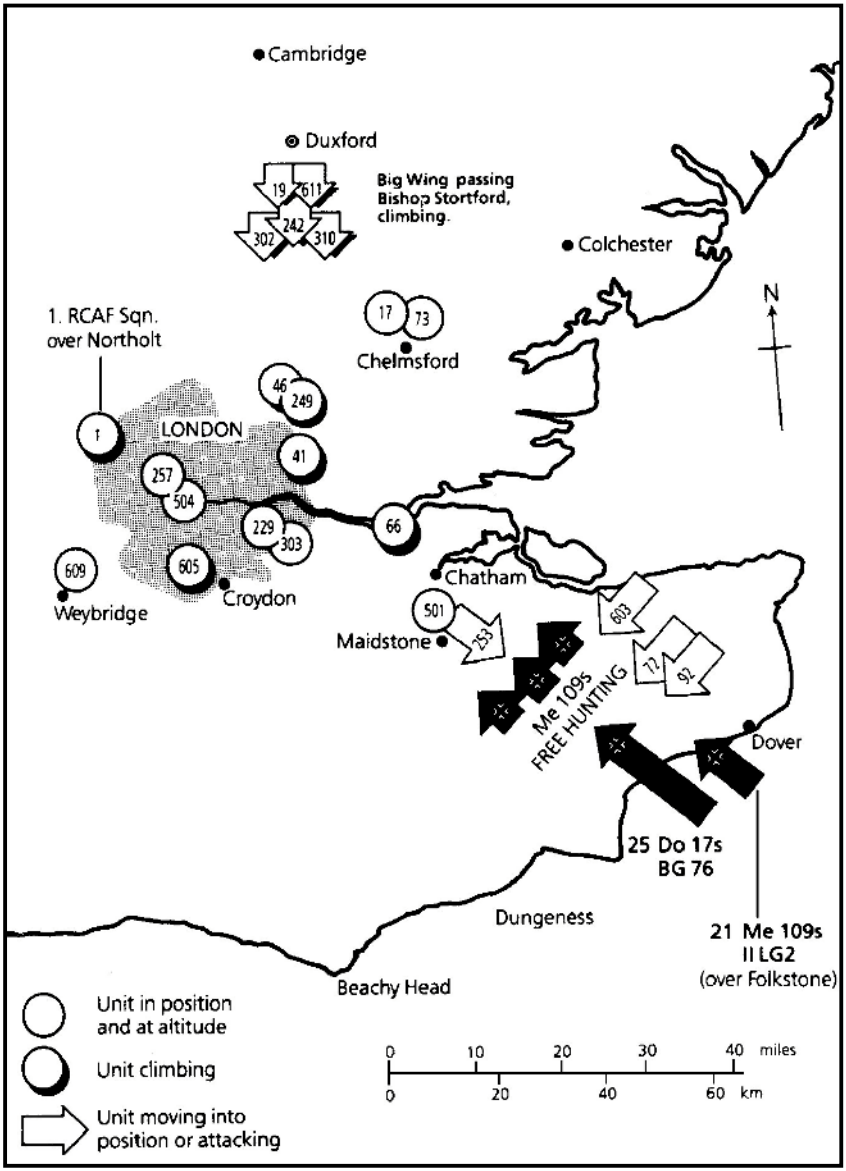


Fig 2. Disposition of British and German formations at 1150hrs.

Canterbury, well to the north of the raiders' expected route. That put them out the path of the free-hunting Messerschmitts. These Spitfires tried to fight their way past the escorts to the German bombers, but ended up in a series of inconclusive combats with the Messerschmitts. As the raiding force progressed across Kent, AVM Park sent eight Hurricane squadrons, operating in separate pairs, to engage the raiders at roughly five-minute intervals. Again the RAF fighters failed to inflict serious damage on the Dorniers but, by forcing the Messerschmitt 109s to fly at high throttle settings, they depleted the escorts' limited reserves of fuel.

The Messerschmitt 109 fighter-bombers, flying above 20 000 feet, reached the capital first and delivered their attack more or less as planned. Interestingly, RAF records make no mention of the attack by fighter-bombers. When the defending fighter squadrons saw Me 109s above them, they took them to be a free-hunting sweep by German fighters and left them well alone. The fighter-bombers aimed their bombs at rail targets in the capital, and caused minor damage and a few casualties in the boroughs of Lambeth, Streatham, Dulwich and Penge. Then they withdrew without loss.

During the approach flight across Kent, the German escorts fought an excellent covering operation. As a result the Dorniers reached the outskirts of London without losing a single aircraft. But, due to the powerful headwind, the bombers reached the target about half an hour late. By then the Me 109 escorts were running low on fuel, and had to turn back to go home. When the Dorniers commenced their bombing runs, virtually of all their escorts had gone home.

AVM Park had planned to fight his main action over the eastern outskirts of London. Accordingly his controllers had directed the remaining twelve squadrons, with 131 Spitfires and Hurricanes, into position there. Thanks to the delay imposed on the German advance by the powerful headwind, the RAF fighters had plenty of time to move into position. As the German formation commenced its bombing run, it came under repeated attack from RAF fighters

The first target was Latchmere Junction, a nodal point in the railway system just to the south of the Thames where lines from Clapham Junction and the south east converge to serve Victoria and Waterloo Stations. The attack was tolerably accurate, most bombs falling between Battersea Park and Lavender Hill/Wandsworth Road. Significant damage

was done to residential properties in the area but the rail viaducts were hit hard and traffic was halted for several hours.

It was during this engagement that one of the most remarkable images of the Battle of Britain was recorded. After commencing its bombing run one of the Dorniers had one engine knocked out and it straggled behind the formation. It immediately came under attack from several fighters and was badly shot up. Three of the crew, including the pilot, bailed out. The two remaining crewmen were almost certainly dead or unconscious. Flying on autopilot the lone bomber crossed the centre of London.

Sergeant Ray Holmes of No 504 Sqn was last to attack the lone bomber. He ran in from head-on, but shortly after he opened fire his Hurricane's guns fell silent – he was out of ammunition. He made a snap decision to ram the bomber. His port wing struck the Dornier's rear fuselage, shearing off the entire tail unit. The bomber then made a sharp bunt, which caused the outer wing on each side to snap off. The bomber then entered a spin so violent, that two 110 lb bombs and a canister of incendiaries tore off their mountings and smashed through the side of the bomb bay. The fall of the tailless, and largely wingless, Dornier was filmed until it hit the ground on the forecourt of Victoria Station. One of its bombs went through the roof of nearby Buckingham Palace, and smashed through a couple of floors before coming to rest in the bathroom of one of the royal apartments where it failed to explode! The rest of the bombs fell in the palace grounds, where the incendiaries started a small fire that was quickly extinguished. At that time newspaper accounts said this was a deliberate attack on the British Royal Family, but of course it was not. In any case, the King and Queen were at Windsor on that day.

Of the three German crewmen who bailed out of the Dornier before it was rammed, two were taken into captivity soon after landing. The third man was less fortunate. He landed by parachute near The Oval underground station in Kennington and was lynched in the street by civilians.

That Dornier was the only German bomber to fall within 20 miles of the centre of London during that particular action. After the engagement no fewer than nine RAF pilots from five separate squadrons claimed to have destroyed the Dornier that crashed on the centre of London. As a result that bomber featured nine times in Fighter Command's victory total for the day. One does not need to look far to see how the defenders

arrived at their exaggerated claim for the day of 185 German aircraft destroyed.

As we all know, an aeroplane makes a very inefficient battering ram. Ray Holmes's Hurricane suffered severe structural damage in the collision and it too fell out of control. He bailed out and his fighter crashed in the middle of a crossroads in Chelsea. Remarkably, considering that both aircraft crashed in an area that was heavily built-up, nobody on the ground was hurt and the falling aeroplanes caused relatively little damage.

As the unescorted Dorniers turned to port, away from London, after bombing, they had seven squadrons of Spitfires and Hurricanes buzzing around them and the German crews closed formation as they prepared to fight their way out. Their formation had a frontage of only about 100 yards, which meant that squadrons had to attack from behind and queue up to do so section by section. When Douglas Baders' 'Big Wing' arrived over London, with five squadrons and a total of fifty-five fighters, he had to hold his force for a few minutes over the bombers to allow 11 Group fighters to complete their attacks.

During this phase of the action nine more Dorniers were damaged and were forced to leave the formation. Five of them were quickly finished off by RAF fighters. With the 90-mph wind now on their tails, the surviving Dorniers left England going three times faster than they had come in. Near Maidstone about thirty Messerschmitt 109s, assigned to cover the Dorniers' withdrawal, linked up with their charges and shepherded the survivors home.

Of the twenty-five Dorniers in the attack force, six had been shot down and most of the rest had sustained damage. Considering the overwhelming concentration of RAF fighters that had engaged the formation, and the absence of escorts, it is surprising that any of the Dorniers survived. The fact that three-quarters of them made it back to France is testimony to the leadership of Major Alois Lindmayr, the formation leader, and to the discipline and flying skill of his crews. By any yardstick he had led a brilliant fighting withdrawal, throttling back to enable the force to maintain cohesion.

It is also testimony to the ruggedness of the Dornier 17 bomber. Its air-cooled radial engines often continued to run despite having suffered battle damage. Other factors helping survival were the carriage of fuel in self-sealing tanks, and the provision of armour protection for the crews.

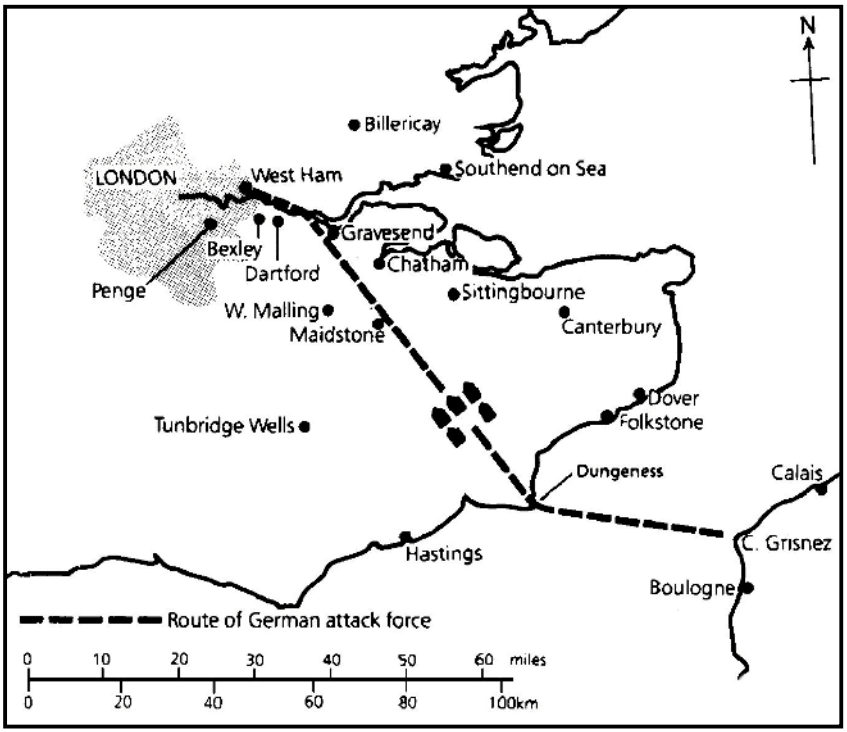


Fig 3. Track followed by the German attack force on the afternoon of 15 Sep 40.

A further factor was the relatively low destructive power of the .303 inch machine guns fitted to RAF fighters. There is ample evidence of the ineffectiveness of the British guns, one photograph shows a Dornier that took more than 200 hits from .303 inch rounds on 15 September and still made it home.

As we have seen, the headwind had greatly slowed the German formation during its ingress but it had had other effects. As well as forcing the escorts to turn back early, it had given the RAF fighter squadrons about 15 minutes longer to move into position to meet the attack. The fighter control organisation made the most of that largesse: of the twenty-three squadrons of fighters scrambled, all except one engaged the raiders.

The *Luftwaffe* lost six bombers and nine Me 109s during the noon action, Fighter Command lost thirteen Spitfires and Hurricanes.

As the survivors of the noon attack crossed the Channel, the bomber formations assigned to the second attack were climbing into position to rendezvous with their fighters over the Pas de Calais. This raiding force was much larger than the earlier one, with 114 Dornier 17s and Heinkel 111s. The penetration covering force comprised some 450 Me 109s, many of them flying for their second sortie of the day, and about forty Me 110s.

The German bomber force crossed the coast at Dungeness and wheeled on to a north-north-westerly heading. As in the earlier action, the initial clash took place shortly after the raiders crossed the coast when the three forward-deployed Spitfire squadrons went into action. This time Fighter Command sent up twenty-eight squadrons with a total of 276 Spitfires and Hurricanes, all of those based within fighting range of the capital.

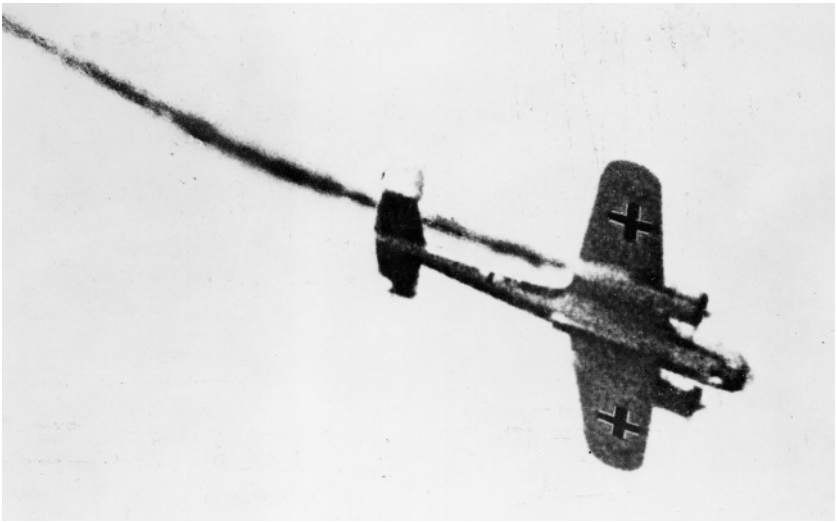
This time the raiding force was more than twice as large as the earlier one, and it outnumbered the British fighters by more than two to one. In terms of fighters, there were about three Messerschmitt 109s and 110s for every two Spitfires and Hurricanes airborne. With many more escorts available, the latter flew in relays and that largely overcame the effect of the wind.

Figure 3 shows the German attack force. The bombers flew in three columns in line abreast, with about three miles between each: on the left the Dorniers of KG 2, in the middle the Heinkels of KG 53 and on the right the Dorniers of KG 3 followed by the Heinkels of KG 26.[1]

On the way to the capital, as during the morning, several squadrons of Royal Air Force fighters engaged the raiders. The Dorniers of KG3, leading the right flank of the German force, came under particularly heavy attack.

As during the earlier action, Park concentrated the bulk of his force to fight the main engagement immediately in front of London. No fewer than nineteen squadrons, with 180 Spitfires and Hurricanes, moved into position to the south and east of the capital to await the arrival of the raiders.

On the way to the target four German bombers were shot down; seven more suffered damaged which forced them to turn back. All five bomber formations reached London intact, however, and they lined up to begin their bombing runs on their assigned targets. These were: the Surrey Commercial Docks, to the south of the Thames, for the forty-



A Do 17 in trouble during the Battle of Britain

two Dorniers of KG 2; the West India Docks for KG 26's twenty-seven Heinkels; and the Royal Victoria Docks for the twenty Heinkels of KG 53 and KG 3's remaining eleven Dorniers. The escorting force comprised some 450 Me 109s and 40 Me 110s, and a large proportion of these made it to the target area with the bombers.

Once again, however, the weather took a hand in the proceedings. During the early afternoon the cloud cover over southern England had built up appreciably, and by now most of the capital was blanketed by nine-tenths cumulus and strato-cumulus cloud with tops at 12 000 feet. To the north of the Thames the only clear patch of sky was over West Ham, and two formations of Heinkels and one of Dorniers re-aligned their attack runs onto this borough causing widespread damage.

The Dorniers of *Kampfgeschwader* 2, comprising the left-hand column of the raiding force, found the Surrey Commercial Docks covered by cloud. The bombers turned through a semi-circle without bombing and headed east. As they were doing this, three squadrons of Hurricanes were moving into position to engage. To the RAF pilots it seemed as if they had forced the bombers to abandon their attack, and many said so afterwards in their combat reports. In fact, the Dornier formation had reached the capital intact, having lost only one aircraft on the way in, and it would easily have fought its way through to the briefed

target had the crews been able to see it. On their way out the Dorniers bombed targets of opportunity and there were reports of damage in Penge, Bexley, Crayford, Dartford and Orpington.

Once again, the strong headwind had slowed the German bombers' penetration, giving the RAF fighters more time to move into position to meet them. Every one of the twenty-eight squadrons of Spitfires and Hurricanes that had been scrambled succeeded in making contact with the enemy. During the afternoon action, the *Luftwaffe* lost twenty-one bombers, and twelve fighters. Fighter Command lost fifteen Spitfires and Hurricanes.

Elsewhere that day, Heinkels of KG 55 attacked the Royal Navy base at Portland and a small force of Messerschmitt 109 and 110 fighter-bombers of *Erprobungsgruppe* 210[2] tried unsuccessfully to hit the Supermarine aircraft works at Woolston near Southampton. Neither attack caused significant damage to these military targets. The raid on the Supermarine works missed the target altogether, the bombs falling across a nearby residential area.

In statistical terms, the *Luftwaffe's* effort on 15 September amounted to 201 sorties by bombers and fighter-bombers, 769 by single-engined fighters and about 40 by twin-engined fighters, making a total of 1110 sorties. Fifty-six aircraft, 5% of the total, were destroyed.

For its part, Fighter Command flew 529 sorties to counter the two attacks on London, loosing twenty-eight aircraft in the process. Thirteen of these fell to enemy fighters, six to return fire from bombers and the remaining nine were lost to unknown causes.

Eight of the RAF's losses were Spitfires, representing 4% of the sorties they flew. The other twenty were Hurricanes, reflecting just over 6% of the sorties they flew. Thus during the main actions, a Spitfire making contact with the enemy was only two-thirds as likely to be shot down as a Hurricane. This was due to the superior performance of the Spitfire, in particular in the climb, and the fact that its fuel system was better protected and less likely to catch fire.

Of the German aircraft shot down, many had been engaged by both Spitfires and Hurricanes. So in this study it was impossible to make a meaningful comparison between the two fighter types as regards their ability to destroy enemy aircraft. Probably they were equal in this respect.

During the two great air actions the total aircrew losses on both sides,

killed, wounded, missing and taken prisoner, was exactly 200. Had it been a land or a sea engagement, it would not have rated as a minor skirmish. *Luftwaffe* aircrew losses were eighty-one aircrew killed or missing, sixty-three taken prisoner and thirty-one wounded. Fighter Command losses were twelve pilots killed and twelve wounded. Thus it cost the *Luftwaffe* seven aircrew for each pilot casualty inflicted on Fighter Command. Historians have made much of Fighter Command's pilot losses during the Battle of Britain but, even as a proportion of the total force, the German losses were significantly higher.

Although RAF pilots that bailed out over England could rejoin the battle, few were able to do so immediately. Of the twenty-eight pilots of the RAF fighters destroyed on the 15th, only four reached the ground uninjured.

This analysis casts new light on the effectiveness of Douglas Bader's Big Wing tactics. Any large-scale air action will produce overclaiming. And any fight involving Bader's full wing was, by definition, a large-scale action. Following the two actions on 15 September the Duxford wing claimed the destruction of fifty-two enemy aircraft, or nearly 30% of the total RAF claim. In my analysis, I could confirm only five victories claimed by the wing, plus two more that it shared with fighters of No 11 Group. In addition, there were four cases where fighters of the Duxford Wing fired at aircraft that were already on their way down. On that day, the Duxford Wing lost five Hurricanes and one Spitfire destroyed.

During the war, and for many years after it, that overclaiming had led to an exaggerated assessment of the Big Wing's effectiveness. With hindsight, we can see the five-squadron Wing was too large and unwieldy for one man to direct effectively in combat. In terms of enemy aircraft destroyed, the Big Wing was less effective than an equivalent number of squadrons operating in pairs.

These negative aspects of the Big Wing operations were more than counter-balanced, however, by the aspect in which they were unfailingly and resoundingly successful - the devastating effect they had on German morale. Before the action on 15 September, *Luftwaffe* crews had been told that they would face only the tattered remnant of an almost-defeated British fighter force. The approach flight across Kent, in which the bombers came under repeated attacks from squadrons of Spitfires and Hurricanes, cast doubts on the accuracy of that intelligence. To then

arrive at the outskirts of London only to be confronted by more than fifty Royal Air Force fighters approaching in parade-formation, caused an implosion of confidence on the German side.

Tactically, the close formation fighting tactics used by the RAF in 1940 were a disaster. Their only redeeming feature, when Douglas Bader's Wing arrived on the scene, was that they made a lot of fighters look like one heck of a lot. During the first engagement the Wing comprised fifty-five fighters; during the second it fielded forty-seven. On the German side those numbers swelled with the telling, and the official *Luftwaffe* account of the action stated 'Over the target huge formations of fighters appeared, with up to eighty aircraft.'

Napoleon Bonaparte once assured us that 'In war, the moral is to the material as three is to one.' Each time it went into action, the Big Wing demonstrated beyond any possible doubt that Fighter Command was far from beaten. If Douglas Bader's Wing did nothing else but impress that unpalatable fact on the *Luftwaffe*, it was well worth the effort involved.

The *Luftwaffe* lost fifty-six aircraft on 15 September, far short of the 185 that the defenders claimed at the time. Yet that day's fighting marked the turning point in the Battle of Britain. For the German High Command it was clear that the reports of Fighter Command's impending demise had been greatly exaggerated: the force was still in business and it was unlikely to be beaten before the weather broke in the autumn. On 17 September Hitler ordered that Operation Sealion, the planned invasion of England, be postponed until further notice. The ships and barges concentrated at ports along the Channel coast started to disperse, and the threat of invasion diminished with each day that passed.

That is why the action on 15 September is so important, and that is why we in the RAF commemorate it to this day.

[1] KG – *Kampfgeschwader*; roughly Bomber Wing.
[2] *Erprobungsgruppe 210* was a trials unit.

QUESTIONS AND COMMENTS FROM THE FLOOR

Wg Cdr Andrew Brookes. Were the German bombers able to communicate with their escorting fighters?

Price. No. Radio equipment was not standardised (any more than the RAF's was) and there was a fundamental incompatibility between the essentially long-rage HF sets carried by the bombers and the short-range VHF radios used by the fighters.

Gp Capt Hans Neubroch. To what extent was Bletchley Park able to contribute to the Battle of Britain? I understand that they may have been able to provide a degree of background operational intelligence, perhaps ORBATs, but little of immediate tactical value.

Price. I would be surprised if ULTRA could have contributed much at this early stage of the war. I have asked contemporary RAF controllers whether they recall instances of mysterious information from 'a reliable but unidentified source' suddenly appearing on the plotting tables. They told me that they had never seen that happen.

There were a number of factors which would have made it difficult for Bletchley Park to glean much information anyway. It was, for instance, the normal practice for the *Luftwaffe* to distribute its Operation Orders by despatch rider and/or landline. Only late amendments were signalled by wireless so there was relatively little radio traffic for the eavesdroppers to listen to. Even when an amendment was intercepted, it was often impossible to determine its significance. Did it refer to a small raid, for instance, or to a large one? To the whole force, or just one element? Where was the target? When was it to be attacked? Then again, the *Luftwaffe* used four- or five-digit codes to identify British objectives and learning that today's raid was against 'Target 1017' did not tell us much until it was over. Too late, we would have discovered that 1017 had been Kenley. It took some time to build up the data base necessary to exploit the ULTRA information. This is not to devalue the potential of long-term intelligence analysis but it could contribute little to the conduct of a battle which depended crucially upon the sort of real-time, tactical information that was derived from radar and the Observer Corps.

Talbot Green. I suspect that some of the misunderstandings regarding Bletchley Park's capabilities may be attributable to Fred Winterbotham but, that having been said, I believe that they were able to intercept

signals traffic dealing with the logistic organisation and that this did have some value. Since we had regular updates on the nature and quantities of material and equipment required by the units in France, it would have been possible to deduce the level of damage that we were actually inflicting. It would, for example, tell us about damaged aeroplanes that were written off when they crashed on landing.

Neubroch. I was under the impression that that sort of information was derived from intercepting W/T traffic within Germany, that is to say, from the Y Service, rather than ULTRA.

Seb Cox. That is possible but we must remember that the Y Service was in its infancy. At the start of the Battle the wing commander actually had to resort to buying three receivers himself from a specialist radio shop in London because the RAF simply did not have anything that could do the job! Nevertheless, once it was established, the Y Service did begin to produce useful tactical information, particularly in connection with the *Luftwaffe's* navigational aids and radio beacons. 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.

Price. There is another question, of course. Assuming extremely sensitive intelligence material was available and that it could be disseminated, just how useful would it really have been to the Air Commander actually directing the action? What good would it have done AVM Park to know that the *Luftwaffe* was making up its losses by drawing on its reserves in Germany? His immediate problem was that he was faced with incoming raids which he needed to confront. The raids were large and his resources were limited. The only information of any

real significance to Park was that which would permit him to deploy his squadrons so that they were in the right place at the right time. His frame of reference was probably less than an hour.

Cox. There was one case where ULTRA directly influenced the conduct of the Battle. It was not an immediate ULTRA 'decrypt' *per se* but there is evidence to show that Fighter Command did receive ULTRA-derived information to the effect that the *Luftwaffe* was redeploying aircraft from *Luftflotte V* in Denmark and Norway to the Pas de Calais. Dowding reacted to this news by assigning two additional fighter squadrons to 11 Group. If this intelligence was derived from ULTRA (and this is not absolutely certain - it could have come from the Y Service) then it is the only instance of which I am aware of ULTRA being of immediate use to the Air Commanders.

Al Pollock. I understand that Lysanders were used during the Battle to fly out over the Channel to report on raid size. Can you shed any light on that?

Price. No, I am not aware of Lysanders being used in that way, although there were instances of fighters being used to amplify information on raid size. In the specific case of 15th September, for instance, Fg Off Wright of No 92 Sqn was scrambled from Hawkinge to patrol over the Channel at 26 000 feet and report on the composition and track of the second raid. That would seem to me to be a far more sensible approach to the problem. After all, because the crew of a Lysander was supposed to spend its time looking *down*, the aircraft had a high wing which must have restricted the upward view. Lysanders were certainly expected to operate in the event of an invasion, spraying gas, strafing with 20mm cannon and so on but I have not come across any reference to tracking raids.

Pollock. It was definitely being done during June.

Cox. This sort of thing became more commonplace in the later stages of the Battle in an attempt to counter fighter-bombers. Radar detection of raids coming in at low level was simply too late to permit an effective reaction so Park began to send individual aircraft up in an attempt to extend the range at which intruders might be detected.

Green. I think it is worth pointing out that, remarkable as radar was at

this time, even in the high level case its ability to discriminate was such that it could not really produce an accurate assessment of raid size, hence the need to send aeroplanes up to amplify the radar plot. Even this could cause confusion because the filter room would have to try to correlate a pilot's report of a formation of, say, twenty bombers with one of, perhaps, several radar plots, none of which were assessed as being twenty-strong.

Price. That is, I think, a very important point. With hindsight we now know the actual size of the *Luftwaffe* formations. When you compare this information with what was being plotted at the time we can find discrepancies of as much as plus or minus 70%. The RAF never put up a formation of fifty of our own bombers to give our radar operators some idea of what fifty aeroplanes actually looked like on their scopes. They were really guessing.

If that was one weakness in the British Control and Reporting system, there was another. To control an air (or, I suppose, any other) battle effectively, the commander needs to know the location of his own forces just as much as he needs to know the location of the enemy. We kept track of our own aeroplanes via 'Pipsqueak', one aircraft in each formation automatically transmitting a tone on HF for 15 seconds in every minute, permitting ground stations to D/F on the signal which, by triangulation, would establish the aircraft's position. It would have been simplicity itself to disrupt this system. It did not require sophisticated jamming techniques. Every German bomber carried an HF transmitter that covered that band, and in some areas ground transmitters in France could have done the jamming. All that the *Luftwaffe* had needed to do was to transmit on the same frequency to degrade the direction finding procedure. It was Fighter Command's Achilles' heel but, fortunately, the enemy never discovered it.

Gp Capt Jock Heron. There are considerable disparities between the numbers of aircraft that we now know were being destroyed and the figures that were released at the time for propaganda purposes. There must surely have been a filter system of some kind at the debriefing stage that actually permitted us to make a more realistic assessment.

Price. I think not. The Squadron Intelligence Officer would record the clams of his pilots in his report and relay this to 11 Group where there was a two-man team, a squadron leader and a flight lieutenant, who

accepted his figures and added them to similar inputs being received from other units to result in a daily tally. The critical factor was that this process had to be complete by 7.00 pm so that the figures could be vetted and released in time for them to be broadcast on the Nine O'clock News.

During a debrief, it might become clear that three pilots were all claiming to have shot down the same aeroplane. They would all have been doing it in good faith, however, and, if the squadron had perhaps suffered heavy losses itself and the survivors needed a boost to their morale, it could well be that a Squadron Commander exerted pressure to get claims validated.

Heron. That may be so, but it still appears to me that, in the public interest, there might well have been a conscious decision to accept inflated figures which would perhaps explain why no real attempt was made to verify claims. After all, if we claimed fifty victories, there ought to be fifty wrecks on the ground.

Price. No, some fell in the sea and it would be argued that many of the other planes claimed had done so too. There actually are Combat Reports for 15th September supporting the claim of 185 enemy aircraft shot down. It is not as if the claim was for 100 and someone said, 'That's not good enough; make it more.'

Heron. I am not suggesting that the reports do not exist, or even that they were not made in good faith. What troubles me, however, is the apparent lack of any attempt to establish the truth.

Price. I don't think that they had the time. The focus of all this information was the two men at 11 Group. They had to handle the inputs from some thirty squadrons, sometimes, as on the 15th September, involving two raids. They had to obtain the raw data, no doubt wrestling with communications outages, enter it in some form of tote and prepare the day's press release, against the clock. There were pilots landing away from base and making claims when they returned late, others who had bailed out making claims when they could get to a phone. It was all pretty chaotic. There was great deal of pressure and they had neither the time nor the resources to conduct a meaningful analysis.

It is interesting to observe, incidentally, that the *Luftwaffe* was overclaiming to a similar degree to the RAF. Indeed, by taking the German assessment of Fighter Command's original strength, adding

their appreciation of production output and deducting their combat claims, they had a theoretical ORBAT measured in negative figures by 15th September. Patently nonsense, because by that time Fighter Command was numerically stronger in aircraft than it had been a month before.

Green. Could I, perhaps approach the question from the other side, because the Germans knew the facts. Despite the RAF's claim of 185, the *Luftwaffe* would have known that they had actually lost only fifty-six. But was that still too many? They had lost heavily in earlier actions and could expect to do so again. Was this the last straw? What was special about 15th September?

Price. I think that we need to take a broader view of the situation. Crucially, the concentration of barges in the Channel ports had more or less paralysed Germany's river-and canal-based domestic transport network. Furthermore, in order to tow the unpowered barges to England the navy had commandeered most of the trawler fleet, thus crippling the fishing industry. All of this had imposed an enormous burden on the national economy and time was running out, because the weather would soon start to close in, making the third week in September the last realistic opportunity for mounting the invasion. In the background to all of this, the *Kriegesmarine* was deeply unenthusiastic about the whole enterprise. Following the Norwegian campaign and its aftermath, they had no modern capital ships left that were fit to go into action. *Scharnhorst*, *Gneisenau* and *Lützow* had all taken torpedoes (and you know how long it takes to repair a damaged ship). *Admiral Scheer* was refitting and *Bismark* and *Tirpitz* were far from completion. The Royal Navy's Home Fleet had taken serious losses but it was still a formidable force. Hitler may have been committed to the invasion but, while his admirals would not directly oppose him, they were really paying lip service to a scheme that they knew could never succeed. The Army was keen, but unrealistically so. Their logistics were awful; it was more a question of what they didn't have rather than what they did. The most glaring omission was a satisfactory means of crossing the Channel – a Rhine barge is not really a seagoing vessel; because they do not need them, they do not even have compasses! Above all, however, it was essential that the *Luftwaffe* secure air superiority before Hitler could even contemplate launching an invasion. On 15th September Fighter

Command clearly demonstrated that it was still a force to be reckoned with. So, yes, I think that 15th September probably was the last straw.

A Heinkel He 111 delivering a load of 110 lb bombs.

WHAT WAS THE IMPACT OF THE LUFTWAFFE'S 'TIP AND RUN' BOMBING ATTACKS, MARCH 1942-JUNE 1943?

by

Squadron Leader Chris Goss

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 2002.* ***Ed***

In March 1942, the *Luftwaffe* formed two dedicated units whose task was to carry out a bombing campaign against shipping and coastal military and industrial installations on the southern coast of England. By fitting bombs to Messerschmitt 109 single-seat fighters, these fighter-bombers (or in German *Jagdbomber*, nearly always shortened to *Jabo*) began attacking targets as far east as Kent[1] and as far west as the Lizard in Cornwall. Known to the British as 'tip and run' attacks, they continued until the 6 June 1943[2] prior to which the *Luftwaffe* had increased its strength of fighter-bombers on the Western Front from in the region of 28 to 118[3], which had prompted the following phlegmatic British comment:

> '…for the first three months of the year (1943), the position with regard to enemy fighter-bomber activity was not satisfactory…the problem was to get adequate warning of these low flying raids as, though enemy casualties were high, these casualties mostly took place after the bombs had been dropped…'[4]

Without warning, 'tip and run' attacks stopped following the attack on Eastbourne on the 6 June 1943. The majority of German fighter-bombers were then transferred to the Mediterranean, leaving just 42 fighter-bombers[5] which were used solely for attacks at night.

This paper will analyse the development of the German tactic of using fighter-bombers prior to March 1942. It will then discuss the impact from the viewpoints of both the *Luftwaffe,* the British military and the civilian population of the 'tip and run' campaign between March

1942 and the 6 June 1943. It will conclude by questioning the German decision to stop such attacks, whether 'tip and run' attacks had been effective or not and the lessons that had been learned as a result.

The origin of the term 'tip and run' is not known but it was first applied to the infrequent small-scale bombing attacks carried out on south-east England by aircraft of the German Imperial Navy in the First World War[6]. Kaiser Wilhelm II had been begged to authorise limited air attacks against British coastal targets of a military nature and when in January 1915 he acquiesced, military facilities on the shores of the Thames Estuary became legitimate 'tip and run' targets. However, a lack of suitable aircraft, the distance from bases in Belgium and the greater importance of air operations on the Western Front limited the scale of such attacks and by the end of 1916, approximately 25 people had been killed but the military and civilian impact of such attacks is believed to have been minimal[7]. By then, Germany was keen to prove the superiority of its Zeppelin airships and its specially designed 'battle planes' such as the Gotha and targets switched from 'nuisance raids' to aerial assaults on London and other major cities, something that was to be repeated in 1940. It appeared as if the memory of 'tip and run' attacks would fade into obscurity.

It was in Spain in 1937 that the idea of 'fighter-bombers' was resurrected, a few German fighters in the First World War having been fitted with bombs as a crude way of stemming the Allied advance in the Summer of 1918, these aircraft being termed 'fighter-bombers'. In August 1936, Nazi Germany, concerned that Communists would get a foothold in Western Europe when civil war erupted in Spain, began supporting General Franco's Nationalist army. The *Legion Condor*, a semi-autonomous German air component, would play an important part during the civil war, allowing its aircrew to gain combat experience for the coming Second World War and for *Luftwaffe* senior officers to devise and prove a concept of air operations. However, it was in Spain in March 1937 that 'fighter-bombers' proved to be an effective weapon.

The single-seat Heinkel 51 biplane fighter was, until the arrival of the Messerschmitt 109 monoplane, the *Legion Condor's* principal fighter. However, it was becoming increasingly obvious that by February 1937, the Heinkel 51 was inferior to the Soviet fighters being used by the Republican forces. Faced with the inferiority of its principal fighter, the *Legion Condor* decided to enhance its offensive capability, particularly

for the battle for Bilbao, by fitting its Heinkel 51s with fragmentation bombs and on 31 March 1937, these aircraft were used to bomb and strafe Republican front positions with considerable success. In the days that followed, the fighter-bombers proved ideal at neutralising those targets that medium to high-level bombers found harder to destroy.

Paradoxically, it was the success of the fighter-bomber that ultimately spelt its demise. Impressed by the concept of close air support and pinpoint bombing accuracy, the Junkers 87 *Stuka* and Henschel 123 dive bombers were quickly brought to Spain and used with great success. It was this concept of operations that, following refinement in Spain, was used with great effect from 1 September 1939 when Germany invaded Poland and again on 10 May 1940 when Germany invaded France and the Low Countries. The *Stuka* suited the *Blitzkrieg* concept and with the air superiority achieved by the *Luftwaffe* in the first nine months of the Second World War, there was no need for a fighter-bomber. This was to change dramatically during the Battle of Britain.

On 10 July 1940, the *Luftwaffe* began attacking shipping in the English Channel and coastal targets, hoping to entice the RAF into battle and, by means of attrition, to weaken the RAF's ability to interfere with the planned German invasion of Great Britain. With the Germans anticipating the same air superiority they enjoyed in previous campaigns, it was thought that the *Stuka* would enjoy the same success. However, when the *Stuka* was at last committed *en masse* on 8 August 1940, it was clear that against far more superior fighters such as the Spitfire and Hurricane, the *Stuka* was vulnerable unless it had a substantial fighter escort[8]. Nevertheless, limited *Stuka* successes on the days that followed appeared to lull the German commanders into using them against inland targets. The results were catastrophic with 25 aircraft shot down and five seriously damaged in the space of two days. The *Stuka* was immediately withdrawn from front line operations and the *Luftwaffe* now had no aircraft that could fulfil the close-support role.

Nevertheless, the *Luftwaffe* had been looking ahead. It was believed that the proposed twin-engined Messerschmitt 210 would be an ideal aircraft to be the *Stuka's* successor as it was anticipated that it could be utilised in the close-support role and then be able to defend itself, a true fighter-bomber like the Heinkel 51. However, the Messerschmitt 210 was plagued by technical problems and as its entry into service slipped, the experimental unit formed to develop its use as a fighter-bomber

pressed ahead with developing the fighter-bomber concept by using the Messerschmitt 110 twin-engined fighter and to a lesser degree the Messerschmitt 109.

It quickly became obvious that the Messerschmitt 110 was slow and vulnerable after dropping its bombs, any successes being achieved purely through the skill of the unit's experienced pilots. However, the Messerschmitt 109 was found to be a much better fighter-bomber and was able to defend itself so it was decided to develop this aircraft as a *Jabo*.

A British intelligence report dated 21 October 1940[9] condensed all that had been gleaned on bombing with the Messerschmitt 109 and appears to be the date that the RAF first acknowledged the existence of fighter-bombers, even though a Messerschmitt 109 captured on 7 September 1940 was found to be fitted with a bomb rack and bomb release mechanism[10]. Furthermore, an attack against railway lines by a formation of Messerschmitt 109 *Jabos* on 15 September 1940 had provoked an outcry by the British Press as to fighter-bombers being 'unfair'[11]. The report acknowledged that one German unit had been practising by bombing with 250 and 500 kg bombs from as early July 1940 and that a third of all German fighter groups were now being retrained as 'Me 109 bombers'. However, by the time that this report had been written, the fighter-bomber phase of the Battle of Britain was almost over.

Following the major attack on London on 15 September 1940 and the failure of the conventional bombers in daylight, the *Luftwaffe* switched nearly all of its bombers to nocturnal operations. From 5 September 1940 onwards, German fighter pilots had started receiving rudimentary training in using their fighters as bombers, using the gunsight as a bombsight. From the start of October 1940, these *Jabos* were then used to bomb at medium and high altitudes. At high level, they were particularly hard to intercept but with a normal bomb load of one 250 kg bomb being dropped by pilots unused to bombing and using a rudimentary aiming system, the accuracy achieved was generally poor and attacks soon began to decrease. Additionally, winter brought with it poor weather which restricted fighter-bomber missions and with the majority of German fighter units being withdrawn to Germany for rest and refit, *Jabo* attacks decreased further. Finally, the RAF started offensive fighter sweeps over the Continent on 9 January 1941 and this

forced the *Luftwaffe* to commit more of its fighters to combat the increasing RAF incursions.

It is interesting to read what the German fighter pilots of 1940 thought about fighter-bomber missions. *General* Adolf Galland, who had been a ground attack pilot flying Henschel 123s prior to the Battle of France, commanded a fighter group during the Battle of Britain. Of fighter-bombers, he said:

> '…we fighter pilots looked upon this violation of our aircraft with great bitterness. We had done everything possible to increase our performance in order to keep up with a progressive enemy. We had discarded everything dispensable in an attempt to squeeze another ounce of speed out of them. We had always demanded ejectable spare tanks in order to increase our range. Instead of that they now gave us bomb-release gadgets and we were forced to see a third of our aircraft drop out of air combat…'[12]

Galland was clearly not an exponent of the *Jabo* and I believe that his view was shared by the majority of German fighter pilots. Galland further acknowledges that fighter-bomber attacks 'apart from their nuisance value, (*they*) achieved very little of any military value'[13] and that such missions had an adverse affect on the fighter pilot's morale:

> '…it is disconcerting for a fighter pilot to have to fight without being able to take the initiative. The morale of fighter pilots was affected; they had to carry bombs, release them at great altitude on an enormous target without being able to observe the effect and then had to adopt a passive attitude towards enemy fighters…'[14]

With *Generalfeldmarschall* Göring highly critical of the failure of his fighter pilots and the ineffectiveness of fighter-bomber missions, it is surprising that just over a year later, the decision was made to recommence *Jabo* attacks against British targets. This was the start of the *Luftwaffe's* 'tip and run' bombing campaign.

The origins of the Second World War 'tip and run' attacks came in March 1941. One fighter group, *Jagdgeschwader* (JG) 2, had continued to carry out fighter-bomber attacks but just against shipping. One squadron from JG 2 was given specific low-level bombing training by the Messerschmitt 210 operational evaluation unit whilst a further two squadrons carried out sporadic fighter-bomber attacks when pure fighter

duties permitted. By June 1941, these latter two units had accounted for two freighters between 5000 and 3000 BRT and a tanker of 2500 BRT as well as damaging a submarine, a cruiser of 10 000 BRT and a freighter of 3000 BRT.[15]

Nevertheless, *Jabo* missions were still secondary until one officer, wounded in July 1941, returned to operational flying duties. Frank Liesendahl commanded one of JG 2's squadrons which still carried out *Jabo* missions. However, he had been replaced after being wounded and it is believed that as well as recuperating from his wounds, he worked on formulating tactics for low-level fighter-bomber missions. He convinced his senior officers of the value of what a low-level fighter-bomber could achieve against shipping and in November 1941 was given permission to form a dedicated *Jabo* squadron.

From 10 November 1941 to 18 February 1942, Liesendahl's squadron trained and perfected the tactics they would employ against British shipping. Liesendahl devised what was called the 'Liesendahl Process' which was quickly adopted as the preferred method of attack. Approaching the target at 450 kph and at an altitude of five meters, 1800 metres from the target the fighter-bomber would climb to a maximum height of 500 metres before levelling off, diving at 550 kph and a dive angle of 3° before pulling up and lobbing the bomb at the target[16].

The first recorded 'tip and run' attack was made against an unspecified target at Fairlight in Sussex on Christmas Day 1941[17] and in January 1941, the first 'tip and run incidents' were reported in Kent (three), Sussex (nine), Dorset (two), Hampshire (one), Cornwall (twenty-eight) and the Isle of Wight (one). However, it would appear that Liesendahl was still trying to convince senior officers of the value of *Jabo* attacks and this proof came on 10 February 1942 when the 3000 BRT steamship *Lieutenant Robert Mory* was badly damaged in an attack off the Cornish Coast. On 4 March 1942, *Luftflotte III*'s[18] Fighter Headquarters authorised *Jabo* missions as well as ordering another fighter group, JG 26, to form its own *Jabo* squadron with effect from 10 March 1942.

JG 26 was at a distinct disadvantage, having not been involved in JG 2's three month work up. Pilots who had limited *Jabo* experience from 1940 and early 1941 were transferred from other squadrons in JG 26 and a number who came to the *Jabo* squadron were either unsuitable as fighter pilots, indisciplined or had incurred the wrath of their Squadron

A Bf 109F-4/B fighter-bomber which was forced to land on Beachy Head on 20 May 1942 and subsequently put back into the air in RAF colours, but retaining its 'White 11' unit code and the bomb insignia of 10.(Jabo)/JG 26.

Commander[19]. With the unsuitability or unwillingness of some of its pilots for 'tip and run' missions and with a lack of training, the effectiveness of 10./JG 26 (as the *Jabo* squadron was designated) was questionable. British analysis of 'tip and run' attacks supported the imbalance of missions between JG 2 and JG 26 in March 1942, the first month of authorised operations. Seventeen 'tip and run' attacks were carried out in JG 26's area of operations (Sussex and Kent) whilst JG 2's area of operations (Hampshire westwards) reported forty-nine such attacks. Admittedly JG 26 was operating in an area heavily defended by anti-aircraft guns and the fighter aircraft of the RAF's No 11 Gp but the successes of 10./JG 2 were impressive and a concern to the British. For example, on 7 March 1942, four Messerschmitt 109s roamed unmolested in the Exmouth-Teignmouth area, attacking numerous targets and even shooting down one of the RAF fighters trying to take off to intercept them whilst, during the month, 10./JG 2 had attacked at least two convoys, claiming to have sunk three ships of varying tonnages and

damaging at least two more.

In April 1942, 'tip and run' attacks increased dramatically, with British intelligence reporting 156 such attacks. April also saw a shift to land targets, particularly gas holders as these were such prominent targets. The *Luftwaffe's* intelligence during the last war has been criticised as being inaccurate or misguided. However, 'tip and run' targets attacked in April and May 1942 did show a high degree of good planning (or possibly luck). For example, the Germans were aware of an underground explosives store inland from Poole and unsuccessfully tried to attack it five times in April and May 1942 whilst two fighter-bombers attacked the Betteshanger Colliery in Kent precisely at shift-change causing damage and civilian casualties. Of greater concern were two attacks carried out by 10./JG 2 against the Telecommunications and Research Establishment (TRE) at Worth Matravers in Dorset. Described as '…one of the country's single most important defence research related establishments during the whole of the Second World War…'[20], much of Britain's radar and radar-related research and development was being carried out at Worth Matravers. In April 1942, the TRE was studying the effect of the ionosphere on 'Gee' transmissions, 'Gee' enabling RAF bomber crews to fix their position by using pulse signals from three widely separated transmitters. 'Gee' could also be used to find targets when they were obscured by cloud. In the early evening of 6 April 1942, three aircraft from 10./JG 2 attacked the site causing unrecorded damage; at lunchtime two days later, another attack killed two and injured six, whilst a bomb passed through the 350 foot tall 'Gee' tower, causing slight damage. The site was unoperational for four days and because of the risk of a further, more devastating, attack and German reprisals for the Bruneval Raid[21], the TRE was moved to Malvern in Worcestershire in May 1942.

It should be emphasised that during 1942, the combined strength of 10./JG 2 and 10./JG 26 was rarely more than a maximum of twenty-eight aircraft[22] but their effectiveness was keenly felt by the British who quickly voiced concern as to finding a means of combating 'tip and run' attacks. The official narrative produced after the war by the Observer Corps was quite specific as to the threat and the difficulties posed, saying:

'…In view of the persistent attacks made by the enemy using very

> low flying aircraft on coastal targets along the south coast of England, various methods were tried to facilitate interception. The difficulties were great as, in view of the low altitude, RDF (Radio Direction Finding or radar) information was seriously limited with the result that anti-aircraft defences were frequently unable to come into action until the attack had been delivered…'[23]

Furthermore, the only anti-aircraft weapons that could counter these low and fast attacks were predominantly the 40mm light anti-aircraft guns. When the 'tip and run' attacks commenced, Anti-Aircraft Command only had forty-three 40mm calibre guns in position on the south coast and these were assigned to protect military installations, the sort of targets that the fighter-bombers were not attacking[24]. Even then, these guns had their failings as an attack on the airfield at Bolt Head in Devon on 1 May 1942 showed. Five Spitfires were damaged, a pilot badly wounded and many buildings damaged and the following report was submitted in respect of the anti-aircraft guns failing to engage the attackers:

> '…the RAF 4 AA Flight twin Lewis gun posts and one Bren gun[25] were in action firing 304 rounds. Hits were claimed on all aircraft but no damage was observed. The Bofors guns[26] made a rather poor showing. Number Four gun fired only two rounds before the traverse gear jammed and Number Two gun fired one round, the case of which could not be ejected….'[27]

By the end of April 1942, it must have been increasingly clear to the *Luftwaffe* of the value of such 'tip and run' attacks, specifically against shipping. Post-war analysis shows that between July 1941 and February 1942, German aircraft had sunk or damaged just 32.35% of the ships they attacked in daylight but in the period March-October 1942, this increased to 64.4%[28]. Still, the *Luftwaffe* did not expand the two units but at the end of May 1942, co-located both units and subordinated them to *Luftflotte III's* Fighter Headquarters for operational, and later administrative, command and control. This was a clear indication that greater direction in fighter-bomber operations was at last being realised. Then, in mid-June 1942, both units were withdrawn piecemeal to near Paris where they began re-equipping with the Focke-Wulf 190. Accordingly, 'tip and run' attacks decreased, dropping from 105 in May, to 77 in June and 37 in July 1942.[29]

The Focke-Wulfs that flew Jabo *operations over the UK were suitably adapted A-models. The ultimate ground attack variant was the Fw 190G, like these, which were probably flying over Russia.*

This was a worrying development for the British. The Focke-Wulf 190 was superior in all flight parameters, except turning radius, to the best Allied fighter at that time, the Spitfire Mark Vb. It was 25 to 30 mph faster at all altitudes up to 25,000 feet and had the highest rate of roll of any fighter of the last war. As a fighter-bomber, it could carry a single 500 kg bomb under the fuselage and four 50 kg bombs under the wings, more than doubling the bomb load of the Messerschmitt 109. Furthermore, if the Messerschmitt 109 had been hard to shoot down (10./JG 2 had so far lost four to anti-aircraft fire and two to RAF fighters whilst 10./JG 26 had lost three to anti-aircraft fire and one to a fighter), the Focke-Wulf 190 was faster, more suited, because of its air cooled engine and robust construction, to fighter-bomber operations and far more capable of taking care of itself when confronted by RAF fighters.

10./JG 2 flew its first attack with the Focke-Wulf 190 on 7 July 1942, claiming to have sunk and damaged three ships, two days later doing the same again, claiming to have sunk two and damaged one. From now on, at least one 'tip and run' attack a day was planned or flown and as yet, the British had no means of countering them.

Because radar was rarely able to detect such attacks, the first line of defence had to be the Observer Corps. Selected posts were ordered to fire a rocket (known as 'Totter') as soon as low-flying aircraft were seen and to continue to fire them whilst they remained in their vicinity. Furthermore, in order to speed up the reporting of low-flying fighter-

bombers, the Observer Corps post would immediately pass the code word 'Rats' to the Observer Centre before passing any plot. This was then passed immediately to the Sector Controller, such messages having full priority to then scramble, or if airborne direct, RAF fighters to intercept.[30]

The 'Totter' and 'Rats' systems were still inadequate. It took until November 1942 before standing patrols of two fighters (with another two on standby on the ground) were introduced at anticipated vulnerable points and even then, successful interceptions were infrequent. Furthermore, the existing spacing of the Observer Corps posts still made it possible for enemy aircraft to fly for appreciable distances overland at very low altitude without their tracks being maintained sufficiently to enable fighters to intercept and air raid warnings given. For example, an attack on Salisbury in Wiltshire at the start of August 1942 was so sudden and fast that no RAF fighters were scrambled to intercept and the air raid sirens not sounded until the two Focke-Wulf 190s were well south of the Isle of Wight on their way home. It was therefore decided to form approximately 150 satellite reporting posts, connected to the nearest Observer Corps 'parent' post which would increase low coverage in a belt 30 miles width from the coast. These satellite posts were simply to report during the hours of daylight low flying 'doubtful' aircraft.[31] Nevertheless, with both German units fully operational with the Focke-Wulf 190 by mid-July 1942, 'tip and run' attacks still continued with virtual impunity even though by the end of the month, each unit had lost one Focke-Wulf 190 to anti-aircraft fire from the ships they were attacking. These losses had resulted in the deaths of each unit's experienced commanding officer, one of whom was the 'tip and run' exponent Frank Liesendahl. However, their replacements were equally experienced and even though the deaths of the two were keenly felt, there was still no respite in the attacks.

It was at the start of August 1942 that changes to the pattern of attacks occurred. 10./JG 26 moved back under the control of *Luftflotte II's* Fighter Leader and again started carrying out more attacks on Britain's south-eastern coast, stretching British defences to their limit. In addition to shipping and coastal targets, the pattern of targets attacked by 10./JG 2 now showed a shift towards specific inland targets such as Helston and Bodmin in Cornwall, Salisbury and, on 5 August, Yeovil in Somerset. The reason for this change in targets was hinted at by a

German war reporter who wrote about the Yeovil attack:

> '…until now, every mission flown by the *Red Foxes*[32] has only been aimed at the south coast of England. They have not yet made an attempt to attack the English hinterland. So they prepare Operation *Ypsilon* all the better because this attack shall hit industrial works on the other side of the range of hills which stretch behind the south coast. Only two planes are going to carry out this difficult mission. First of all they have to wait for appropriate weather. Up to now, those designated for this attack had to turn back twice because they had not been able to break through the line of English fighter patrols…'[33]

The full report, much of which should be regarded as German propaganda, is interesting for three reasons. Firstly, it gives the rationale for attacking targets other than coastal ones. Secondly, it acknowledges that 'tip and run' attacks relied on good weather and thirdly, the British defences, even though they might not be aware of it, did manage to cause some 'tip and run' attacks to be aborted. Nevertheless, this attack was a success. Just two 500 kg bombs destroyed 15 buildings with a further 972 suffering varying damage whilst three civilians were killed and 26 injured. It was thought at the time that the target was the Westland aircraft factory but in fact the railway line and station and the centre of the town were the intended targets. The effect it had on the civilian population was not recorded but the audacity and the success of the attack did result in much analysis afterwards, particularly by the Ministry of Home Security.[34]

For the following weeks, the occasional coastal target was attacked but an increase in Allied air and sea activity was noted and the reason for this became obvious on 10 August 1942 when a predominantly Canadian force carried out a raid on the French port of Dieppe. German twin-engined bombers were quickly committed but did not arrive over the beachhead until just before midday and then had to contend with smoke, anti-aircraft fire and a massive Allied fighter umbrella and so Dieppe became an ideal battlefield for fighter-bombers to utilise their speed and skill to attack Allied shipping. 10./JG 26 was based close to Dieppe and was committed throughout the day against purely naval targets, but both 10./JG 2 and 10./JG 26 attacked warships, transports, torpedo boats and landing craft throughout the day, 10./JG 26 losing just one aircraft and

its pilot. The more experienced 10./JG 2 proved the value of 'tip and run' tactics being employed against ships off Dieppe, claiming to have sunk two destroyers, two large landing craft and two other ships, damaging a further destroyer, transport ship, landing ship, two other ships and shooting down a Spitfire for no loss. The validity of these claims are hard to ascertain but the Royal Navy did lose the destroyer *HMS Berkeley* which was a considerable embarrassment, especially as the destroyer was also being used as a forward air controller for the Allied fighters and those fighters had been helpless to prevent bombs from just two 10./JG 2 fighter-bombers from breaking the destroyer's back.

It would appear that the German successes on 19 August 1942 in respect of employing 'tip and run' tactics against shipping were not developed further as from now on, land targets were concentrated on and by that autumn, no further Allied ships would be attacked by German fighter-bombers, prompting the German Navy to state that it '…regrets every bomb that is not dropped on shipyards, ships etc'[35]. 'Tip and run' attacks would continue to be a constant source of irritation and threat but now the Allied defences were forced to try to counter them more effectively.

September and October 1942 saw a reduction in the number of 'tip and run' attacks with Kent and Sussex receiving the brunt of the attacks. In order to ensure the success of attacks in this region, the fighter-bombers now had their own escorts but the majority of fighter-bombers lost during these months were still due to anti-aircraft fire[36]. The *Luftwaffe* also employed fighters on, what were termed by both sides as, nuisance or disturbance attacks in Kent and Sussex, the effects of which were minimal.

It was about now that the RAF assigned a new weapon to counter the 'tip and run' raiders. The Hawker Typhoon had been introduced into service in early summer 1942 and so far had proved to be a disappointment. In August 1942, the commanders of the three Typhoon squadrons complained that the Spitfire, not the Typhoon, was better used on offensive sweeps whilst the Typhoon's superior speed and firepower would be better used countering 'tip and run' Focke-Wulf 190s and by basing the three squadrons near the eastern, south-eastern and south-western coasts[37]. This was accepted and by the end of September 1942, a total of five Typhoon squadrons were employed in this manner.

The tactics adopted by the Typhoon squadrons was another matter. It

A partial solution to the tip and run raiders, the Typhoon. This one belonged to No 56 Sqn. (MAP)

would appear that those developed by one squadron of 15 patrols a day by two aircraft flying at low or even lower altitudes with a further two on 'cockpit readiness', were soon adopted by other squadrons. Standing patrols then positioned themselves two to six miles from the coast and waited[38]. There was an additional hazard in that the Typhoon at some angles could look like its German opponent but this was partially solved by painting the noses of the Typhoons white and applying black and white stripes under their wings. Still, success was hard to come by as a squadron records:

> '…what with having to keep one eye on engine temperature, scan the air for enemy raiders, watch each gun position and Spitfire with suspicion and guard against crashing into cliffs or balloons, the whole enterprise seemed unprofitable. By the end of November (1942), with nothing to show for it, anti-aircraft fire had claimed one Typhoon, the weather two Typhoons and their pilots…'[39]

There was another reason for this lack of success. On 8 November 1942, American forces landed in north-western Africa and the Germans immediately moved fighter units, including both fighter-bomber squadrons, to southern France as a precaution against any Allied invasion. Both fighter-bomber squadrons remained there for just over a

month and between 1 November and 16 December 1942, only one ‘tip and run’ attack was made. The unit responsible for this sole attack had been withdrawn temporarily from North Africa to exchange its Messerschmitt 110 fighters for Focke-Wulf 190 fighter-bombers and cost the German squadron two fighter-bombers, intercepted by a standing patrol of two Typhoons thus validating the RAF’s new aircraft and tactic.

However, prior to the southern France detachment and the inactivity of the last two months of the year, it should be stressed that the new British aircraft and tactics were unable to prevent what was the *Luftwaffe’s* largest daylight attack on Britain since 1940. Hitler, increasingly annoyed by Bomber Command’s offensive, ordered a full strength vengeance attack against Canterbury on the evening of 31 October 1942. The attack was carried out purely by fighter-bombers, nineteen coming from the two recognised fighter-bomber squadrons reinforced by an unknown number of temporary fighter-bombers drawn from fighter units and the unit which had been temporarily withdrawn from North Africa. The total force, including escorts, numbered 62 Focke-Wulf 190s[40].

The attack was an embarrassment to the British defences. The German formation approached the Kent coast at wave-top height in three waves, hedgehopped approaching the outskirts of Canterbury, then climbed, dropped 31 bombs which killed 32 people and damaged countless buildings, and streaked back for France. British defences claimed to have shot down 10 fighter-bombers and suspected a further aircraft had been destroyed hitting a balloon cable. The true cost was one fighter-bomber lost to anti-aircraft fire after it had dropped its bomb, one fighter-bomber lost part of its wing to a balloon cable but returned safely and one of the escorts was shot down by an RAF fighter. To add further embarrassment, German fighters shot down two RAF fighters. As a vengeance attack, the attack on Canterbury was an unmitigated success with the British acknowledging that 70% of the total weight of bombs fell in the target area but failing to acknowledge their failure to intercept the raid[41].

The attack of 31 October was effectively the last ‘tip and run’ attack of any substance for 1942. The Home Office, amongst other political and military organisations, was quick to analyse the successes and failures of the ‘tip and run’ attacks over the preceding nine months. In an end of

year report produced by the Key Points Intelligence Directorate, it said of 'tip and run' attacks:

> 'It is clear that attacks were directed against gas and electricity undertakings, railways, trains and in some cases a terror raid was made on residential and shopping areas. Gas works and electricity undertakings in exposed coastal sites provide in themselves a good target and it may well be that the enemy were encouraged to develop these attacks in view of the repeated warnings of the Government for the necessity of limiting both industrial and domestic fuel. The undertakings at Brighton suffered severely in the several attacks made on them and as a result of the attack on the St Ives undertaking in August, domestic supplies were held up for about two months….'[42]

An analysis carried out by the War Office on 'tip and run' attacks up to the end of 1942 was even more blunt[43]. Bearing in mind that the maximum number of fighter-bombers available to the *Luftwaffe* at this time was twenty-eight, 40% of all daylight attacks in 1942 were carried out by *Jabos*, with low-level attacks being preponderant in the latter half of the year. Four out of every five fighter-bombers attacked recognisable military targets, average efficiency on each attack was 71% and German losses had been light.

From a British viewpoint, the small number of German fighter-bombers was creating far more work for the Observer Corps, RAF and anti-aircraft defences than they should have. In addition to an expansion of the Observer Corps satellite posts and increased fighter defences using new (and untried) tactics, the increase in anti-aircraft defences was dramatic. The numbers of light anti-aircraft guns assigned to combat 'tip and run' attacks rose from 43 in March 1942 to 543 in November 1942. Searchlight battery personnel were withdrawn from their primary duties and trained to man twin machine guns whilst the RAF Regiment anti-aircraft guns and personnel and 400 Royal Navy rocket projectors which fired wire obstacles into the paths of enemy aircraft were also assigned to the battle[44]. Despite all of this:

> '…the increase in gun strength was not accompanied by any corresponding rise in the success rate… The first big weakness lay in the early warning arrangements which failed to record raid approach or did so too late. Out of 44 attacks in August 1942, only

eight were preceded by radar warning…'[45]

A reminder of the ineffectiveness of British defences was cruelly reinforced early in the New Year by another German 'vengeance' attack. As a reprisal for Bomber Command's attacks on Berlin on 16 and 17 January 1943, 28 fighter-bombers attacked the London Docks area at lunchtime on 20 January 1943 whilst a further 12 fighter-bombers carried out a diversionary attack on the Isle of Wight and Tunbridge Wells. Another 16 Focke-Wulf 190s were used as escort whilst 39 German fighters carried out a diversionary fighter sweep off the Kent coast.

The attack achieved total surprise. The balloon barrage in that area of London had been brought down for maintenance during that lunch hour and the fighter-bombers attacked as that part of London's inhabitants were going to or at lunch; they were unaware of an attack until the first bombs exploded and only then the sirens sounded, by which time they were too late. With impunity, the fighter-bombers dropped their bombs and strafed buildings before heading south, their only loss being suffered on the return flight. A gasholder was set alight, the Royal Naval College at Greenwich was hit as was the Deptford West Power Station and Surrey Commercial Docks. To add insult to injury, the Germans also shot down ten barrage balloons, the barrage being hurriedly winched back up during the attack.

The loss of life was high and the effect on morale considerable. A school was hit, killing 38 children and six teachers, countless others were injured and many buildings and vehicles destroyed and damaged. So serious were the after effects of the attack that, for the first time, the problem of 'tip and run' attacks was debated in the House of Commons. A petition was signed by local residents complaining about the inability to prevent this attack and questions were asked as to why the defences were down and what was being done to combat 'tip and run' attacks. In a particularly evasive reply, the Secretary of State for Air, Sir Archibald Sinclair, said that the balloons were down for maintenance and that '…the best deterrence to such attacks as that on the 20th of January is the infliction of heavy casualties on the attackers…'[46] which was precisely what did not happen; all but one of the losses suffered by the Germans were from the diversionary sweeps whilst the only fighter-bomber was lost after it had dropped its bomb. A further question, asking whether the

Secretary of State for Air was satisfied that everything was being done to combat 'tip and run' raids, resulted in a similar response: '…the tactical measures best suited for defending this and other areas which are subject to varying forms of attack are under constant review…'[47]

The attack received unprecedented publicity in the days that followed which was not helped by the captured German fighter-bomber pilot who, whilst being interrogated, stated that *Jabo* pilots:

> '…have been told to attack anything and everything liable to terrorise the British public. Trains, motor buses, gatherings of people, herds of cattle and sheep etc have been mentioned specifically at the briefing as likely targets...'[48]

All of this still did not alter the fact that Britain's capital city had been bombed in broad daylight by a force which penetrated nearly 100 miles at high speed and low-level into enemy territory and still managed to drop its bombs onto recognised targets with good effect and then returned virtually unscathed.

When the weather permitted, for much of January and February 1943 more traditional 'tip and run' attacks were carried out from as far west as Torquay to as far east as Margate with the usual results-destroyed gasholders, hotels where trainee aircrew were being billeted, railway junctions and lines and, more often, town centres. It also appeared that the British defences were at last exacting a toll against the attackers; Typhoons accounted for five fighter-bombers in these two months, light anti-aircraft fire a further three. However, again all eight aircraft were shot down after dropping their bombs on the designated target and these losses did not deter the *Luftwaffe* or affect the potency of the attacks. In fact, a greater number of attacks were now flown when the weather improved in March and a number of these were by much larger formations of 20 or so fighter-bombers. As the Observer Corps narrative noted:

> '…many minor attacks were made by aircraft in small formations with occasional more ambitious attacks by formations of between 12 and 30 fighter-bombers with or without an escort or rear cover. In January (20th), 12 (*sic*) fighter-bombers bombed the crowded areas round Poplar and Bermondsey from low altitude with considerable moral effect. This was followed by several other similar attacks on Eastbourne, Hastings, London and Ashford…'[49]

If the attack on London on 20 January had 'considerable moral effect', similar attacks in March 1943 had an even greater adverse moral effect for British civilians. The attack against Eastbourne on 7 March by 18 fighter-bombers was undetected until the first bombs exploded; no RAF fighters were able to intercept and 14 civilians and seven servicemen were killed and countless buildings destroyed or damaged. Then again on 11 March, 27 fighter-bombers attacked Hastings, killing six civilians, destroying 40 houses and blocking the railway line. No German aircraft were lost even though anti-aircraft defences claimed to have shot down three but as HQ 11 Group noted:

> '…standing patrols were immediately detailed to the raid but the attack was so sharp that the enemy were passing out to sea six minutes after they were sighted…'[50]

The following day saw another reprisal for Bomber Command's continued attacks against Berlin with 24 fighter-bombers, this time with a massive escort, dropping bombs on Ilford and Barking in Essex and the eastern outskirts of London. Only minor damage was inflicted but the residents of Ilford were vociferous over the defence's failure to prevent the attack and at the sirens again being sounded only after the attack had started. The RAF did manage to intercept the formation but not until it approached the Belgian coast on the return flight where two fighter-bombers were eventually shot down.

The final massed attack took place against Ashford in Kent on 24 March and was the most successful by far. The official report is graphic as to the attack's effectiveness:

> '…this attack was heavier and more successful than the enemy's previous efforts. The enemy aircraft flew across Ashford at low level from south-east to north-west. Two of the five bombs aimed at the railway works did considerable damage whilst three bombs which fell to the north of the works damaged rolling stock. The remaining enemy aircraft appear to have made an indiscriminate attack on the town. One enemy aircraft made a cannon attack from roof top height on a petrol lorry standing in the yard of an agricultural works and the lorry exploded. The bomb carried by this aircraft was hit by light anti-aircraft fire and the enemy aircraft blew up. Extensive damage was caused to the works as a result of the double explosion…'[51]

All this increased activity, with 'tip and run' attacks now spreading further north-east as far as Walton-on–the-Naze in Essex, coincided with a massive expansion and reorganisation of the German fighter-bomber force in France. In addition to the two established fighter-bomber squadrons, a dedicated *Jabo* group had begun to form in December 1942. *Schnellkampfgeschwader* (SKG) 10[52] flew its first operational sortie on 7 March 1943 and by the 31st of the month, had 90 aircraft available to attack Britain, an additional 28 being assigned to it when the two original fighter-bomber units came under its aegis early in April 1943[53].

The British were unaware of this massive force of fighter-bombers and, if the *Luftwaffe* had utilised it in a similar tactical manner to the 'tip and run' attacks of the previous 13 months, it would have been a formidable weapon which the British defences would have had considerable difficulty in countering. Crucially, the *Luftwaffe* High Command, probably due to incomplete intelligence, believed that daylight *Jabo* missions had not achieved the desired effect and therefore the vast majority of SKG 10 was to be trained for nocturnal attacks, to the incredulity of many of its pilots:

> '…they got the idea that attacks would be practicable at night…such an absurd idea. The…pilots of SKG 10 had no qualifications for night missions. There was no experience in night and instrument flying and no (night) navigation system was available…'[54]

April 1943 saw daylight 'tip and run' attacks continue but on a much reduced scale, as much of SKG 10 trained for nocturnal operations, and only five separate attacks were carried out. Only one of these was a mass attack and took place on 3 April when 16 fighter-bombers, yet again, completely surprised the defences, caused considerable damage and all aircraft returned safely. A minor attack on 8 April by a smaller formation caused considerable damage to military and industrial targets on the Isle of Wight but two fighter-bombers were lost, one to a Typhoon on a standing patrol, the other to light anti-aircraft fire.

This reduction in 'tip and run' activity did not go unnoticed and although no obvious reason could be given for it, the British still saw 'tip and run' attacks such as the one on 3 April as wholly successful and that '…it is clear from the results achieved in the 'tip and run' raids on coastal targets that our defences can be improved…'[55]. Furthermore, a

similar report analysing nocturnal bombing did not connect the reduction in daylight attacks with a commencement of fighter-bombers attacking by night, stating:

> 'The fighter-bomber appeared for the first time as a night bomber on the 16th/17th of April and it is presumably the new fast bomber[56] which has been mentioned recently in German broadcast claims…They have operated mostly in the London and Home counties…'[57]

May 1943 saw a sharp increase in massed 'tip and run' attacks with 12 specific attacks on seven days. On two days, two attacks were made simultaneously in an attempt to split the fighter defences and all the attacks occurring either early in the morning, lunchtime or late in the evening, maximising their irritation to the civilian population. The fact that Great Yarmouth and a nearby radar station was under attack by 20 fighter-bombers on 7 May was not evident until the first bomb exploded whilst a similar attack four days later was equally successful. Only two aircraft were lost in these attacks, one of them to British defences again after the bombs had been dropped. The following day, Lowestoft was attacked by 25 fighter-bombers just before sunset; the results were predictable:

> '…the first warning received by anti-aircraft sites was the noise of falling bombs; the official warning was given two minutes after the first bomb had dropped. In addition to 21 bombs on land, several bombs were dropped in the sea near the harbour. Nine anti-aircraft sites were attacked with cannon and machine gun fire and the gas works, electricity mains and a hospital were damaged…'[58]

Yet again, no German aircraft were lost.

It seems incredible that the *Luftwaffe* was not aware of the successes it was achieving in May 1943 and even German radio broadcasts, usually boastful of such attacks, preferred to play down the successes of the 'fast bombers'[59]. The frequency of nocturnal missions now began to increase as daylight attacks decreased but even then, 'tip and run' losses for the first 20 days of May 1943 numbered two whilst nocturnal losses for the same period were higher despite such attacks being flown on only four nights.

'Tip and run' attacks would only occur on three more days in May 1943 and all attacks but one were devastating. On 23 May, simultaneous lunchtime attacks were launched against Hastings and Bournemouth. At Hastings, anti-aircraft sites appeared to be the chosen targets but for a change, these sites and the fighter standing patrol had received ample warning. The town was still bombed and the two German losses, one to a Typhoon, the other to anti-aircraft fire, occurred after the bombs had been dropped. Despite a six-minute warning, the attack on Bournemouth was a total success. Considerable damage was caused to the town centre with five buildings destroyed and a further 3,000 damaged whilst civilian casualties were 77 killed, 45 seriously wounded and 150 slightly wounded. Far more serious was a direct hit on a hotel being used by trainee RAF aircrew; 31 service personnel were killed, three missing and 38 wounded. Two days later, Brighton suffered another mass attack. Again, there was five minute's warning of the attack but the fighter-bombers still succeeded in damaging the railway and locomotive works and appeared to be targeting, with considerable success, Brighton's larger buildings.

The only failure that month was on the evening of 25 May when adequate warning enabled Spitfires to break up an intended attack on Folkestone. Slowed down by their bombs, the fighter-bombers jettisoned them into the sea and turned for home. Spitfires claimed to have shot down six fighter-bombers but only one was lost.

The final attacks of the month took place on 30 May. Torquay, another location where RAF trainee aircrew were billeted, had always been a popular target for 'tip and run' attackers; this time five servicemen were killed and 11 wounded. However, one of the five fighter-bombers lost in the attack did so because it collided with a church steeple; its bomb was thrown clear to explode on a Sunday school, killing 21 children and three of their teachers; the morale of the town's inhabitants was, obviously, badly shaken and the fact that five enemy aircraft had been lost during the attack was of little recompense. An attack on Walton-on-the-Naze that same evening also caused much damage but no casualties.

It could have been safe to assume that 'tip and run' raids in June 1943 would continue in the same vein. Indeed, this was the case for the five mass attacks that took place on the first six days of the month. Each attack was analysed by the British as being a total success, particularly

the attack against Eastbourne in the early afternoon of 6 June 1943. However, 'tip and run' attacks expected on the days that followed did not materialise; no further such attacks would occur against the British mainland for the remainder of the war.

The reason for the sudden cessation of 'tip and run' attacks has never been satisfactorily explained. The Observer Corps Narrative tries to explain it by saying:

> '…at the end of the first week in June (1943), these 'tip and run' raids ceased. Undoubtedly, the enemy had found it increasingly dangerous to make daylight sorties over this country…'[60]

Another source supports this explanation by saying '…Göring decided that the losses were too great and in June (1943) the…attacks petered out…'[61]

However, I have tried to show that contrary to the above, 'tip and run' attacks had met with considerable success, especially for much of 1943, by normally hitting the designated target whilst keeping fighter-bomber losses to a minimum. There were a very few exceptions to this and in particular, the attacks carried out in June 1943 were seen by the British as being 100% successful.

I believe that there are three simple reasons why 'tip and run' attacks stopped. Firstly, German post-attack intelligence, normally quite poor throughout the war, underestimated what the attacks had achieved; even the German radio broadcasts were unusually non-committal about the achievements[62]. Secondly, the *Luftwaffe* mistakenly believed that by using the fighter-bomber at night, similar results could be achieved whilst the darkness would help protect the aircraft. However, advances in British air-to-air radar technology and the superiority of British night fighters proved that darkness was no protection, German losses were high and effectiveness very poor. As one German commander, who had flown such missions in 1943 and 1944, made clear after the war:

> '…the night action of the Focke-Wulf 190 against London was not very successful. It was a real makeshift. This type of aircraft was neither designated for this kind of mission nor was it suitable for this task…'[63]

However, the final reason why tip and run attacks stopped was far simpler in that there were no fighter-bombers available for 'tip and run'

missions left in north-west Europe by the middle of June 1943. On 12 May 1943, German forces had surrendered in North Africa and it was clear that the Allies would soon invade southern Europe. The Germans thought that the greater threat was now in the Mediterranean, the 'soft underbelly of Europe', so in order to reinforce one wing of SKG 10, a second was rushed from France to southern Italy in the second week of June 1943 whilst a third wing was withdrawn from France and was operational in Italy by the end of June 1943. By then, the only fighter-bomber unit still in northern France was the nocturnal wing of SKG 10.

So, to conclude, what was the impact of the German 'tip and run' campaign? The Germans had discovered a unique use for its fighter aircraft and after much trial and error and even opposition, the fighter-bomber proved to be a very effective weapon against shipping. Extending its usage to coastal targets was also a success and the British defences had great difficulty in preventing many devastating attacks on numerous coastal towns and latterly inland targets.

For much of the 15 months that 'tip and run' attacks occurred, the Germans could only muster a maximum of 28[64] aircraft to attack targets on a coastline which stretched from Great Yarmouth to the Lizard, a distance in excess of 1300 kilometres. However, this length of coastline and the uncertainty as to what would be attacked also played into the German's hands. There were insufficient anti-aircraft guns of the correct calibre to counter a low-flying high-speed threat, whilst:

> '…the RAF could offer no positive defence against these fast, low-flying fighter-bombers which achieved an effect out of all proportion to the effort they represented. The Chain-Home and Chain-Home Low radar stations…were unable to plot the movements of the *Jabos* on account of their low altitude and Fighter Command was forced to mount standing patrols in order to counter the threat…'[65]

It is interesting to note that wartime analysis stated anti-aircraft guns accounted for 55 'tip and run' attackers during the period March 1942 to 6 June 1943; fighters were said to have accounted for a further 51.[66] Analysis carried out by myself tells a different story; anti-aircraft fire actually accounted for 28 fighter-bombers, fighters a further 28, one aircraft was shared whilst a further five either collided with buildings, high-tension wires or other aircraft.[67] It is clear that to lose 62 aircraft

and 62 pilots over a 15 month period was high but at this stage of the war, this was sustainable. Furthermore, these losses should be compared against a comparable German twin-engined bomber group which, for the same period, lost 122 aircraft in attacks on Britain, costing in the region of 480 aircrew killed, missing or prisoners of war.[68]

From a military viewpoint, 'tip and run' attacks did result in many more anti-aircraft guns and associated personnel being dedicated to defend potential targets. Furthermore, Fighter Command was forced to dedicate many aircraft to try and prevent the fighter-bombers from dropping their bombs, which normally met with little success. These assets could have been better used.

What of the impact on the civilian population and the Government? The inability to prevent such attacks was a great worry to those living on the south coast. For example, Torquay was attacked eight times over the 15 months, two of the attacks being severe and resulting in considerable loss of life. Two other attacks in 1943 so incensed civilians living in the towns affected that petitions were written and questions asked in the House of Commons. However, it would appear from the non-committal responses that 'tip and run' problems were left purely to the military and 'tip and run' attacks remained a constant irritation to civilians living on or near the south coast.

What then of the value of the 'fighter-bomber' as a weapon? The Germans did indeed develop the idea but the Allies copied and perfected it. Every Allied fighter introduced during the war had to have, with minimum modification, the capability of carrying a bomb and the best example of this was the Hawker Typhoon. In the second half of 1943, the Typhoon found a new role as an all weather intruder and then close support aircraft, armed with bombs and rockets. In the battle for Normandy in the Summer of 1944, the Typhoon made a name for itself as a first-class anti-tank, anti-vehicle, anti-building and anti-strongpoint weapons platform, something the Germans never managed to achieve after the early success of the war.

It is therefore my conclusion that 'tip and run' attacks did have an impact on both the British military and, to a lesser extent, the civilian population living on Britain's southern coast but there is scant evidence that the Government was overly concerned, unless a Member of Parliament's constituency was a regular target. From the German viewpoint, they underestimated what they were achieving with what was

a very small force of fighter-bombers, a force which was too small to cause massive damage. The decision made in 1943 to use the fighter-bomber at night was misguided and even when the *Luftwaffe* had a massive fighter-bomber force at its disposal, it failed to utilise it in a way that would have swamped British defences and allowed the fighter-bombers to attack more targets, further inland, with virtual impunity.

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Notes:

[1] In 1943, this extended as far east as Great Yarmouth.
[2] Reaching a peak in the Summer of 1942.
[3] Balke, U (1997), p389.
[4] *Royal Observer Corps Narrative 1943*, p101.
[5] Balke, U (1997), p391.
[6] Steel, N & Hart, P (1997), p262.
[7] *Ibid*.
[8] Even though the convoy was nearly annihilated, eight *Stukas* were shot down and a further seven damaged.
[9] AI 1 (K) Report No 781/1940.
[10] Caldwell, D (1996), p71.
[11] Goss, C H (2000), p145.
[12] Galland, A (1975), p50.
[13] Galland, A (1953), p28.
[14] *Ibid*.
[15] Bigge, J, p19.
[16] Frappe, J-B (1977), p12.
[17] *Royal Observer Corps Narrative 1942*, p85.
[18] Occupied Europe was divided up by Air Fleets by the *Luftwaffe*, Air Fleet 3 covering much of France.
[19] Caldwell, D (1996), p214.
[20] Pomeroy, C A (1995), p115.
[21] This took place on 28 February 1942 when British commandos captured German radar equipment.
[22] Balke, U (1997), p389.
[23] *Royal Observer Corps Narrative 1942*, p86.
[24] Routledge, N W (1994), p402.
[25] Both .303 calibre machine-guns.
[26] 40mm calibre.
[27] RAF Bolt Head Operations Record Book, 1 May 42.
[28] Neitzel, S (1995), p 127.
[29] Analysis of South Coast Tip & Run Incidents (7/43).
[30] *Royal Observer Corps Narrative 1942*, p87.
[31] *Ibid*.
[32] A reference to the unit badge, a red fox carrying a ship in its mouth.
[33] Krebs, K K (1942), p58.
[34] HO192/875.
[35] KTB Skl, p675.
[36] Five were lost of which only two were shot down by fighter aircraft.

[37] Ziegler, F (1993), p248.
[38] *Ibid* pp.253-254.
[39] *Ibid*, p254.
[40] Caldwell, D (1996), p300.
[41] AWA Report Number BC/G/11, p2.
[42] WT.16628 83/6/43, p35.
[43] BC/G/11, p3.
[44] Routledge, N W (1994), p403.
[45] *Ibid*.
[46] Parliamentary Debates Commons 1942-43, Vol 386, p477.
[47] *Ibid*.
[48] AI (K) Report Feb 43, p5; there is no evidence that this was the norm but that it was a tactic reserved for 'vengeance' attacks.
[49] *Royal Observer Corps Narrative 1943*, p101.
[50] HQ No 11 Group Operations Record Book, March 1943, p7.
[51] AWA Report No BC/18 May 1943, p7.
[52] Fast Bomber Group 10.
[53] Balke, U (1997), p389.
[54] Setzer, F (1989).
[55] AWA Report No BC/20, p2.
[56] Reference to the new unit, SKG 10, which was thought to be using a newer and faster FW 190 which was in fact not the case.
[57] AWA Report No BC/19, p1.
[58] AWA Report BC/20, p4.
[59] *Diary of Day Raiding- April and May 1943*, p2.
[60] *Royal Observer Corps Narrative 1943*, pp101-102.
[61] Routledge, N W (1994), p404.
[62] *Diary of Day Raiding – April and May 1943*.
[63] Dahlmann, K, p81.
[64] Assuming 100% serviceability, which was never achieved.
[65] Wood, T & Gunston, B (1977), p62.
[66] Routledge, N W (1994), p404.
[67] Sources for the German losses are the Luftwaffe Quartermaster General's Returns and *Deutsche Dienststelle*. Sources for how these aircraft were shot down came from the Command, Group and Squadron Records books held either at the Air Historical Branch or Public Record Office.
[68] Balke, U (1997), pp.428-457.

SUMMARY OF THE MINUTES OF THE FIFTEENTH ANNUAL GENERAL MEETING HELD IN THE ROYAL AIR FORCE CLUB ON 12th JUNE 2002

Chairman's Report.

AVM Baldwin reported that the Society had held two seminars during the past year. The first, in October 2001, had been held at the British Aerospace Welfare Association facility at Filton and had covered the birth of MRCA/Tornado. The Society was indebted to Gp Capt Jock Heron, who had masterminded the event, and also to British Aerospace and Rolls-Royce who had both given generous donations to help defray the costs. A second seminar, held at the RAF Museum in April 2002 and dealing with Electronic Warfare, had attracted the record attendance of 135 members.

The published record of these proceedings would undoubtedly maintain the Society's high standards in this respect. In this context, the Chairman wished to acknowledge the contributions made by Lee Bedford and Talbot Green in proof reading the journals and to Jeff Jefford who, as Editor, deserved enormous credit for the high quality of the Society's publications. Sadly, however, the printers had transposed some pages in some copies of the most recent journal while the Post Office had managed to send a number without stamps! The Society apologised for these errors and would seek to avoid any recurrence.

The Chairman noted that the next seminar would be held at Hendon on 23 October 2002 and would cover Reserve Forces; AVM Barry Newton had agreed to chair the day which was being masterminded by Sqn Ldr Tony Freeman and Wg Cdr Jefford. The spring 2003 event would deal with the Falklands Campaign.

Turning to financial affairs, AVM Baldwin noted that the Committee had taken the view that the Society's reserves should not normally exceed twice its annual operating costs. Since its finances were in a healthy state, however, he was pleased to report that the Committee had agreed to support two worthwhile causes: a plan to build a memorial to the British aviators of WW I at St-Omer in France, and a project to catalogue Sir Frank Whittle's papers at the University of Bath.

In conclusion, the Chairman thanked the Committee for their continued hard work on behalf of the Society. The quality of the Society reflected their efforts, their only reward being the support of the

membership in attending seminars and recruiting new members. As always, the Chairman wished to acknowledge the advice and encouragement of the President, Marshal of the Royal Air Force Sir Michael Beetham, and the Vice-President, Air Marshal Sir Frederick Sowrey.

Secretary's Report.
Gp Capt Dearman noted that fifty-four new members, of whom six were serving officers, had joined over the year, while seventeen memberships had lapsed. The membership now stood at 873. The sale of journals had realised just over £1000 since the last AGM. A steady flow of correspondence, much of it by email demonstrated a wider interest in the Society and a healthy source of new members.

Treasurer's Report.
Mr Boyes tabled the annual accounts for 2001 which showed a surplus of £2782. The current year forecast was for a surplus of some £2346. A continued subscription of £15 pa was therefore appropriate, and seminar fees would also remain unchanged at £15 per head. The Society's reserves stood at £29 618 at 31 December 2001. Gp Capt Neubroch, seconded by Air Mshl Sir John Curtiss, proposed that the accounts be accepted and that Messrs Pridie-Brewster of 29/39 London Road, Twickenham TW1 3SZ be re-appointed as independent examiners; the proposal was carried.

Appointment of Executive Committee.
The Chairman noted that Gp Capt Chris Finn had succeeded Gp Capt Gray as Director of Defence Studies (RAF). Welcoming Gp Capt Finn's agreement to serve as an ex-officio member of the Committee, AVM Baldwin took the opportunity to record his thanks to Gp Capt Gray for his valuable contribution to the Society during his tenure. Wg Cdr C McDermott had succeeded Wg Cdr Angus Deas on the staff of the JSCSC and he too had agreed to serve ex-officio. All other members of the Committee offered themselves for re-election. It was proposed by Sir Frederick Sowrey, seconded by Sir John Curtiss, that those standing for election should be accepted. There being no objections, and no alternative candidates, the Committee listed below, was duly elected to serve to the next AGM:

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

The ex-officio members of the committee were:

Mr J S Cox BA MA	Head of AHB
Dr M Fopp MA PhD FMA FIMgt	Director, RAF Museum
Gp Capt C J Finn MPhil RAF	DDefS(RAF)
Wg Cdr C McDermott RAF	JSCSC

Discussion.

The Chairman declared that it gave him great pleasure to announce that the Air League and RAF Historical Society Gold Medal was to be awarded to Air Cdre Henry Probert in recognition of his services to the history of the RAF which had culminated in the recent publication of his biography of MRAF Sir Arthur Harris. The presentation was made by MRAF Sir Michael Beetham

Inviting the President to make a second presentation, the Chairman announced that Sqn Ldr Chris Goss had won the Two Air Forces Award sponsored jointly by the Society and its counterpart, the (US) Air Force Historical Foundation. His paper, which discusses the impact of the *Luftwaffe's* 'tip and run' bombing campaign between March 1942 and June 1943, would be published in (this edition of) the Journal.

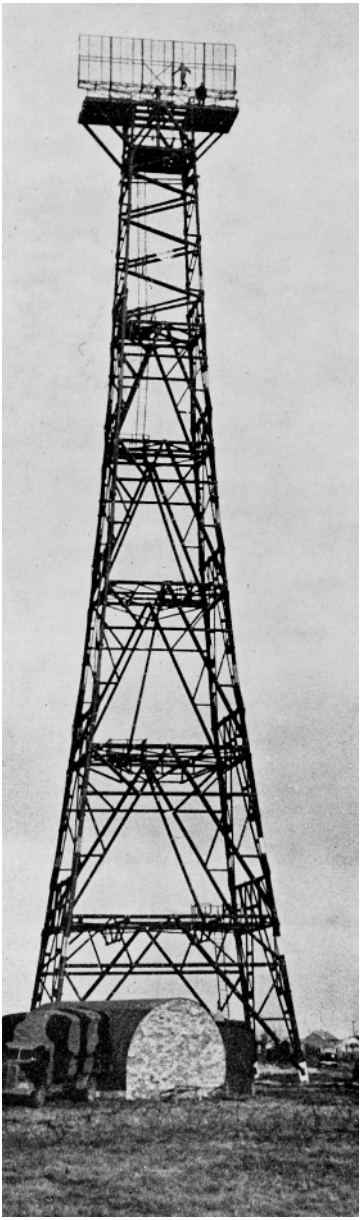
ON THE GROUND BUT ON THE AIR.

by Charles Mitchell

This short paper recently came to hand and is published here for two reasons – because it has some relevance to the discussion following Dr Price's address, and because it was written by one of the RAF's countless unsung groundcrew. **Ed**

Before the war the Germans and the Americans both knew that radio waves reflected from aircraft could be used to locate them but it was in Britain that the first practical radar system was devised. The drive and initiative shown by British engineers and scientists, such as Robert Watson-Watt and Henry Tizard, backed by forward thinking airmen like Hugh Dowding, ensured that Britain had a string of what were called Chain Home Radio Direction Finding (RDF) stations, linked to filter and operations rooms by landlines, established in time to greet the *Luftwaffe* in the Battle of Britain. The name 'radar' is an American import which had come into general use by 1943. It is now so universal that I will use it in this article. In 1940 two types of radar set were used, Chain Home (CH) and Chain Home Low (CHL). The former operated on wavelengths around 10 metres and frequencies around 30 MHz. CH stations had fixed transmitting aerials on masts 360 feet high with fixed receiving aerials carried separately on 240 feet masts nearby. A CH transmitter flooded the sky in front of it with twenty-five pulses of radio waves per second and its receiver picked up any reflections. When aircraft were detected the aerials could not be moved to bring the reflections into sharper focus but a device called a goniometer mounted on the operator's desk enabled him or her to do some sharpening by electrical means. The CH stations provided broad coverage over a range of some 50 miles and altitudes up to some 15 000 feet. CH was not so good closer to the ground, however, and the problem of aircraft flying under the radar was tackled by the use of CHL sets, which were also more accurate in detecting the precise position of an aircraft.

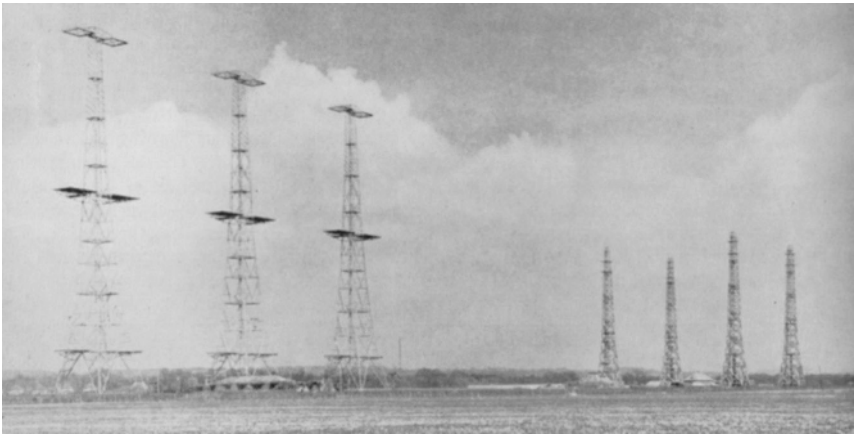
CHL operated on a wavelength of 1.5 metres and a frequency of 200 MHz. It used a rotating aerial array, made up of both transmitting and receiving elements, which scanned the horizon with a narrow beam which was swept through 360^{o}. If CH transmitters can be thought of as floodlights, the CHL transmitters were more like searchlight beams, sending out 250 pulses of radio waves per second. CHL aerials were



A CHL Mast.

mounted on much shorter towers than the CH variety, about 30 feet or so above the ground. At the feet of CH and CHL aerials were huts, one housing the transmitters and one the receivers, where plotters, often WAAFs, saw the reflections of the radar signals on their cathode ray tube screens. They translated what they saw into bearings and ranges, made estimates based on their experience about the number of aircraft responsible for the reflections and sent their data to the filter room of Fighter Command via telephone landlines. The 1940 CH and CHL sets were basic compared to what was possible when the British magnetron came into use and enabled really short wavelength, very high frequency radar to be achieved. Watson-Watt knew that the radar that was available in 1940 was not the best that could have been done, even in those days, but, as he once remarked, the third best solution was OK because the second best would have taken too long and the best would never come!

At Easter 1940, as an AC2 wireless electrical mechanic, I entered the CH world at Ottercops Moss, a bleak location about 10 miles inland from the east coast at the northern end of the Pennines. The majority of CH stations were nearer the coasts than that; Ottercops was an exception. The place was shrouded in dense fog when I arrived so it was not until the following day that I caught my first glimpse of the



A typical CH/CHL site.

transmitter masts, which I would soon I have to scale to clean insulators and effect any running repairs that might be needed. That sort of thing involved a half hour climb and some giddy moments leaning out into space with a mate holding on to my belt! The station was in the process of being taken over by the RAF from civilian engineers and, apart from them, all expertise rested in the hands of long-serving Regulars who were Boy Entrants and Halton types in the main. I got no formal instruction whatsoever and was expected to pick things up as I went along, by watching what my more experienced colleagues did. My civilian occupation had been in the wireless trade, servicing the Ekco, Bush and Murphy sets of the 1930s, so I could understand a lot of the jargon. One of my first duties in the transmitter room was to take regular readings from the multitude of meters in the place. I realised what a big league I had got into when I found the filament currents of the transmitter's valves running at tens of amps – compared to the few milliamps I had been handling in civvy street. Everything got very hot and one had to be careful what one touched.

In June 1940 I was posted to St Twynnels, on the Pembrokeshire coast overlooking Milford Haven, to help build a CHL set to supplement the nearby CH already in operation. I must have been doing something right because by then I was a corporal and had been re-mustered as an RDF mechanic. We built the CHL from scratch, aided by lots of manuals, civilian boffins who calibrated the set for us and a handful of

RAF types with some previous experience – about equivalent to my own. The rotating aerial, mounted above the roof of the receiver hut, was a hefty rectangular affair containing Yagi arrays in a substantial wooden frame. It was rotated by manpower, provided by an airman who sat and turned a former truck steering wheel attached to the aerial via a system of gears. He could manage about 30 minutes of this hard labour before being relieved. When high winds buffeted the aerial the sweat would pour off him! We were on air for 23 hours daily with one off for maintenance and our plots were fed to the navy at Pembroke Dock.

St Twynnels was in Fighter Command's 10 Group territory. They had squadrons at Pembrey and St Eval and probably benefited from some of our data but we really had no idea what use was being made of our findings. Life on a radar station could be a rather isolated business, not at all like that on an operational squadron. Our radar colleagues on the CH stations covering the south east and south coasts were well aware of what was going on (including being bombed at times) but our horizons tended to be limited to the CH towers and rotating Yagis of the CHL. We were not totally unaware of German activity, however, since the *Luftwaffe* carried out some successful mine-laying operations around the docks and managed to set the oil refinery at Milford Haven alight. It burned for about a month and I was reminded of it during the Gulf War when the Iraqis set fire to the Kuwaiti oil wells.

In November 1940 I was posted to the radar school at Cranwell where, for the first time, I encountered theoretical instruction in a classroom. Whilst there I was remustered as a radar mechanic and became an instructor and a sergeant in the process. Providing such formal training was essential to meet the growing demand for radar mechanics which could not be met by the sort of apprenticeship system I had experienced at Ottercops. After Cranwell I switched to mobile radar in 83 Group and prepared for crossing the Channel as a flight sergeant with 2nd TAF. But that is another story.

ST-OMER APPEAL UPDATE

by Air Commodore Peter Dye

It is nearly eighteen months since the Society responded so generously to the request for support in the erection at St-Omer of a memorial to those members of the British Air Services who served on the Western Front. In demonstrating their commitment, the Society provided the necessary momentum to the Appeal, which is now progressing well towards the formal unveiling in September 2004.

We have recently received formal planning permission from the French authorities for the construction of the memorial on the original airfield site at St-Omer adjacent to the current Flying Club. Local support for the project has been enthusiastic and includes the Mayor and Town Council of St-Omer as well as the Mayors of the adjacent communes.

The design of the memorial has been finalised and an artist's impression of the final version accompanies this note. Provision will be made for the incorporation of individual plaques in the pediment – if there is interest from squadron associations. It is hoped that the Commonwealth War Graves Commission, whose representatives have been closely involved with the project, will provide long term care of the memorial.

Fund raising towards the expected cost of £30 000 continues. Lord Trenchard and Air Marshal Sir Frederick Sowrey (no stranger to members of the Society) have agreed to be official patrons. We will shortly be beginning a publicity campaign to widen the profile of the Appeal. This effort has been greatly helped by the recent receipt of a cheque for £1200 from No 206 Squadron whose members raised the sum during a recent visit to Northern France and St-Omer. To date, some £8500 has been raised which represents an excellent start with a little over a year still to go.

Finally, planning is in hand for the formal unveiling ceremony at which it is hoped that the Society will be formally represented. However, individual members of the Society and all those who have supported the Appeal will be very welcome.

SAINT-OMER MEMORIAL

Coincidentally, the Chairman recently received the following letter and it is reassuring to know that there is support for the Committee's initiative among the membership. **Ed**

First, I must say how much I enjoy the reports of the Society's seminars. However, I am writing now to endorse the Committee's decision to support the project to commemorate the British flyers of World War One.

Although I believe that the last pilot from that war has just passed away in Toronto aged 106, those times seem utterly remote from today. In the long perspective of the centuries of British history, WW I is perhaps only 'last week', but so much has already been smothered from view.

In 1993 my brother and I determined to go to the Pas de Calais to locate the RAF aerodrome at which No 20 Sqn was based in 1918, when our father had been severely wounded in air combat. Finding the village was easy but the aerodrome site was elusive until the *Cross & Cockade* library at Old Warden produced an aerial photo of Boisdinghem, not far from St-Omer. It showed a bridge over a ditch for aircraft to go from one field to another not far from a lane junction. On the ground we were able to find this bridge, which was made of concrete. Then, with reference to the aerial photograph, we found residual tarmac on tracks within, what had been, domestic sites and (canvas) hangar areas. But this was already almost an exercise in archaeology. The fields were no longer grass but growing barley, although this did not hide the distant view to the east over the old front line.

My father had returned in 1968, following the RAF 50th Reunion at Hendon, and he was prepared to swear that the same white horse was in the field adjoining the village church as had been there in 1918....

Without the timely monument, the flyers of World War One will become as shadowy as the archers of Agincourt. Those who come later need to be able to see where it all happened.

A good decision by the Committee.

W D Markham
Southampton

LIFE IN THE SHADOWS

by

Squadron Leader Stanley Booker

Prompted by the account of the seminar on Cold War intelligence gathering published in Journal 23, Sqn Ldr Booker offered the Society his recollections of his involvement in this field with an agency which we did not discuss at Hendon. ***Ed***

As a flight lieutenant at Lyneham in 1951 I was the Flying Wing Search and Rescue and Intelligence Officer. To familiarise me with some aspects of the topics involved I was sent on a five-week RAF General Intelligence Course which was held at Monck Street, near Victoria Station.

Having been shot down over France in 1944, I had some practical experience of evading which stood me in good stead and on the last day of the course, I was taken to one side and interviewed by a Sqn Ldr Freddie 'X' from 'Another Department' who congratulated me on my excellent results and final placing, and commended me for having found some papers in the CO's secretary's waste paper basket while doing my after-hours rounds as the Duty Security Officer. Quite coincidentally, it just so happened that the discarded carbons that I had discovered had been used in the preparation of the end of course examinations, in which I had done so well.

He went on to comment favourably on my lecturette on 'Survival as an Enemy *Terrorflieger*', which I had based on my experiences in the infamous Buchenwald concentration camp, and to wonder how fluently I could speak German. Having satisfied himself on this point and observed that my Annual (so-called) Confidential Reports tended to characterise me as having a retiring nature and an inclination to avoid mess social functions, my remarkably well-informed squadron leader asked whether I would be interested in a posting to Germany where there would most certainly be very few such events.

No details of the nature of the posting on offer were forthcoming but I accepted, on the understanding that I would be accompanied by my wife and family. This was agreed and I was told to return to my unit and await instructions. Several weeks later, I was attached 'supernumerary for temporary duty at RAF Uxbridge', whence I commuted in civilian

clothes to attend a course (as the only Service officer) run by the Foreign Office in a palatial, but seemingly mostly empty, residence in Carlton Gardens. From time to time, between lectures, we students would sally forth on strange (for an RAF officer) excursions making 'unobserved RVs' with strangers in Soho and Leicester Square. Other outdoor exercises included clearing dead letter boxes in toilet cubicles in isolated underground public conveniences, usually in Mayfair or in the vicinity of Harrods. Whether by accident or design these cubicles always seemed to be the only ones that were occupied and our furtive activities inevitably attracted the attention of the attendants, who were clearly aware of what was going on and could be relied upon to make an embarrassing scene at the expense of the hapless trainee. Other skills covered included: steaming open letters; types and uses of secret ink; practical safe combination security and even the selection and appreciation of a good brandy. As it progressed the course became increasingly cloak and daggerish, my position being made a little uncomfortable by the obvious mistrust of my colleagues, all of them qualified War Department Security Officers who were attending a Refresher Course and who regarded me as a possible 'snoop'. Their suspicions tended to be reinforced by the fact that no indication was ever given as to what I, an obvious outsider, was going to do when I was posted to Germany.

Having signed the Official Secrets Act, twice, I returned to Lyneham where my absence was difficult to explain, as I had been specifically warned not to discuss the events of the previous few weeks with anyone. It was almost a relief, therefore, when I was summoned to the Station Commander's presence a few days later to be advised that I was to clear my married quarter, send my wife and young daughter home and present myself to the RTO at Liverpool Street Station. Thus it was that in early May 1951, with my few civilian items of clothing in my case (along with a .38 Service pattern Smith & Wesson revolver), I reported as instructed at the appointed time, much surprised to find that I was actually expected, and duly directed to join the evening Forces Troop Train. My destination was HQ 2nd TAF at Bad Eilsen.

Having spent 1948-49 flying 400 Berlin Airlift sorties in No 206 Sqn's Yorks, it somehow seemed good to be back in Germany – but in what capacity? – and with whom? – and where?

The first week was spent in the hands of 2nd TAF's very friendly Intelligence Section. There I was given briefings and studied official

classified journals and technical volumes on the Soviet Air Force in East Germany, which was being dramatically expanded and rearmed with MiG-15s and -17s and Il-28s. Having been thoroughly indoctrinated on the 'Need to Know' principle back in London, I was reluctant to ask questions about my future employment, even though I still did not know where I was going or what I would be doing when I got there. Since I did not appear to be sponsored by any particular organisation, it was almost reassuring to be asked whether I 'belonged to Ackermann's outfit?', to which I would respond with a discreet nod and a wink which seemed to satisfy everyone. Perhaps I *was* to be one of Ackermann's men, whoever they were? It was to be many months before I discovered that Sqn Ldr Ackermann was an electronic intelligence specialist whose concerns embraced a cluster of RAF outposts, usually on high ground, where there were big 'ear trumpets' and other odd aerials.[1]

Early in June, my official RAF intelligence background orientation was concluded, and I was put on a train, now the possessor of a most impressive Special Security Card which stated, *inter alia*, that I was to be given every assistance when required, by Service and Civilian Authorities alike, that I could wear civilian clothes on duty and that I could enter all Out of Bounds places. This document had a concluding authorisation which always raised eyebrows on the rare occasion that it had to be produced in earnest. It read: 'The bearer of this document is authorised to carry a pistol of non-War Department pattern.' When I had been issued with my Special Security Card, the RAF Provost Marshal had handed me a .32 Walther automatic. Now I really was concerned as to what I had let myself in for. Thankfully, I was never called upon to use my gun in earnest, although much later on its presence under my jacket was a real comfort when keeping company with dubious characters in lonely corners of Berlin. With this in mind, whenever the opportunity presented itself, frequent close-range practice would be undertaken at Gatow with another RAF colleague; but all of this was in the future.

On disembarking at the battered Hamburg railway station, I was met by a polite, but shabbily dressed civilian, wearing a long raincoat and large black hat (like a character from *The Third Man*). He introduced himself, in perfect English, as Jacques, announced that he was to be my personal driver and escorted me to an imposing black Opel *Kapitän* saloon – status indeed! Twenty minutes later we were in a small, modern

barracks in the undamaged outskirts of the city. Here I found the answer to my weeks of curiosity. I had been delivered to a small office complex identified by a notice proclaiming it to be the 'Military Liaison Section'. After passing through a heavily protected security door, I found that the section appeared to be staffed by a handful of rather unconcerned civilians (who seemed to keep very much to themselves in their individual rooms) with a small secretarial support group of rather spoiled female CCG (Control Commission Germany) civilians. One of the secretaries eventually detached herself and conducted me to an office where I was greeted by a Flt Lt 'X', who had been expecting me and whom, it transpired, I was to replace.

Over the next couple of days all was revealed. I was driven around and shown various safe houses where I was occasionally to meet local German 'head agents' who had contacts in West Berlin and who made regular BEA flights up to the Big City to collect reports on their briefed targets in the DDR. All very routine and orderly, on the surface, and completely impersonal; at that stage I was to have no direct contact with East Germans. I found that I really was a 'liaison officer', since I was a *de facto* civilian employed by the British War Office's intelligence commission in Germany. We served its HQ back in the Rhineland by sending them reports on topics specified and prioritised in official briefings which were periodically updated. In addition to my regular 'head agent' contacts, I was responsible for following up the interrogations of newly arrived refugees with a view to extracting any background information on new airfields being built in East Germany and, where appropriate, exploiting these people further as possible future contacts.

After several months of these routine, low key intelligence gathering operations I found that I was becoming increasingly involved, off station, with another, more professional, organisation. This one engaged in direct personal contact with its informants who dealt with technical matters. My specialised RAF background was clearly expected to be useful in this respect and I was eventually appointed as 'minder' to a former *Luftwaffe* pilot who was being groomed for a specific special operation. By this time it was apparent that I was now serving two masters; the official, War Office-sponsored, German CCG organisation *and* one of those shadowy Departments back in London which were never officially acknowledged to exist (certainly not in 1951). My Sqn

Ldr Freddie 'X' and his boss occasionally left their London lair to make an appearance in Germany and it was now clear that I was actually one of their 'seconded field officers' and that I was being groomed for bigger things with the real professionals, the SIS (Secret Intelligence Service) in Berlin.

It was to be another year before I was permitted to join the 'first team' in the Big City and in the meantime there was much more tradecraft to learn. Meanwhile, my family had joined me and I experienced some difficulty in rationalising the apparent abrupt change in my status from RAF officer to civilian. This created problems for my wife, for my young daughter – 'What has Daddy done?' – for all of one's friends and relations, all of whom had to be taught to address letters to me as 'Mr', and with Service colleagues who were naturally curious to know what one was up to and why? Eventually matters were eased, at least domestically, when a wing commander came over from London to acquaint my wife with my circumstances. Even then, however, this was only on the basis of my activities as a War Office civilian intelligence officer; there was still no hint, to either of us, that I was 'on loan' to a far bigger organisation. In fact it was 1955, by which time I was operating in Berlin on a much higher professional level, before it was acknowledged that I (and another RAF colleague) had been seconded to 'the Firm' and that our Head Office was in Broadway Buildings, the pre-war home of MI6, as described by R V Jones in his *Most Secret War*, so my wing commander 'Boss' in the 1950s must have been a successor to the wartime Wg Cdr F W Winterbotham.[2]

Despite being in the FRG, much valuable information could be gleaned about what was going on in the DDR, which was only a few miles to the east of Hamburg. In pursuit of this aim, the British, US and French Control Commissions had each established field intelligence/security organisations within their respective zones of occupation. There were also co-operative allied frontier police organisations distributed along the entire Inner German Border, then merely a barbed wired fence, nothing like the formidable and heavily mined fortification that it would become in the 1960s, following the erection of the Berlin Wall. The policing of the British sector of the frontier was carried out by recently discharged servicemen and seconded civilian policemen who were very familiar with and controlled the regular 'line crossers', legal and otherwise. Needless to say, it was the

latter whose expertise we tended to exploit. I was particularly fortunate to establish contact with a regular (or, rather, 'irregular') line crosser, a former *Luftwaffe* engineer who had been responsible for examining recently crashed Allied aircraft to obtain technical and other intelligence from the wreckage and, sometimes, from the remains of their crews. He could always be persuaded (at a price) to make a special sortie to a location where his specialist knowledge could be put to use. We were not encouraged to make extensive use of such rogues, however, as they were difficult to control and their loyalty was suspect.

Despite the damage inflicted by Bomber Command, Hamburg was still a major commercial centre and the terminus for much of the traffic plying to and from Berlin, and beyond into Poland, all of which entailed lengthy transits of the Soviet Zone. The major *Autobahns* passed close to a number of military facilities, extensive exercise areas and several operational airfields so regular travellers were always good sources of *de visu* reports on barrack activities, convoy movements, new military equipment and so on. Doubtless many of these drivers, most of whom would have had wartime military experience, earned a relatively lucrative income by co-operating with the various allied intelligence agencies.

For a newcomer joining the local intelligence community, it was a question of getting stuck in and patiently seeking contacts who might travel to, live near or have friends in a part of the DDR or Poland in which one had a particular interest. One would then arrange secure meetings with them to ascertain what they knew, or had witnessed. Painstaking interrogation would often reveal that the subjects actually knew a lot more than they thought they did, but this procedure was equally necessary in order to detect the fabrications with which they often embellished their accounts in an effort to inflate their rewards. It was all too easy to be taken in, either through inexperience or through an inadequate grasp of the language. The reality of the situation was that we were dealing with former enemy nationals, few of whom had any real desire to co-operate with institutions which plainly represented the foreign powers which were occupying their homeland. The majority of our sources were motivated primarily by money or, in the case of refugees, securing recognition of their status and assistance with resettlement.

Working silently in the background were the ever-vigilant East

German Secret Police, the *Stasi*, and their extremely competent GRU and KGB masters. All of these agencies were well aware of the targets which were of particular interest to the Allies and they took every opportunity to infiltrate the refugee stream. These planted 'contacts' represented another trap into which the inexperienced or overzealous field officer could easily fall. This was a particular problem for the Allied 'talent scout' at the Berlin Refugee Centre who was forever coming up with enthusiastic new arrivals, eager to offer to contact a dependable pro-Western friend who, it might be claimed, was 'the train driver on the high security railway line feeding the Peenemunde airfield and adjoining Soviet coastal naval base'. Our American colleagues were known to have taken the bait on occasions, which had resulted in the odd embarrassing security situation and the associated unwanted publicity that such planted incidents could generate.

Early in my secondment to Hamburg, it soon became apparent that a reliable car and an experienced driver were operational necessities. Our locally employed German drivers were not part of 'the organisation' as such, although they had all been vetted. In those rather impoverished early post-war years, they knew they were on to a good thing and most of them could be relied upon for their discretion. Whenever we used a driver, he would take us to a British military or Control Commission establishment, where he would wait while we went elsewhere in the vicinity to keep an RV or attend to whatever other business was required. Ostensibly our business was the sort of above-board activity that one might expect to associate with a Military Liaison Section, a frequent cover being the search for missing wartime aircrew. I doubt that this fooled many people but the word 'intelligence' was certainly *never* used. I was particularly fortunate in that I was the only Service officer in the section, and perhaps because the Head of Station was a former RAF Provost Marshal, I was allocated the senior driver and the best car, a splendid Opel *Kapitän*, to the obvious annoyance of the other members of the staff.

My driver had been a pre-war *Luftwaffe* fighter pilot. In 1944 he had been flying Ju 88s from St André, near Dreux, just where my Halifax had been shot down on 3 June following an engagement with two enemy night fighters. I found him to be a genuine, decent, family man, whose operational background coincided in many ways with my own. As a result he was a most satisfactory companion during the many hours that

we were obliged to spend sharing a car, our conversations serving to polish my colloquial German and to absorb a lot of background detail on former *Luftwaffe* airfields where he had been stationed but which were now in the DDR where many were being redeveloped for use by the Soviet Air Force.

Much as had happened in the UK during the 1930s, the expansion of the *Luftwaffe* had resulted in many new airfields being constructed to a more or less standard pattern. It was, therefore, possible to acquaint oneself with a typical German facility by visiting airfields like Celle or Gütersloh and then reading across to similar installations in the east, my driver's familiarity with some of these permitting me to develop a more intimate feel for those of particular interest. This degree of detailed knowledge, the arrangement of railway spurs, the layout of hangars, the uses of various ancillary buildings and so on, could be very useful when briefing on a 'technical operation'.

The demand for high grade technical intelligence increased as the Cold War intensified but the acquisition of such information was beyond the capabilities of the local field organisation in which I had, in effect, been undergoing my apprenticeship as an intelligence operative. By early 1953, I had become involved in monitoring the ambitious Soviet airfield construction programme, on which increasingly specialised and more frequent reports were required. To deal with this, I was transferred to Berlin where I was to join the 'professionals', in other words, the SIS. What a profound shock that proved to be. Life in Berlin was *very* different.

Berlin's unique status during the Cold War led to the locals calling their city the *Agentensumpf,* the 'agent swamp', in which the American CIA, the British SIS, the French SDECE, the ever-vigilant *Stasi* and Soviet Intelligence and Security agents revelled in the unusual opportunities that the situation provided, along with the unofficial, but tolerated, presence of the West German *BND* (Federal Intelligence) and *BfV* (Federal Counter-Espionage) Agencies.

Apart from the gathering of intelligence, from both overt and covert sources, that went on around the clock, one could hardly be unaware of the mountain of salvaged rubble, over 100 metres in height, located on the edge of the *Grunewald* in the British Sector. On top of this artificial hill, the *Teufelsberg,* was an imposing array of radar dishes, aerials and miscellaneous signals vans marking the presence of an RAF SIGINT

Post-war Berlin, the surprisingly lightly damaged Brandenburger Tor.

unit which had an uninterrupted 360° field of 'view'. In addition, one could often hear the quiet burring of an inoffensive little Chipmunk from nearby Gatow; it was not quite as innocent as it seemed, as it was often being flown by RAF members of BRIXMIS armed with cameras fitted with telephoto lenses.

Much less visibly, a very ambitious technical exercise had been in progress for many months. One of the most spectacular operations of the Cold War, Operation PRINCE[3] was a joint SIS/CIA venture to construct a tunnel, 1800 feet long and 17 feet in diameter, extending from the US Sector into East Berlin. The intention was to tap into the main East German telephone network, permitting the Allies to eavesdrop on military and political communications. Regrettably, this technically difficult combined operation was doomed from the outset as it had been betrayed by George Blake, an SIS officer on the staff of the West Berlin Station. Before being posted to Berlin, Blake had been the SIS secretary of the London-based Anglo-American committee that had examined the feasibility of the Berlin tunnel project. Much later, it was learned that he had passed details of the joint planning meetings to his Soviet masters. Later still, while stationed in Berlin, he had relayed other sensitive information, including details of agents and of the itineraries of BRIXMIS tours which meant that many had been 'blown' to the East German 'narks' before they even set out.

I was no longer dealing in Hamburg-style intelligence gathering by proxy, via a third person who made regular visits to Berlin to collect

information from his (often non-existent) contacts. In Berlin, real operatives came and went or spent time sequestered in their offices, each of which had a dedicated and extremely loyal secretary capable of holding the fort in her master's absence. There was intelligence, good and bad, to be gathered, often at a price in personal time and enthusiasm, not to mention in cash of various denominations on a modest – at times *very* modest – scale. There were no more posh motor cars, driven by a personal chauffeur. In Berlin everyone had his own inconspicuous, civilian VW in which to drive to and from work and around the city on business. There were, however, additional 'operational' cars, embellished with a variety of odd number plates, located in secure garages for use when appropriate.

One established one's own working routine, which was largely determined by the type of contact one had to deal with in order to satisfy a particular intelligence function. As I was mainly responsible for Soviet airfield construction projects, my contacts tended to be relatively random as they could not easily be conducted to a fixed schedule. As a result, I had to be permanently contactable and able to accept an RV at any time. Since this was long before mobile telephones had even been thought of, this required a very efficient central control organisation that was manned on a 24 hour-basis in order to identify, verify and then arrange a meeting between a usually tense and anxious 'traveller' and his case officer. We took turns at manning the overnight Duty Officer's desk and these interludes could be quite stressful. An organisation like the SIS did not suffer amateurs gladly, especially if a 'guest' mishandled the arrangement of an RV through carelessness or an overlooked linguistic nuance.

Vast numbers of refugees were continually pouring into the Western Sectors of the city. Most were of prime working age and they were often accompanied by their families. By the end of 1952 a total of 675 000 had already been registered and, following my arrival in February 1953, a further 330 000 had reached West Berlin before the end of that year. This haemorrhage of people continued throughout the 1950s, resulting in devastating damage to the East German economy.

The information we had been sent to Berlin to acquire was readily available but much of it was also being sought by other friendly agencies, some of which had a surfeit of dollars at their disposal which, combined with promises of resettlement in the West, worked wonders in

loosening the tongues and refreshing the ailing memories of desperate refugees, all too often at the expense of the truth. It was all part of the game of deception and bluff which, sadly, sometimes worked to the disadvantage of one's Allied colleagues. Berlin was a murky world of intrigue and, at times, dirty goings on and I am a little ashamed to admit, that I soon felt completely at home.

While there was a great deal of satisfaction to be gained from the sense of achievement when an RV went well, such clandestine activities also created a constant sense of unease. At times of local political tension, apart from a heightened awareness of the fact that one's family was some two hours drive from the relative safety of 'the Zone', I also became more conscious of my personal vulnerability as a result of my current occupation. However cavalier an air we might effect, we knew that we were competing with an all too often ruthless opposition, who were fully aware of our presence and our activities. The fate of Cdr Crabb represented an unmistakably brutal warning. Then again, there was the case of the, still mysterious, disappearance and subsequent reappearance of Otto John, the Head of the West German Intelligence Service. Whatever the facts of the matter, at the time, we in 'the trade' perceived this incident to be another warning. With as many as eighty espionage agencies said to be operating in West Berlin anything could happen. It would, for instance, have been all too easy to present a kidnapping as a defection – how could you distinguish fact from fiction?

The sense of insecurity was heightened by the presence of one's family. Would 'they' go to the lengths of kidnapping one's children? It was not so far-fetched. There would have been political repercussions, of course, but, depending upon the operational advantage to be gained, the opposition might have considered this to be a price worth paying. I had experienced the humiliation and shame of a *Gestapo* interrogation and knew my capacity to tolerate pain, but how would I cope if one of my daughters was being threatened? Pondering this could lead to a great deal of heart-searching during a long restless night; was I being selfish keeping the family together under such circumstances? I was not alone in having such misgivings, several of the other seconded Service officers confided that they had had similar doubts. Most of the full-time SIS men, more or less conditioned to permanent overseas assignments, elected to send their children to boarding school in the UK. Perhaps, with hindsight, we officers should have done the same. To have made such a

decision would have required some foreknowledge of what lay in store, of course, but there had been no briefing on the implications of being involved in 'liaison duties'; indeed few of us even knew where we were going, let alone what we would be required to do.

The SIS worked quite independently of both BRIXMIS and the resident RAF Signals Unit. Nevertheless, from time to time the Station received the odd tip, advising us that we should check the reliability of a particular contact. Suspicions might have arisen, for instance, because the information he had been supplying conflicted with that being obtained from other sources (perhaps his reports on a radar installation were unsupported by the data being collected by the SU) suggesting that our man might perhaps have been 'turned'. Cases such as these were often handled informally via the old boy net. Having recently returned from a 'tour', which had taken in an airfield known to be of particular interest, an old RAF acquaintance, now working with BRIXMIS, might quietly suggest that one of our regulars might be being less than conscientious in keeping us up to date on the ORBAT. This sort of liaison was entirely unofficial but very effective.

Apart from the Station's direct intelligence gathering activities we had to spend a great deal of time 'talent spotting' at the Refugee Reception Centre in Marienfelde. This might involve following up a tip off from our friendly local mole in order to recruit a likely lead at the expense of French and American case officers on similar missions. In many cases, however, we would only want to talk, albeit sometimes at great length, to a new arrival from an area where we already had adequate coverage, the aim being to obtain additional background detail, particularly on the individuals employed by the *Bau Union Brandenburg*, the East German airfield construction agency. Keeping up to date with developments by such means was a useful method of verifying what we already knew and, by getting ahead of the game, impressing upon one's regular contacts their need to be more conscientious in their routine surveillance of whatever project they were supposed to be monitoring. Time spent at the Refugee Centre was never wasted, although it was sometimes difficult to cope with cases of obvious hardship and the sense of hopelessness and despair, especially among those with families.

My personal priority target was the new Soviet airfield at Gross Doelln which had been my responsibility since its inception in the early

1950s. Construction was being monitored, virtually around the clock, by a variety of independent sources, providing constant updates on the laying of concrete. With typically Teutonic efficiency each concrete section was allocated a sequential identification number, and we used these to keep track of the locations of drainage tunnels, electrical ducting, inspection access points and so on, anything that might one day be useful, perhaps for a sabotage operation.

Construction work on the runway, 3500 metres long and 80 metres wide, and made of unusually heavy load-bearing concrete, was undertaken by the *Bau Union Brandenburg*. When they had finished, the *Bau Union Sud*, took over to co-ordinate the activities of a variety of contractors who completed the necessary electrical installations and built a semi-underground fuel depot alongside the airfield rail spur. When all was done the airfield was taken over by the Soviet Air Force who moved in with a convoy of extra large (and new to the DDR) five-axled fuel bowsers, suggesting the imminent arrival of aircraft so large that the standard bowser would be inadequate. That same afternoon, the first of a series of special aviation fuel tanker trucks was shunted down the airfield spur to start stocking the new fuel dump.

Within a matter of hours of its being delivered, we had a litre of the new aviation fuel in West Berlin for analysis. I have little doubt that several of the other local intelligence agencies had done the same. The following night, however, we definitely hit the jackpot, being the first to report on the occupation of the airfield. Gross Doelln had long been a major source of curiosity, indeed concern, to the entire Allied intelligence community. It was such a major installation that it was generally perceived to be a potential ‘war indicator’. In the event, when the first Soviet aircraft flew in, after dusk, they turned out not to be the anticipated *Bears* or *Bisons* armed with stand-off missiles but Il-28 *Beagle* tactical light bombers. Our reporting system worked well, a FLASH signal being dispatched to London before dawn. Some very important persons were said to have been woken from their sleep, but World War Three did not break out. Had it all been a hoax?

A few hours later, I was summoned to the Head of Station’s office to receive an official pat on the back because we had ‘beaten the Yanks’ with the vital information that Gross Doelln had finally become operational. This was considered to have been a good show for Berlin but, in my eagerness to get the news off to London, I had committed the

cardinal sin of releasing the highest priority signal on my own authority without having cleared it with the Head of Station, or even informing him of what was going on. As a result, after nearly four years of dedication my brief moment of glory was crowned, not with a celebration but with a dressing down.

The next few months were something of an anti-climax. Even though its Cold War function had still not been finally confirmed (and indeed I believe that there is still some mystery surrounding the operational concept which had lain behind this major civil engineering project) the enigmatic Gross Doelln was no longer quite so highly rated as an intelligence target. The Il-28s were eventually withdrawn, apparently to Poland whence they had come, their place being taken by MiG-21s, which, since they were a new type of aeroplane, provided a new challenge. But that would be later and, in the meantime, by 1957 my usefulness had declined.

My less important permanent airfield projects, and the more challenging tactical forward strips such as Allstedt and Mahlwinkel, were nearing completion, details of their construction having been confirmed by BRIXMIS and other agencies. Several other highly classified technical operations were going on but I was unaware of the details of these because of the strictly applied 'Need to Know' principle. Despite this precaution, however, the Station had a mole, Blake, who was doing terrible damage, the full extent of which would take several years to uncover

In October 1957 I was recalled to the UK to resume flying duties. In the process I was obliged to forfeit my acting 'scraper' but, because I had not worn uniform for six years, I had never actually sewn it on, so it was not all that much of a wrench.

Notes:

[1] Eric George Ackermann was commissioned into the RAFVR in 1940 and thereafter his name becomes a permanent feature of the Air Force List, latterly as a civil servant (a Principal Scientific Officer by 1963), but its compilers had a somewhat cavalier attitude to the spelling of his name, rendering it with one or two 'n's on a fairly random basis; in 1949 he appears twice, providing the bureaucracy with the opportunity to offer us both options. **Ed**

[2] See *Secret & Confidential* (Kimber, 1969) and *The Ultra Secret* (Weidenfeld & Nicolson, 1974) for Wg Cdr Winterbotham's description of his work.

[3] PRINCE was the British codename for this undertaking; it was known to the CIA as Operation GOLD.

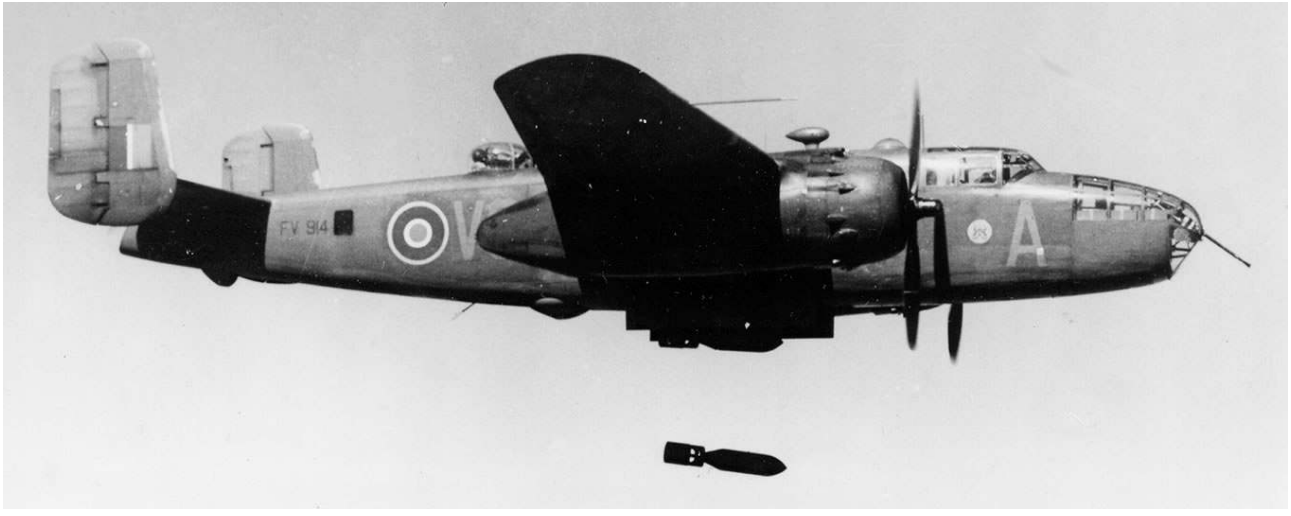
THE MUNICIPAL LIAISON SCHEME
by
Wg Cdr C G Jefford

During the autumn 2002 seminar, which dealt with reserves forces, reference was made to the squadrons of the RAuxAF and to the local affiliations that were such an essential characteristic of the auxiliary concept that they were incorporated into the designation of each unit, giving rise to such familiar titles as, for example, No 504 (County of Nottingham) Sqn, No 602 (City of Glasgow) Sqn and No 608 (North Riding) Sqn. It is less well known that there was another mechanism which was intended to permit all squadrons to establish local links.

In early 1939, to mark the RAF's imminent twenty-first birthday, the Municipal Liaison Scheme was inaugurated. It had two aims, to stimulate recruiting while fostering good relations between the rapidly expanding Service and local communities. In the first instance it was clear that the air force would be heavily dependent upon urban centres to satisfy its insatiable demand for skilled manpower while, in the second, the proliferation of new aerodromes was having an increasingly significant economic and social impact on the areas in which they were located. Units were encouraged, therefore, to affiliate themselves to a town or city, ideally, but not necessarily, one close at hand and to keep its local press acquainted with such items of interest as detachments, honours and awards, changes of CO and so on. Each territorial link was to be marked by mutual exchanges of hospitality including at least one formal annual visit by the squadron, although additional visits could be made so long as they did not disrupt routine training or other Service commitments. These occasions could be marked by a ceremonial fly past but no more than that; there was to be no 'display' flying.

Unlike those of the auxiliary squadrons, however, these relatively loose associations were not to be reflected in the formal titles of regular units. Conversely, the provisions of the municipal scheme were not confined to regular units, permitting the auxiliary squadrons, where appropriate, to focus their affiliations, No 500 (County of Kent) Sqn, for instance, electing to associate itself most specifically with Maidstone.

The Air Ministry initially required all commands to submit brief reports on these activities at six-monthly intervals commencing on 1 January 1940. By that time, of course, the country had already been at



A Mitchell II of No 98 Sqn. The device painted below the cockpit window, aft of the letter 'A' is the Coat of Arms of the City of Derby.

war for four months and the system had not really been in existence long enough for it to have become very firmly established. As a result, while some of these links were sustained, most of them lapsed. For example, the Digby-based No 73 Sqn had set up a liaison with Lincoln but this short-lived arrangement did not survive the test of war. The day after war was declared the squadron began to move out and within a week it was in France; it never came back. Indeed, apart from a couple of months in the summer of 1940, No 73 Sqn spent the rest of its entire career abroad, rendering the Lincoln-connection too tenuous to be worth re-establishing, if indeed, anyone even remembered that it had once existed.

Sadly, there were far too many negative influences at work to encourage the liaison scheme to flourish. Wartime security would clearly have been a problem, as was mobility, especially for units that were posted abroad, and No 73 Sqn was far from being alone in this respect. High casualty rates would also have disrupted continuity, as would disbandment. That having been said, as the accompanying photograph suggests, some of these links did demonstrate a remarkable degree of resilience. No 98 Sqn spent the first months of the war in France and Iceland followed by a period out of the line, but it eventually reformed in the UK in 1942 and the new squadron evidently re-established its pre-war link with Derby.

In August 1946 some thought was briefly given to re-establishing the system but it was quickly concluded that, in a local context, the RAF was more appropriately represented by its permanent stations, rather than its squadrons, because, even in peacetime, the latter can be relatively unstable entities. By October 1947 some thirty station/town links had been established. Two years later this figure had tripled. These associations became increasingly formalised as communities began to grant their local RAF station the ‘Freedom’ of their city, town or borough, the first probably being Bridgnorth in 1950 (although No 616 Sqn had been granted the Freedom of Doncaster in 1949).

When the original scheme had been formally announced on 1 April 1939 the registered affiliations were as listed at Figure 1. Other associations that are known to have existed later include: No 29 Sqn (Maidstone); No 40 Sqn (Abingdon); No 61 Sqn (Hull); No 82 Sqn (Coventry); No 91 Sqn (Folkestone); No 106 Sqn (Newcastle); No 110 Sqn (Ipswich ex-No 9 Sqn); No 207 Sqn (Leicester). That said, it is not certain that all of these links were forged under the terms of the

Municipal Liaison Scheme; most of them probably were and there may well have been others, but a consolidated list has yet to emerge.

Squadron	**Town/City**		
No 1 Sqn	Brighton, Hove & Worthing	No 97 Sqn	Halifax
No 2 Sqn	Ramsgate	No 98 Sqn	Derby
No 4 Sqn	Reading	No 102 Sqn	Morecambe
No 9 Sqn	Ipswich	No 103 Sqn	Swindon
No 10 Sqn	Blackburn	No 105 Sqn	Hereford
No 15 Sqn	Oxford	No 107 Sqn	Lowestoft
No 18 Sqn	Gloucester	No 142 Sqn	Worcester
No 21 Sqn	Norwich	No 144 Sqn	Grimsby
No 22 Sqn	Portsmouth	No 166 Sqn	Huddersfield
No 24 Sqn	Luton	No 185 Sqn	West Hartlepool
No 26 Sqn	Blackpool	No 204 Sqn	Plymouth
No 35 Sqn	Shrewsbury	No 209 Sqn	Scarborough
No 41 Sqn	Carlisle	No 210 Sqn	Swansea
No 46 Sqn	Stoke-on-Trent	No 217 Sqn	Exeter
No 48 Sqn	Southampton	No 218 Sqn	Weston-Super-Mare
No 49 Sqn	Sheffield	No 228 Sqn	Rochester
No 51 Sqn	York	No 500 Sqn	Maidstone
No 57 Sqn	Cheltenham	No 501 Sqn	Bristol
No 58 Sqn	Southport	No 502 Sqn	Belfast
No 62 Sqn	Northampton	No 504 Sqn	Nottingham
No 63 Sqn	Wolverhampton	No 605 Sqn	Birmingham
No 64 Sqn	Bradford	No 607 Sqn	Newcastle
No 72 Sqn	Barnsley	No 608 Sqn	Middlesborough
No 73 Sqn	Lincoln	No 609 Sqn	Leeds
No 77 Sqn	Lancaster	No 611 Sqn	Liverpool
No 78 Sqn	Preston	No 613 Sqn	Manchester
		No 616 Sqn	Doncaster

Fig 1. Affiliations registered under the Municipal Liaison on its inauguration on 1 April 1939.

BOOK REVIEWS

The Royal Air Force and Aircraft Design, 1923-1939: Air Staff Operational Requirements by Colin Sinnott. Cass; 2001; £39.50.

If the reader wishes to know why the RAF entered the Second World War with such a wide assortment of combat aircraft either in, or about to enter, service then this book will explain some of the reasons. It is an intensively researched account of the close relationship which existed between the Air Ministry and the British airframe and aero engine industries between the First and Second World Wars. Immensely detailed, with some forty-seven of its 243 pages devoted to notes, references and bibliography, it reviews the planning assumptions which changed fundamentally as it became evident that the principal threat to the United Kingdom was Germany rather than France. Colin Sinnott describes how the need to obtain command of the air by consolidating the first principle of war, offensive action, was recognised but policy for the home defence air war vacillated, depending on the strength of views of individual Air Council officers as their minds struggled to focus on the potential of air power. The sixteen years under review saw multiple aircraft prototypes pioneer new technologies where the biplane gave way to the monoplane, the top speed of fighters was more than doubled while the payload and range of bombers saw similar improvements as engine power-to-weight ratios improved substantially. The narrative quotes at some length from official papers with supporting evidence for the conflicting points of view of individual officers in senior Air Ministry posts but, as the text tends to jump chronologically, it is sometimes confusing to the less well informed reader. However the chapter headings provide a logical guide to the fascinating material contained within the book.

Setting aside those which had been in service for some years, and which were thus earmarked for disposal, the RAF entered the Second World War with nine widely different types of bomber either in squadron service or in the final stages of trials and development. These ranged from the single-engined Fairey Battle to the four-engined heavy bombers and finally the Mosquito, the author refuting the popular view that the latter type, one of the few innovative aircraft to emerge from pre-WW II concepts, was an independent initiative by the De Havilland Company. Despite the pioneering efforts of the RAF at the end of the

Great War to employ bombers in long range offensive operations and an assumption that in any future war the bomber would be supreme the author shows that the Air Ministry seemed slow to develop a strategy for its use, either by day or by night. Several reasons are explored for this apparent lack of central policy direction but, even with the benefit of hindsight, the author hesitates to criticise those who were responsible. Instead he is content to describe the several issues and leave the reader to draw his own conclusions by quoting from one of his source's observations on bomber experience early in the Second World War:

> 'More was learnt about the potentialities and limitations of the day bomber formations in a few months of war experience than had been gained from the previous twenty years of theorising on the basis of fragmentary and often obsolete evidence derived from the First World War, the Sino-Japanese War and the Spanish Civil War.'

At the same time, policies for the use of fighters were equally ill defined but the author dismantles the perception that the RAF opposed development of the monoplane and that it wished to persist with the biplane. He reminds the reader of the protracted debate in the Air Ministry about the choice of gun armament and the differing concepts of operation for fighters and acknowledges the support which the RAF gave to research into high speed flight. The trials and studies of the late 1920s are well covered and here the author does offer criticism of the trial scenarios where he suggests that too much emphasis was placed on set piece battles. Another quote, this time from the RAF Manual of Air Tactics of the 1930s, gives an insight into the unambitious thoughts which prevailed at the time:

> 'Manoeuvre at high speeds in air fighting is not now practicable, because the effect of gravity on the human body during rapid changes of direction at high speed causes a temporary loss of consciousness, deflection shooting becomes difficult and accuracy is hard to obtain.'

While fierce disagreements continued to prevail at the highest levels of the Service on the different concepts of operation and weight of armament the author throws new light on the events which led to the far sighted conclusion that there was a universal need for all-metal, high

speed, monoplane fighters. He describes events leading to the important decision in 1934 which led crucially to the development of the multi-gun Hurricane and Spitfire while the Air Ministry retained the option to pursue turreted fighters for attacking bombers. Although some obsolete biplane fighters were still in service at the beginning of WW II the author covers the history of the three future monoplane fighter concepts: the single-seat cannon-armed fighter, which led to the Whirlwind; the single-seat multi-machine-gun fighter, which became the Hurricane and Spitfire; and the multi-crew turreted machine-gun fighter, the Blenheim and Defiant bomber destroyers. Although the Whirlwind was delayed and did not see action in the Battle of Britain all the other fighters did and lessons were learned quickly. History shows that the Hurricane and Spitfire were the most successful and were modified subsequently to carry increased calibre cannon armament, as were all later British designed RAF fighters; the Blenheim and Defiant were relegated to night fighting duties.

The final paragraph of his book summarises admirably the subject matter where Colin Sinnott writes:

> 'We might conclude that the bombers and fighters which the RAF got, as opposed to those they were seeking, were not inappropriate for the home defence air war they encountered. That this was so owed much to the RAF's influence on aircraft design between the wars. The Air Ministry had encouraged and funded the development of high speed monoplane fighters, recognised from the late 1920s the need for multi-machine-gun fighter armament, and as early as 1935, its replacement by 20mm cannon. The RAF saw the need for fast long range bombers for war with Germany, seized the apparent opportunity to call for very large bomb loads and sought power-operated multi-gun turrets at a time when German and American designs had none. That it also pursued some dead ends of development was perhaps inevitable during a period of rapid technological change.'

From the standpoint of the early 21st Century there is a sense of *deja vu* in reading the debate on priorities which existed in the 1920s between the needs of the European war as they conflicted with the those of the colonial air force. Furthermore the timescale of the review, at a time of rapidly developing technology, is five years shorter than the total

timescale from conception to service release for the Eurofighter which, some sixty years later, also suffers from internal debate over the relative priorities of NATO and Out of Area.

Aircraft lend themselves to visual display so it is disappointing that the book is not well illustrated. Just sixteen photographs, of which only four are unfamiliar, are all that are included to show the numerous concepts which appeared between 1923 and 1939. Line drawings and diagrams would have been most useful references where photographs of the aircraft or mock-ups were not available but despite some minor criticism this book is a splendid record of RAF combat aircraft procurement during a critical period in the Service's youth. Colin Sinnott's detailed research material means that his book is an excellent reference, aimed primarily at the serious student of military history, rather than a jolly good read for the amateur enthusiast.

Gp Capt Jock Heron

Through Eyes of Blue edited by Wg Cdr A E Ross DFC**.** Airlife; 2002; £25.

Through Eyes of Blue is an anthology. The first contribution is an account of the experiences of a lieutenant who trained as a pilot with the RFC/RAF in 1917-18, the last, a summary of the evolution of the RAF's approach to logistics between 1918 and 2002 by an air chief marshal (and one who clearly harbours some reservations over recent trends in this field). In between there another 191 personal recollections and essays ranging from first-hand accounts of air operations of all kinds, through insights into less well-documented aspects of RAF activities, to overviews of campaigns as seen by senior commanders.

A book of this nature needs to be well-balanced and, despite (one imagines) being constrained in his choices by the material that was actually available to him, the editor has done particularly well in this respect. Books about the RAF tend to concentrate on the events of 1939-45 and, in particular, on the exploits of its wartime pilots. WW II was obviously a critical time for the RAF, but the fact remains that it occupied only six years out of more than eighty, and a lot has happened in the half-century since. Furthermore, there was, and there still is, a lot more to the Service than simply flying aeroplanes. Some 43% of this book is devoted to aspects of WW II and 46% to the post-war era. That is probably about right and the editor's selection of subject matter is also

good. So far as WW II is concerned, there are plenty of tales told by the pilots of Sunderlands, Mosquitos, Tempests and the like but these are tempered by stories of flying autogiros, of the wartime University Air Squadrons, of operating barrage balloons, of the female nursing attendants who flew, of being a PoW and so on.

Because they have been written about far less frequently, the accounts relating to the post-war years probably make an even more significant contribution to the recording of RAF history than do the wartime stories and, for the same reason, I also found them to be more interesting. Again, we have the recollections of pilots flying in various campaigns from the Berlin Airlift, through Korea, Malaya and Suez to the Falklands, the Gulf and the Balkans. As in the WW II section, the flying business is kept in proportion, by including numerous contributions from the Regiment, doctors, lawyers, suppliers, policemen, mountain rescuers and many of the other unsung disciplines which actually keep the show on the road. To take just one example, this book provides some insight into the sort of intrigues that our security people have indulged in from time to time in order to ensure the safety of our personnel and facilities when overseas bases have been at direct or indirect risk due to outright hostility, as in Egypt in the early 1950s, or political instability, as in Cyprus in the mid-1970s.

So much for the pros, of which there are many. What of the cons? While the chronological perspective is very good, the overall balance is rather distorted by the overwhelming preponderance of officers, many of them very senior officers, among the contributors. As a result, we are presented with an excellent impression of the air force as seen from the top down and as perceived by its ‘middle managers’. This gives us the view from the HQ and from the flight deck, but how did it look from the flight line? Again, it probably comes down to having to use what was available, but is notable that, while the thoughts of air commodores abound, NCOs and airmen are (almost) silent.

A decision that every editor has to face is whether he should or should not ‘improve’ the drafts at his disposal. There is no right answer to this one, of course. Interfere and you may distort the truth, leave it and you may promote myths or appear to endorse inaccuracies. It would seem that, in this case, the text was left alone and, as result, there are numerous oddities. These range from Worthy Down being presented as one word and Flycatcher as two, through Scarfe (for Scarff) ring and

Walthur Novotny (for Walter Nowotny – you can't 'Germanicise' a German), to Barrowbeer (for Harrowbeer) and Fassburg (for Fassberg). Although anomalies like these can interrupt the flow, they are of little real consequence but there are some more significant errors buried within the text. For instance, the RAF of WW I never attained a strength of 280 squadrons (204 squadron numbers were in use when the war ended but only about 180 of these units could be regarded as having been operational). There is also some lingering hyperbole from WW II which could, perhaps, have done with toning down after fifty years. We now know, for example, that the RAF actually cost the Italians two Fiat CR 42s in an engagement fought over Kent on 23 November 1940 but here we are still being presented with the contemporary claim for seven. More surprising, however, are errors that creep in many years later. An account of a rescue from a crashed two-seat Griffon-engined Hornet (*sic*) at Kuala Lumpur, for instance, really involved a Mosquito of No 81 Sqn. An error of this sort, arising from a half-remembered incident in 1954, hardly matters, of course, but it is a little more disturbing to have very senior officers, who participated in events as such, telling us that Valiants were based at Tel Aviv during the Suez affair and that, during the Falklands campaign, Vulcan tankers began to relieve the Victors at Ascension Island in May 1982 (the first Vulcan tanker did not actually fly until June; they did not enter squadron service until August – and I doubt that they were ever deployed to Wideawake).

The book contains about 170 photographs. One or two of these (eg Demons, Stirlings) have been rather savagely cropped and the captions to some are, to varying degrees, inaccurate or misleading. For example: a Wapiti, represented as being flown over India by No 60 Sqn, is plainly marked as being the property of No 603 Sqn; a formation of 'Harts' is actually of Demons of No 41 Sqn; a Tiger Moth said to belong to Oxford UAS never flew with that unit (it spent most of its career with No 18 ERFTS/EFTS); a nominal Battle is a Fulmar; an Anson, said to be of No 217 Sqn still bears that unit's codes, but was actually flying with No 321 Sqn when it had its picture taken; a Blenheim associated with Dunkirk is actually the first production aeroplane which spent its entire career on trials work; are the Spitfires on page 151 really at Salerno?; the missile being carried by a Vulcan is a BLUE STEEL (not a BLUE STREAK); WB550, captioned as being a Gatow-based 'camera-equipped Chipmunk', never operated from Berlin and Gatow's Chipmunks never

were actually 'camera-equipped' (it was the chap in the front seat who had the hand-held optical recording device).

Do defects like these matter? Yes, I think that they do and that, as a reviewer, I do have an obligation to point them out. That having been said, however, what impact do they have on my overall assessment of the book? Not a great deal. I would say that it reduces it to a nine-point-five, rather than a perfect ten. *Through Eyes of Blue* reflects Airlife's well-deserved reputation for high production values and, because it is such a big book (350 pages of quite small print; 9 point, like this paragraph thus far), it will keep you occupied for ages. The quality of the writing is good throughout and some of the later passages really are quite excellent. It is entirely a matter of taste, of course, but I was particularly taken by pieces by Jerry Witts on the first Tornado mission flown in the Gulf War, by Flt Lt Wynn on Sentry operations over the Balkans and by Stuart Mitchell on the 'organised chaos' of operational AAR from the point of view of a TriStar crew. But there are many, many others of equal interest, including a summary of the career of Air Cdre T M Gibson who offers a very persuasive explanation for his having opted to become an RAF, rather than an Army, doctor because….but you will have to read the book.

Highly recommended, and, if you still need a reason to persuade you to buy this book, you should know that it has been produced to raise funds for the Leonard Cheshire Foundation.

CGJ

Independent Force by Keith Rennles. Grub Street; 2002. £19.99.

The subtitle of this book, *The War Diary of the Daylight Squadrons of the Independent Air Force, June-November 1918*, neatly summarises the content but, at the same time, it creates a sense of unease. Although the 'Independent Air Force' (IAF) label did gain some currency, both at the time and since, it was never correct. Trenchard's command was the Independent Force, RAF and a book dedicated to the exploits of an element of this formation should surely get its name right; it is unsettling, therefore, to observe that this one features both titles on its cover and that, with a few exceptions, the author refers to the IAF throughout. Similarly, Trenchard's appointment was as a General Officer Commanding; he was not, as the author states, a Commander-in-Chief. He did become, at least a notional, CinC in October 1918 when he was appointed to command the projected Inter-Allied Independent Air Force. This was to have been an Anglo-Franco-Italo-US strategic bombing force but, having been constituted only a fortnight before the Armistice,

it never actually established a tangible presence. The author does make some reference to this development, incidentally, although he omits to note the Italian contribution, which was likely to have been quite substantial.

There are several other instances of imprecise nomenclature; there never was, for instance, a No 3 Flying School, or a No 3 Training School and No 1 Observers School was not at Hythe. Other anomalies crop up throughout the text, for example: No 45 Sqn did not re-equip with Snipes in January 1919 (it only ever had two and the second of these was struck off charge on 21 January as the unit was reducing to cadre); John Quinnell did not command No 83 Sqn in 1925 (that unit had disbanded in 1919); some biographical notes on Air Mshl Pattinson's later career are incorrect; No 99 Sqn was not at Reading in January 1918; No 30 Sqn was never stationed at Newcastle (perhaps a typo for No 36 Sqn); there are others. Then again, the author tends to overemphasise facts which are of only marginal significance. It is true, for instance, that some of the early-production ex-naval DH 4s which flew with No 55 Sqn retained their twin forward-firing guns but, of the twenty-six RNAS machines transferred to the RFC, only seven ever found their way to No 55 Sqn and of these only two were still on charge after it had become a part of the Independent Force. Similarly, No 100 Sqn is (twice) stated to have been equipped with FE2cs, whereas only half-a-dozen or so of this model reached France; No 100 Sqn's basic type was the FE2b. Finally, I have a lot of trouble coming to terms with the contention that, for attacks delivered from altitudes of 10-15 000 feet, ie about two miles, the 'leaders simply judged when to release their bombs' without the aid of a sight. The equipment specified for the DH 9/9A was the High Altitude Drift Sight, although there is reason to believe that these were not widely used (possibly because of limited availability), but these aircraft were also fitted with a Negative Lens Sight as standard and some use would surely have been made of these.

So much for the 'cons'. What of the 'pros'? The bulk of the book is a record of all known sorties flown by Nos 55, 99, 104 and 110 Sqns during the period in question. Where known, basic details are tabulated (date, target, time off and back, crew names, aircraft serial numbers and fates), the only frequent omissions being serial numbers, simply because these were often not recorded at the time. These facts are then amplified by a narrative account of each mission, distilled from unit records,

combat reports, casualty cards and the occasional letter or diary; many of the losses have been cross-referred to other sources to identify the German pilot(s) responsible.

So long as the author is dealing with his core topic, the information he offers appears to be sound, problems arising only when he begins to embellish his account by, for instance, inserting biographical notes on individuals. This was, I think, a mistake as, apart from being unnecessary, this additional information often tends to be flawed which, one suspects, may reveal a degree of unfamiliarity with the basic stuff of early RAF history. The text is supported by a typical Grub Street-style illustrated insert. This reproduces some seventy-four photographs, at least one of which is incorrectly captioned; the chap identified as Lt H S H Read of No 99 Sqn is actually Maj W R Read of (at the time that the picture was taken) No 45 Sqn.

The book is rounded off by some statistics, including a rather sobering list of casualties. In five months, more than 250 men were killed, wounded or captured from a force of only three, later four, squadrons flying two-seater aeroplanes. Generally operating in (or at least, starting out as) formations of twelve, there were several occasions on which more than 50% of the aircraft failed to return. In the light of this experience, I have always found it a little surprising that the post-war RAF concluded that the defensive fire from a formation of bombers would permit it to penetrate to a target in daylight and survive. The evidence of WW I argued against this but the daylight doctrine prevailed until we were taught the same lesson a second time over Wilhelmshaven in 1939.

On balance, this book is not a bad effort and it does achieve what it sets out to do. It certainly represents a convenient, and apparently comprehensive, reference work but, sadly, it contains too many errors for it to inspire total confidence. Certainly a useful secondary source and the misinformation that it contains may be confined to the ancillary text, but how can one be sure? For a reference book, that is a problem.

CGJ

Combat Codes by Vic Flintham and Andrew Thomas. Airlife; 2003. Price £45.

Between 1938 and 1945, or perhaps even the early 1950s, one imagines that there must have been a clerk, lurking in the basement of

the Air Ministry, who allocated identity codes while doing his best to minimise duplications between units. The fact that these allocations were 'codes' implied a degree of secrecy and our notional clerk evidently took this aspect of his job so seriously that he appears to have maintained, or retained, no record of his work. As a result, only very fragmentary official documentation seems to have survived, leaving us with a vast jigsaw. We generally know what units there were (although obscure ones continue to emerge, even today) and we have countless photographs of aeroplanes bearing code letters. The trick has been to identify matched pairs. Over the years this very frustrating project has engaged the attention of a number of prominent members of the 'Mafia' of British aviation historians. A first attempt at publishing a consolidated list in book form appeared in 1979. Further devilling permitted the picture to become more sharply focused in later years, these revelations being reported in a series of articles in the aviation press. Vic Flintham and Andy Thomas are two well-respected long-term members of the group that has been researching in this field and, while warmly acknowledging the debt that they owe to their colleagues, they have drawn all of the threads together to reflect the latest state of play.

Combat Codes is essentially a series of lists of tabulated data, although there are explanatory essays on the concept of codes and the way in which their use evolved, along with some useful notes on how to use the book. The core of the content is provided by a series of tables dealing with the pre-war, the wartime and the post-war RAF, but these are complemented by similar tables covering the wartime identification codes used by the FAA and the RCAF, RNZAF, RAAF, SAAF and the Indian Air Force plus US Army and USAAF units operating in the European and Mediterranean theatres. It does not stop there either, as post-war coverage is extended to embrace the continued use of the wartime system by (mostly European) air forces until it finally faded away (in Norway) in 1970. The RAF picture is brought right up to date with an explanation of the logic behind the various systems of tail codes that it has employed since the 1970s. Last but not least, there is a list of all known 'personal codes' reflecting the good old days when a Wing Leader expected to be able to adorn 'his' aeroplane with his initials. All of this data is cross-referred so that one can, for instance, enter via a consolidated index featuring every one of the code groups listed within the book or, in the case of the RAF, via the squadron number or the

A Lysander of No 208 Sqn modelling a temporary early desert colour scheme in which the dark green areas of the standard camouflage pattern have been overpainted with a light tan. This exercise has obliterated the last digit of the aeroplane's serial number (L843?), although the unit's post-Munich/pre-war GA identity code is still prominently displayed. Note, incidentally, the proportions of the fuselage roundel, which are very like those of the 'C1' pattern of 1942; the intriguing thing is that this picture was taken at Heliopolis in 1939. Irrelevant? Arcane? Perhaps, but such oddities can be fascinating and the Thomas/Flintham book offers many photographs illustrating examples of anomalous markings.

numerical designation of some (but not all) of the more significant lesser units, eg certain flights, OTUs, HCUs, AFSs, OCUs and the like.

To amplify this mass of tabulated information there are no fewer than 280 photographs. These have been very carefully selected to illustrate some of the more obscure units and to provide examples of typical and atypical ways in which code letters could be displayed, thus demonstrating how easy it can be to misidentify a unit due to the non-standard style in which it painted its codes on its aeroplanes – this code business is plagued by such pitfalls. As a result, some of the pictures are less than perfect but the occasional tilted horizon, cropped nose or slightly grainy print is more than compensated for by their rarity. I would

guess that well over 80% of the photographs in this book are being published for the first time.

Combat Codes is not (cannot be) the last word on this subject. As the authors acknowledge, there are still gaps to be filled and they make no attempt to hide them, indeed known omissions and uncertainties are italicised throughout. Nevertheless, the research is meticulous and the content is as comprehensive and authoritative as can be expected. This is as good as it gets for the time being, and very good it is too. It is indicative of the care that has been taken in compiling this book that, in order to make it as user-friendly as possible to researchers who may not be familiar with aeroplanes (people hoping to discover more about a wartime snapshot in the family album, perhaps), a conscious effort has been made to illustrate just about every type mentioned in the text, these pictures also being cross-referenced.

Is there a downside? Sadly, yes. The price, which is a bit eye-watering. The book is a large (A4-ish) format, 248-page hardback reflecting Airlife's well-deserved reputation for quality but, even so, £45 does seem a bit steep. Still, for some folk I suspect that this title is going to be a 'must have'; one for the Christmas wish list perhaps?

CGJ

Silent Invader. A Glider Pilot's Story of the Invasion of Europe in World War II by Alexander Morrison. Airlife; 2002. £8.99.

This book, which was first published in 1999, has been written by a captain in the Royal Fusiliers who volunteered for the Glider Pilot Regiment in 1942. It opens with an account of his training as a pilot on Tiger Moths and Magisters and subsequently on the gliders he would fly. Then it moves to the intensive exercises he took part in before seeing action, at first with OVERLORD, flying men of the 6th Airborne Division to Normandy, and later taking jeeps and guns for an anti-tank battery to Arnhem. The RAF comes in for praise, for the quality of its tug crews, the reassuring fighter cover it provided and for the skill of its Typhoon pilots in neutralising German ack-ack batteries. At this point in the book the author's aerial activities cease and what follows is concerned with his adventures on the ground. These include some sporadic infantry action after landing, taking refuge with a courageous Dutch family, capture and interrogation by the *Gestapo*, transfer to

Stalag Luft I at Barth, the flight of his German guards at the approach of Russian forces and his subsequent encounters with those forces.

The fleeing Camp Commandant and his men left behind arms for their erstwhile captives so Morrison and his colleagues formed a Field Force which set off to meet the Russians. They came upon a forced labour camp for press-ganged Frenchmen and one housing female political prisoners. On being released, these women turned on their captors and beat them to death in a frenzy of retribution which Field Force members were unable to check. Meetings with the Russians went well, even with a Mongol Supply Column whose treatment of the local civilian population foreshadowed the kind of thing which was to happen in Berlin when that city fell. The Russian Brigade HQ did all it could to provide hospitality and help towards repatriation but the arrival of a Political Officer made things difficult for a while. At last, an airlift of B-17s came to take them home.

Glider pilots have not received much attention and this well written and informative account of what it was like to be one helps to put that right. However, some 60% of the book is given over to the post-Arnhem period and takes on a different flavour. From it one gathers the usual messages about POW life and the resilience of men in such circumstances. One also begins to appreciate the abject terror which anticipation of the arrival of the Russians inspired in German breasts – not without good reason – and learns once again about the inhumanity which the Germans in their turn were capable of. It is not a profound book, in the sense of being one to take off the shelves for reference purposes perhaps, but it tells an interesting tale and does so fluently.

Dr Tony Mansell

Hurricanes Over Malta by Brian Cull and Frederick Galea. Grub Street; 2001. £19.99.

Grub Street published *Malta: the Hurricane Years* in 1987. Since then additional information has continued to emerge and Brian Cull, one of the co-authors of the original volume, has pulled it all together in this new book. Inevitably, it covers the same ground as before but, in so doing, it sheds a new light into previously darkened corners. *Hurricanes Over Malta* is, in effect, therefore, a revised and updated history of the air defence of the island between June 1940 and April 1942. As such it is the most accurate account of the action that we have, the detail being

enhanced by the author's having had access to the log books, diaries and photograph albums of a number of 'new' veterans, some of whom have contributed anecdotes to lighten the tone. The authenticity of this account is further underlined by the co-operation of Frederick Galea, a local historian who has studied the air defence of Malta for many years.

The appendices, which list the Hurricane pilots who died, the combat claims lodged by the pilots of Hurricanes (and of the earlier Gladiators) and the victories with which they were actually credited at the time, appear to be extremely comprehensive. Contemporary combat claims are, of course, notoriously optimistic and the authors have generally cross-referred these to enemy records so, while the narrative reflects what the RAF's pilots thought they had done at the time, it usually also tells us what damage they had actually inflicted. There is an index to all personalities mentioned in the book (Italians and Germans, as well as RAF) and an insert in which more than eighty new photographs are reproduced, practically all of them snapshots on cheap wartime film stock, but these grainy images convey a lot of atmosphere. In addition, the rear of the dust jacket features two pictures of Fg Off Jock Barber posing with his Hurricane on Malta at about the turn of 1940-41; remarkably, both of these are in colour. There are some residual typos which should have been weeded out at the proof-reading stage, for instance, course (*sic*) pitch and Hatson (for Hatston), but these are few and far between.

Because it tends to be a blow-by-blow account of what happened, the narrative can sometimes be a little heavy going, but that is in the nature of the beast. As a work of reference, *Hurricanes Over Malta* is unlikely to be bettered. If you want to know who shot whom and when, and what it was like to fly in combat during those hectic days, this one is for you. Recommended.

CGJ

The Buccaneers by Air Commodore Graham Pitchfork. Patrick Stephens Ltd; 2002. Price £25.00.

My Canberra and Buccaneer colleague and contemporary has achieved the impossible: there's something here for everyone. As Sir Michael Knight says in the foreword to this handsome volume: '...a compelling read. And that must surely hold good not only for those favoured by membership of the Buccaneer fraternity but, if they can bear

it, for the aircrews of those very many less distinguished types of military aircraft.'

Graham Pitchfork is ideally placed to tell this story with authority, and with due regard to the affection for the aircraft from folk in both Services – he was among the very first RAF aircrew to be sent to the Royal Navy in 1965. That sensible leavening probably stands as one of the more successful examples of jointery. His book's ten chapters tell the 36-year story from first flight to end of service: it describes early RN carrier experiences, the development of RAF roles and missions, both overland and maritime, and pays due respect to the work of the training organisations, both RN and RAF.

In something just over 150 pages, richly illustrated with a treasure house of photographs of the Buccaneer (and its air and ground crews) at work, Graham has captured the exhilaration of operating this all-British success story. The book is deliberately limited to the in-Service life of the aircraft with the Royal Navy and the Royal Air Force. It does not set out to tell the story of its technical genesis, although the reader is steered towards the definitive account of its design and development (Roy Boot's memoir *From Spitfire to Eurofighter*). Nor does the relatively limited size of the book allow for coverage of the aircraft's service with the South African Air Force. What it does manage to do is to set down for posterity a picture of the quite remarkable spirit of affection its operators had for the aircraft. It does not deny that the 'banana bomber' could be a bit of a handful: there are some gripping words and pictures describing just how excitingly things could go wrong. But the satisfaction of using the aircraft to its maximum effectiveness comes over loud and clear, all the way through. There is, for example, a story from the early days of RN carrier operations, describing the 1966 use of No 800 Sqn's Buccaneers from HMS *Eagle* on the Beira patrol, enforcing oil sanctions against the post-UDI Rhodesia. Sorties were flown that stretched the fuel to the maximum, returning to the deck with just enough for one wave-off (and doing so with no diversion airfield!). In the late-1970s, the Buccaneer in Royal Air Force service startled the Americans when it was first invited to the RED FLAG series of tactical exercises in Nevada. With its limited 'gear', but with ingenuity and panache the characteristics of the crews, the Buccaneer acquitted itself magnificently, breaking through realistic defences and seeing off some quality opposition. All the way forward to the late '80s, and the aircraft

had finally had an avionics and weapon system upgrade, and could now plan co-ordinated attacks of six aircraft against deep-water targets at night (with perhaps two hours in close formation at 300 feet) launching Sea Eagle from outside the target's radar coverage, with air-to-air refuelling en route, and all in radio silence.

Ironically, it was after all these advances, and long after the Buccaneer had been withdrawn from the RAF Germany overland strike role, that actual combat was finally engaged. Over the desert. At high level. But – naturally – with outstanding success. The Gulf War was the Buccaneers' swansong. A call to lead the Queen's Birthday Flypast in 1993, in a sixteen-aircraft diamond formation, gave the final nod of approval to the beast before the last lost weekend in March 1994 at the first and last Buccaneer base, RAF Lossiemouth. The former Naval Air Station that had seen the entry into service of the Mark 1 now, in light blue mode, saw out the Mark 2. Well over a thousand of its former air and ground crews and their families joined the last of the current operators for a farewell party. That turn-out reflects the regard and respect generated by an airframe that, to be honest, was not the most elegant in appearance. But down in the weeds, with the left hand forward, there was nothing to touch it. Graham brings it all to life.

For those associated with the Buccaneer, this is the souvenir volume to have to hand. For every anecdote in the text, there'll be another one tucked away in the memory. For those who haven't kept a shoe box full of photos of the beast, there are plenty enough here to satisfy them. For those who – as the Air Chief Marshal says – had the misfortune to be denied this character-building experience, this splendid book will tell them exactly what they missed. Very highly recommended.

Air Cdre Phil Wilkinson

The Last of the Phantoms by Ian Black. Patrick Stephens; 2002. £25.
The Last of the Lightnings by Ian Black. Sutton; 2002. £25.

Although published under different imprints, these two books are identical in having been produced in the same roughly 10 inch-square format as, and are in series with, the Buccaneer book reviewed above. Since both are by the same author, they are dealt with together. Ian Black began his flying career as a Phantom navigator, subsequently being retreaded as a pilot and going on to fly the Lightning, Tornado F.3 and Mirage 2000. Today he drives an Airbus.

Although both books begin with a concise and workmanlike account of the design, development and service history of each type (confined to British units in the case of the Phantom), thereafter the narrative treatment is slightly different. The Phantom book is a series of essays contributed by a number of Phantom phlyers in addition to Black himself. We are therefore presented with a variety of descriptions of what it was like to fly the brute and an assortment of first-hand impressions of the conduct of various types of sortie, as seen from both the front and rear seats. All of these reflect the experience of second-generation Phantom pholk so they deal with the air defence operations of the 1980s and '90s (flown in a fighter that weighed roughly the same as a fully-loaded Lancaster) rather than strike, attack and recce which had been the F-4's game in the 1970s. The writing is uniformly punchy and informative and the lingering affection of Phantom veterans for their phormidable (enough!) aeroplane is palpable. One of the pitfalls in having a book written by a committee is that the same information may crop up several times and this does happen here – it is plain that the incident in which a Phantom pilot accidentally shot down a Jaguar made a lasting impression on a lot of people.

By contrast, the Lightning book is very much a personal account of the author's progress through the conversion course (he was the very last pilot to qualify on type) and on through the various stages of progressive operational clearance after he had joined No 11 Sqn, culminating in live gunnery over Cyprus and the firing of a Red Top over Cardigan Bay. Arguably, this made him the very last RAF single-seat fighter pilot in the Spitfire tradition; he even had his name painted below the cockpit sill of his very own aeroplane. The only external contribution in this case (this volume is, incidentally, a revised edition, the original having been published in 1996) being an account by Mike Beachy Head of the rebuilding of three Lightnings (there is a fourth in prospect) for his remarkable Thunder City enterprise at Cape Town. Black's writing is vivid and colourful and he very successfully conveys the tension involved in getting to grips with a 1950s-technology Mach 2 fighter and in engaging in air combat at 1000 mph; at times you can almost smell the adrenaline. In creating this atmosphere, he occasionally resorts to crewroom *patois* to liven up the prose but he never leaves the uninitiated in the dark. It does not, for instance, take too much imagination to guess at the essential features of a 'Playtex break'.

By and large the text is remarkably unflawed in both books. To be pedantic, I could observe that 'swoops' are fell, not foul, and take issue with the presentation of one or two designations, eg Aim 9L instead of AIM-9L and SU23 for SUU-23, but I will resist the temptation. I will, however, point out that the Vulcan tanker illustrated on page 100 of the F-4 book belonged to No 50 Sqn, not No 44 Sqn. There is also a bit of a 'Howler' on page 111; the Phantom's drop tanks may well have been made by Sargent-Fletcher but Sargent was the name of Fletcher's business partner, not his rank, so one cannot really abbreviate it to 'Sgt Fletcher'.

So much for the words, what about the pictures? Ian Black is as good at photographing aeroplanes as he is at flying them and writing about them, possibly even better. Both of these books are lavishly illustrated, almost entirely in colour and almost exclusively with pictures taken by the author. It is a matter of taste, of course, but I fancy that his later Lightning pictures are even better than those of the Phantom. One can, incidentally, see that clicking away in the back of an F-4 would have been a relatively straightforward exercise, but how do you take pictures from a single-seater? Easy, as Black explains, you just plug in the autopilot and tell the other chap what to do, although you still have to juggle the relative positions of the sun, the cloudscape and all of that, because these pictures are not mere snapshots; they are portraits. One that deserves particular comment is an air-to-air shot of a Lightning burning merrily followed by one of the pilot ejecting, although the latter was taken from a safe distance, so it is not possible to say whether he was actually saying 'cheese'.

The pictures alone would probably be sufficient to sell these books. The words are a bonus, but they are not mere padding and the account of learning to fly the Lightning is certainly worthy of publication in its own right, even without pictures. Nevertheless, it is the pictures that make the lasting impression. This is aeroplane porn of the highest quality. If you were associated with either of these types, you may find these books difficult to resist.

CGJ

The Combat Legend series. Airlife; 2002. £9.99 each.

Back in 1994 Osprey launched a very successful series of softback publications under the generic title *Aircraft of the Aces*. Typically, each

volume (and there are now some fifty of them) examines the more prominent pilots associated with a particular fighter aircraft type, role or formation and/or theatre, a major selling point being that each booklet contains numerous very high quality colour profiles of specific aeroplanes. Airlife have recently embarked on a comparable project, their series being called *Combat Legend*. The format is very similar, except that the focus is on a particular type of aeroplane, although the aviators are not overlooked. Each book presents a workmanlike account of the technical development and combat career of its subject within the constraints imposed by rather less than 100 pages, much of this space being taken up by 70-100 photographs, almost all of which are well-chosen and well-reproduced. The text is supported by a selection of colour profiles (rather fewer than are offered by Osprey, but then the Airlife books cost £3 less) which should provide ample inspiration for modellers.

Four titles have been submitted for review thus far and, since the authors are dealing with aeroplanes and events that have been extremely well-documented in the past, one would expect a 100-page digest to be pretty well free of error. Sadly, this is not always the case, as the following notes suggest:

Messerschmitt Bf 109 by Jerry Scutts. The Messerschmitt book frequently omits umlauts, as in, for instance, Bär, *Ritterkreuzträger* and *Jägerschreck* (it makes all the difference if you say it out loud). There are a few dodgy 'facts' as well, eg JG 27 re-equipped with the Bf 109F in late 1941 (not 1942); the Macchi C.202 was the *Folgore* (not the *Veltro*); there is a rather uncomfortable reference to a 'vertical tailplane'; and, although some of its soldiers did defect, Hungary did not change sides during WW II.

B-17 Flying Fortress by Martin Bowman. One can indulge in the same sort of exercise with the B-17 book. For instance, Ruhland (not Ruhrland) is about 100 miles (which is hardly 'just') south of Berlin; Keroman is a suburb of Lorient (not eleven miles from it); 8th AF Fortresses could not have been escorted by Thunderbolts on 8 March 1943 because the 4th FG did not fly its first sweep until the 10th (and the first P-47 escort mission was not mounted until 4 May); the 15th AF B-17s which took part in the first 'shuttle-bombing' mission via Russia on 2 June 1944 were escorted by the 325th FG flying P-51s (not P-38s); and, did the 15th AF really lose 'more than 100' aircraft from a force of

335 despatched on 23 June 1944? (I think that six out of 139 was closer to the mark). There are others like these and I cannot resist citing just one more, which states that RAF Fortresses of No 100 Gp 'carried out jamming of German (*Düppel*) *Window* using recorded engine noise….'; now how did that work, I wonder.

Spitfire Mks I-V and **Focke-Wulf Fw 190**, both by Peter Caygill. The contrast between Caygill's titles and the other two is quite marked. It is not practical to attempt to analyse each author's syntax here, but the fact is that, while Caygill's writing covers very much the same sort of ground as that covered by the other two books, his are much easier to read. Furthermore, they are both refreshingly free from errors. The Focke-Wulf book does suffer from intermittent umlaut syndrome, as in (or *not* in) *Kommandgerät*, *Rüstsatz*, Heinz Bär and Friedrich-Karl Müller, and *Stalag Luft III* was at Sagan (not Sagen), but that's what you get if you meddle in the language of Johnny Foreigner.

So, how to sum up? I should make it quite clear that none of these four books are 'bad' and such flaws as there are derive from unnecessary (careless?) errors. As softbacks, selling at less than £10 a copy, the *Combat Legend* series is probably aimed at the pocket money sector of the market and, as such, it should appeal to a new generation of enthusiasts. There are more titles to come; most are fairly predictable, the Mustang and Lancaster having already been announced, as have, skipping a generation or two, the F-15 and SR-71. The series certainly has the potential to build into an attractive and affordable basic reference but, if it is to establish itself as being authoritative, contributors will need to take just a little more care when preparing their drafts.

CGJ

Japanese Army Air Force Fighter Units And Their Aces 1931-1945 by Ikuhiko Hata, Yasuho Izawa and Christopher Shores. Grub Street; 2002. £29.95.

Every now and then a book comes along that defeats the most determined of nit-pickers. This is one of them, because, thus far, relatively little has been published in English on the Japanese air forces, which severely limits the scope for cross-referring. So here we have something new. Researched and written by two Japanese historians, it has been rendered readable by Chris Shores who, as one of the co-authors of *Bloody Shambles* (along with Yasuho Izawa), was already

very familiar with much of the subject matter and thus an ideal candidate for the task.

Some members may already be familiar with a book dealing with the fighter units and aces of the Japanese Naval Air Force which was published in the USA in 1989. This was also written by Izawa and Hata and their Army Air Force book is similar, but better. Similar in that it includes a history of each unit but better in that these are far more detailed, recording: movements; changes of equipment; battle honours; key personalities, including *Sentai* Commanders and *Chutai* Leaders (roughly Wing and Squadron Commanders); and offering line drawings to illustrate unit markings. This is followed by biographical notes, accompanied in almost every case by a photograph, on more than 120 army pilots who were credited with eight or more victories. The book is rounded off by a selection of maps (of variable quality), a list of aces in descending order of scores, a roll of honour of fighter pilots who died, notes on major engagements and so on. Where the new book differs from its predecessor is that it begins with a lengthy narrative account of the various campaigns in which the Army Air Force was engaged, not just in WW II but going back to the fighting which began in China in 1937 and to the Nomonhan Incident of 1939.

There are numerous photographs, over 300 of them, almost one per page. Pictures of Japanese aircraft on active service tend to be of poor quality but many of these are quite good. I spotted only one incorrect caption, on page 88, where an aeroplane identified as a Ki 43 of the 54th *Sentai* is actually a Ki 84, *possibly* of the 182nd *Shimbu-Tai.* Almost inevitably there are one or two typos, a Nomonham (for Nomonhan) for instance, and a Hangkow which should, if only for the sake of conformity, have been Hankow. If you have accustomed yourself to the current *pinyin*-style rendering of Chinese place names, incidentally, you can forget all that. No new-fangled Beijings or Guangzhous here, this book uses the more familiar (to me at least) Wade-Giles system that was in vogue in the West during WW II, so it's Peking and Canton.

So, part narrative, part potted unit histories and individual biographies, this book is a very useful reference work, indeed one of only a handful available to us anglophones. A little esoteric perhaps but, so far as I can tell, pretty comprehensive, and a Chris Shores by-line is in itself a guarantee that it will be authoritative. This book may not appeal to the general reader but if you have any interest in the war in the Far

East at all it probably falls into the 'must have' category.
CGJ

The First Naval Air War by Terry C Treadwell. Tempus; 2002. £16.99.

This 192-page softback in, what has become, the standard Tempus house-style sets out to examine the development of naval aviation during WW I which it does by reviewing the naval air services of eight nations while sketching in the evolution of shipborne aircraft operations. I cannot claim to have read it from cover-to-cover but the first third, which is largely devoted to the RNAS, was sufficient to permit an assessment to be made.

Although the specific maritime connection is obscure, the book begins with a discussion of air combat claims in which the author informs the reader that, while the British insisted on independent verification of a 'kill', the Germans claimed victories 'almost at the drop of a hat'; neither of which was the case. He even goes so far as to state that 'some historians' say that if the claims of Richthofen and the other German aces had been subject to the same rules as those of the Allies, their numbers would have been halved. These (unidentified) historians are quite wrong, of course. The fact is that practically all of Richthofen's eighty victories can be correlated with specific Allied losses, and much the same is true of the claims of other German pilots. In stark contrast, Bishop's score is notorious as being among the most extreme examples of uncorroborated claims being recognised. In reality, it was the Germans who demanded verification of a claim while the victory tallies of British pilots routinely included opponents who had merely been forced down 'Out Of Control' (more often than not, these 'victims' had simply broken off the engagement and flown home unscathed to fight another day).

Not a good start, and it does not really improve. Further examples of duff gen include: 'canvas'-covered Blériots (it was linen); Churchill qualifying as a pilot (he did not); the RFC's Naval Wing acquiring control of all lighter-than-air affairs at the end of 1914 (it was at the beginning); No 214 Sqn being an RNAS unit (it was RAF); J T Cull also being identified (incorrectly) as T J Cull; a Scarf (for Scarff) gun mounting; the Handley Page 0/400 (for O/400); Pups entering service with the RFC *before* the RNAS (whereas No 54 Sqn did not arrive in France until Christmas Eve 1916, by which time the Navy's Pups had

been in combat for three months); the liner *Conte Rosso* being commandeered from the Italians (it was purchased). This list is not exclusive. I did not venture very far into the chapters involving foreign naval air arms but on the first page of the section dealing with the USA, I found 'Manilla', which needs only one 'l', and on the second 'Veracruz', which is conventionally expressed as two words, and the Mexican President Victoriana Huerta emasculated as 'Victoria'.

Errors of this sort are also reflected in the photographic content which includes pictures which are inappropriate or incorrectly captioned or both. Examples of each are: the inclusion of a Seagull II (which did not fly until 1922, and thus had nothing to do with the 'First Naval Air War'); an aeroplane taking off from HMS *Vindex*, tentatively identified as the Pup in which Kilner lost his life (it is quite plainly a Camel); and a picture of (implicitly wartime) Short 184s being loaded aboard *Ark Royal*, which actually shows Fairey IIIDs during the Chanak crisis of 1922-23. Furthermore, while I claim no expertise whatsoever when it comes to identifying Czarist naval vessels, I can tell that the *Imperator Nikolai I* illustrated at the top of page 123 is a very different ship from the one at the bottom of page 131. From another picture in the book, I would guess that the latter may actually be the *Almaz*, but can one rely on the caption to that photograph? And that is the problem with this book.

The factual content aside, it is quite plain that there has been no independent proof-reading; indeed it is difficult to believe that the copy can have been proof-read at all. As a result, apart from some sections of the narrative being repetitive, there are instances of letters missing from words and words missing from sentences; italics are used inconsistently and accents are sometimes omitted. There is confusion over the use of the singular and plural, as in 'criteria' being used in place of 'criterion' and in passages such as 'the wings and tail came from Curtiss and was (*sic*) extremely sturdy' and 'British losses were double that (*sic*) of the Germans'. Then again, 'reverted back' is tautologous and the adjective 'different' ought to take the preposition 'from'; 'to' is an acceptable second-best, but 'different of' is simply a non-starter. It is very wearying to read prose studded with grammatical faults such as these, as one is repeatedly obliged to re-read passages to confirm that they did actually say what one thought they said and then having to decide what they probably ought to have said.

So what do we have? A collection of almost 250 photographs, all of them very interesting but many of them of indifferent quality, partly as a result of rather muddy reproduction. These are supported by a text, written in a rather clunky style, that contains far too many grammatical errors to do the publisher any credit and too many factual errors to inspire much confidence. This book had great potential but, as it is, it must be regarded as a disappointment.

CGJ

A Hell of a Bomb by Stephen Flower. Tempus; 2002. £19.99.

As its sub-title proclaims, this 320-page softback sets out to chronicle 'how the bombs of Barnes Wallis helped win the Second World War'. Does it succeed? Yes. It is well-written, comprehensive and extensively illustrated with diagrams and many well-reproduced photographs. Does it add much to what we already knew? Since the book lacks both references and a bibliography, that one is less easy to answer. There have been many published accounts of the spectacular exploits of Nos 9 and 617 Sqns, particularly the latter, and of the trials and tribulations of No 618 Sqn as it pursued its, ultimately unrealised, aim of becoming operational with bouncing bombs in the anti-shipping role. Then again, there have been biographies of many of the leading players, Wallis himself, Cheshire, Gibson and Harris to name but four. What this reviewer has not seen in print before, however, is such extensive data on the trials work that was carried out on each of Wallis' weapons – *Upkeep*, *Highball*, *Tallboy* and *Grand Slam*. The bulk of this information has been drawn from files in the PRO and this has been amplified by interviews with some of the people who actually designed and built these bombs.

There are very few facts with which I would care to take issue, although I am not convinced that there were any Vimys standing by to attack Berlin in November 1918, as only four had flown before the Armistice; all were prototypes, one of which was in France at the time although it has yet to be shown that it was ever issued to an operational unit. Then again, Lancasters modified to carry *Grand Slam* did not dispense with *Fishpond* tail-warning radar because the aeroplanes would be too heavy to take evasive action but because they lacked H2S (*Fishpond* had its own display, at the WOp's station, but received its signals from the H2S scanner).

These observations are pretty superficial, however, and the book is fundamentally very sound, although it really could have done with an index. It certainly pulls all of the threads of the story together very neatly and, apart from covering the design and development phases in some depth, there is a detailed account of every operational mission on which these very special bombs were employed. These accounts include a list of participating aeroplanes and crews (well pilots anyway), so one has between one set of covers, the stories of the Dams Raid, the sinking of the *Tirpitz*, the attacks on the Saumur tunnel and the Bielefeld and other viaducts, and the campaigns against V-weapon sites and U-boat pens. In all 879 *Tallboys* and 42 *Grand Slams* were dropped on operations. This book tells you where and by whom and what damage they inflicted. Recommended.

CGJ

Celebration of Flight: The Aviation Art of Roy Cross with Arthur Ward. Airlife; 2002. £25.

I would guess that relatively few members will not have constructed an Airfix kit at some stage, if not overtly for themselves, then in a thinly disguised effort to make it seem that it is for one of their offspring. The company recently celebrated its 50th anniversary and this book is a spin-off from that event. Even if you never did make an Airfix kit, you can hardly have avoided seeing them and being attracted by the colourful box top portrayals of warbirds in combat or airliners going about their business. Most of these were the work of Roy Cross. If you were a boy, or a dashing young bachelor, in the 1960s the chances are that you had a large Roy Cross print of a Camel, an Avro 504, an Albatros DV or a SPAD 13 on your bedroom wall. But Cross is as adept at engineering drawing as he is at painting and his technical work has appeared in many prestigious publications, including *Flight*, *Aviation Week*, *The Aeroplane, The Aeroplane Spotter* and, before that, the *ATC Gazette* – and we are now back to WW II. If any of you still have a copy of Air Cdre Chamier's *Birth of the Royal Air Force*, which was published way back in 1943, you will find that the meticulous pen-and-ink drawings that illustrated it were the work of the nineteen-year old Cross. In later years he was commissioned to produce artwork for various concerns within the aviation industry, including BEA, Handley Page, Fairey, De Havilland, Hawker-Siddeley and BAC, much of which was used in

advertising campaigns. But while such commercial opportunities have publicised his work and made much of it widely available, he has long been, and still is, a 'painter' in the classic sense, a member of the Guild of Aviation Artists and of the Royal Society of Marine Artists, Cross is one of the foremost marine painters in the country, his work commanding prices of up to $50 000.

So much for the artist's professional pedigree; what of the book? It has a large squarish (11×12 inches) format, is printed on coated paper and runs to some 128 pages. It has 113 colour plates, including many of the originals for the Airfix box tops (but minus the company logo and assorted titling) and sixty-nine black and white drawings in various styles, including cutaways of, for instance, a P-51C, a Wyvern S.4 and a Meteor F.8. I am no artist myself, but I would consider the quality of reproduction to be faultless throughout. Arthur Ward's Introduction provides a CV outlining the artist's career while Cross himself has contributed the informative captions to the pictures.

This delightful book is well named. Its pages really do represent a celebration of flight, the earliest aeroplane illustrated is a Bristol Boxkite and the latest a Panavia Tornado. Because so many of the pictures are so familiar, especially those Airfix boxes, leafing through the pages is also a pleasant exercise in nostalgia. Lovely. Nevertheless, as another reviewer has observed recently, what exactly do you do with a book of paintings once you have looked at it?

CGJ

Fighting the Bombers edited by David C Isby. Greenhill Books, 2003. £18.95.

This book was assembled from narrative reports by, and question-and-answer sessions with, prominent figures in the *Luftwaffe* air defence organisation, prepared by or for US intelligence officers immediately after WW II. The list of personalities is impressive and includes *Generaloberst* Hubert Weise, *General* Josef Kammhuber, *Generalleutnant* Adolf Galland, *Generalleutnant* Josef Schmid, *Generalmajor* Wolfgang Martini and top-scoring night fighter ace *Major* Hans Wolfgang Schnaufer. The interrogation report on aircraft designer Dr Willi Messerschmitt is thrown in for good measure.

A theme running through many accounts is that Germany spent the first 3½ years of the war on the offensive. During that period the

homeland air defences were under-resourced, and *FlaK* units suffered a continual drain of trained and able-bodied men to replace losses in the ground fighting. When, in the spring of 1943, the strength and the frequency of Allied air attacks on Germany reached serious proportions, the *Luftwaffe* found itself overstretched in every area. From then on the air defences of the homeland could be bolstered only by stripping fighter units from the battle fronts. Early in 1944 the superlative P-51B Mustang appeared in large numbers, able to accompany day bomber formations to almost any part of Germany. From then on the US escort fighters inflicted a continual succession of heavy blows on the *Luftwaffe* fighter force, from which it was never able to recover.

The quality of the accounts varies. The separate descriptions by Schmid on the direction of the day and the night fighter battles, and by Schnaufer on night fighting are particularly good and contain much useful information. That said, almost all of the accounts have passages that are difficult to follow in parts, because it appears that those who translated the material from the German lacked understanding of the subject.

To sum up: for those wanting to learn more about the *Luftwaffe* view of the huge day and night air battles fought over Germany during WW II, this book contains a lot of useful information. There is 'gold in them there hills', but readers will need to work hard to extract it.

Dr Alfred Price

Flying Guns – World War II by Anthony G Williams and Dr Emmanuel Gustin. Airlife; 2003. £40.

We are all very familiar with books that evaluate the aeroplanes of WW II, especially the fighters, by comparing their performance, particularly their speed, their manoeuvrability, their handling qualities and so on. The authors of this book have stepped out of this well-worn rut to view the situation from a rather novel perspective. While they do not take issue with the fact that a successful design needs to measure up to the traditional yardsticks, they point out that most assessments tend to overlook the central importance of armament; in the final analysis, it matters little how fast your aeroplane can go, or how sweetly it handles, if it cannot bring sufficient firepower to bear to shoot down the opposition. Starting in about 1933, this book traces the development of the machine-guns and cannon used by the aircraft flown by the major

warring nations between then and 1945 and makes extensive comparisons and evaluations along the way.

The book opens with a very informative chapter on the technical aspects of guns. This explores and explains: the main types of gun mechanism; the complications of gun mountings, synchronisation (to fire through the disc swept by the propeller), sighting and harmonisation; the interplay between rates of fire, muzzle velocities and trajectories; the various types and calibres of ammunition and the means of feeding it to the breech; and so on. All of this is related to specific examples of the guns being developed by the Germans, the British, the Americans, the French, Russians, Italians, Japanese, Danes and even the Hungarians. The book then goes on to recount how guns were used on various fronts, and not only in fighter aircraft; full coverage is given to the employment of guns in maritime and ground attack operations and in the defence of bombers and attack aircraft.

I would not presume to challenge the authors' accuracy when it comes to a subject that they have been studying for years and all of the information that they convey appears to have been researched in depth and, as a result, they demolish a number of long-standing myths. There are one or two minor slips, for example, a Heinkel He 86 on page 82 (presumably a Junkers Ju 86), a rather jarring reference to the RAF's '1st Squadron' on page 91 (all other references to RAF units being identified in the conventional style), a mention of Elgin AFB on page 156 (which should surely have been Eglin) and No 6 Sqn just might want to take issue with the claim that when No 20 Sqn was withdrawn from the line in June 1945 it had been the last operational RAF Hurricane unit (although this may depend upon one's interpretation of 'operational'). These are all relatively minor observations, of course, and they do not detract from the overall, and very convincing, authenticity of this well illustrated 352-page hardback.

The only problem with this book is that it is terribly difficult to read. There is nothing wrong with the language, the grammar or even the style; it is simply that the material demands constant repeated references to the designations of guns and specific variants of aeroplanes. This leads to statements along the lines of: 'The 30 mm 50 kg Ho-155-I or the 46 kg Ho-155-II (each with 100 rpg) could be fitted to the Ki-45-KAIb or the Ki-45-KAIc as alternatives to the more usual 37 mm Type 94 cannon.' I made that up, but it is a typically dense sentence and it would

have been preceded and followed by others just like it. These passages, with their relentless delivery of facts and figures, are very heavy going, although they are interspersed with more accessible interludes in which changing operational concepts and the like are discussed in more general terms. The saving grace is that the last 100 or so pages (40% of the book) are presented as tabulated information. Among other things, these appendices provide: basic technical data on all guns carried by aircraft during WW II, from rifle calibre machine-guns up to 75 mm cannon; drawings, to a common scale, of the fifty most prominent weapons; technical data on ammunition; and an exhaustive listing of which guns were carried by which marks of each type of aircraft flown by the combatants (and others, even the neutral Swiss and Swedes, for instance, being included).

So, how to sum up? If you are 'into' guns at all, you will undoubtedly need this book in your library. The tabulated data is comprehensive and easily interpreted. The first chapter is an excellent primer on guns and gunnery and the rest of the text is also very good value, provided that you can stay awake. That said, while this book is hard going for the casual reader, if you are looking for something specific, a comparison of Japanese versus American design philosophies, for instance, it will almost certainly provide a valuable insight. Highly recommended.
CGJ

British Built Aircraft – Greater London by Ron Smith. Tempus; 2002. £16.99.

The title of Ron Smith's 188-page softback is slightly misleading as its focus is really to do with British aircraft manufacturers, rather than the aeroplanes that they built. It is only the first in what is expected to be a series of books which will eventually cover the whole country. The author has included in his Introduction a 'Not Yet Found (and Imperfect Knowledge Disclaimer)', which was a wise precaution, as many obscure concerns have operated on the fringes of the aviation industry, particularly during WW I and its immediate aftermath. To take just one example, there was the Morley Aviation Co Ltd which was registered in SE 11 (that's the Elephant and Castle to you) in September 1918, its activities being listed as: 'Aeroplane, aircraft parts and piano manufacturers, woodworkers, etc'. Nothing else is known. The company may have been swallowed whole by a bigger fish and traces of its genes

may still be detectable within the DNA of BAE SYSTEMS, or it may have been a fly-by-night enterprise worthy of Del Boy. Who knows? The author hopes that someone does and that readers will be moved to fill in the gaps. If Tempus are prepared to publish a revised edition (of each volume) in the fullness of time, this series will build into a valuable record and will probably keep the author occupied for another ten years – at least.

The geographical approach will be useful to local historians but it is less appropriate for those whose interests lie in aviation because it is necessary to cross refer in order to trace a company that moved from one borough to another. For example, when the military assumed control of Hendon aerodrome, this displaced the Beatty School of Flying which was obliged to move further down the Edgware Road to set up shop in Cricklewood. This problem will be even more marked for organisations that had facilities spread across the country; Shorts, for instance have operated from sites as far apart as Rochester, Bedford and Belfast, and one can foresee an eventual need for a consolidated multi-volume index. The present book has two indices; one grants access via a geographical location (town/borough), the other by the name of the company. Unfortunately, the second of these leaves something to be desired. For instance, the aforementioned Beatty School is not listed under 'B'; you will find it under 'G', because the index presupposes that the reader will know that the outfit was set up by George Beatty so his school can be found under G W Beatty. Unfortunately, because of the way in which the content of the book has been presented, it really does need a comprehensive and user-friendly index and this one falls rather short of that description.

The text is concise and the author has wisely avoided the temptation of being drawn too deeply into a discussion of the activities of the major players, De Havilland, Fairey, Handley Page and the others, because the histories of these companies have been well covered elsewhere. That said, there is a certain untidiness about the overall layout and there are one or two really unfortunate instances. The worst is probably a table identifying the aircraft types, broken down into one of four categories, which represented the major British production effort during WW II; this offers us the Lancaster as a fighter and the Proctor as a bomber while the Beaufort and Barracuda are listed under 'trainers/liaison'. On the other hand there are two really interesting 'wiring diagrams' that graphically

illustrate the evolution of the aircraft industry from 1910 onwards as, through a succession of mergers, takeovers and shotgun marriages the original forty-member SBAC of 1920 contracted to become in effect (and with due acknowledgement to *Aviation Week*), first the Society of Both Aircraft Companies (BAe and BAC) and eventually, today's Single British Aerospace Company.

The book is extensively illustrated with some 140 photographs with brief but accurate captions (although the BE2c on page 17 is actually a BE2e) and, perhaps even more interestingly, about ninety contemporary advertisements. The latter shed considerable light on the way things were in days of yore. I had always rather assumed, for instance, that by 1920 one could pick up a war surplus aeroplane from the Aircraft Disposal Company (whose activities are featured in this book) for a song. I was somewhat surprised, therefore, to see that the company was selling-on FE2bs at £500 apiece, which would be something in excess of 'twelve grand' today – not bad for a two-seater in good running order, of course, but hardly a give-away price.

Notwithstanding the slightly untidy presentation and the rather inadequate index, this book contains many tantalising insights into long forgotten aspects of aviation and I found it very rewarding to browse through. As a reference work, it could be the start of something big, provided that the momentum behind the project can be sustained.

CGJ

Green Two – Sgt Dennis Noble by Keith Arnold. Available direct from Southern Counties Aviation Research/Publications at PO Box 334, Chichester, PO20 2XJ at £12.99, including postage and packing.

On 30 August 1940, just twenty-seven days after he had joined No 43 Sqn, Sgt Noble RAFVR was shot down and killed. His Hurricane crashed in a residential area of Hove and most of the wreckage was eventually buried where it had fallen. The pilot's body having been recovered, he was interred in his home town of Retford. In 1996 a group of aviation archaeologists reopened the crater and extracted the remnants of the airframe, essentially the fuselage, the wings having been sheared off on impact. It transpired that much of the pilot's body had been left in the cockpit and his remains were recovered with due respect and passed to the local coroner; they were reburied in Retford in 1997.

This 100-page illustrated A5 softback records the events surrounding

the excavation of the site and the recovery of Dennis Noble's aeroplane. It also sketches in the details of his short life and his brief air force career. Keith Arnold is plainly not a professional writer and it has to be said that his syntax is somewhat erratic, even eccentric (and that is being generous), but *Green Two* is a do-it-yourself undertaking and, as such, it is a commendable effort and one which provides an interesting footnote to the story of the Battle of Britain.
CGJ

Unsung Heroes of the Royal Air Force – the Far East Prisoners of War by Les and Pam Stubbs. Barny Books; 2002. (Available direct from the authors at 143 New Road, Bromsgrove, B60 2LJ at £15 inc postage and packing).

Some 95% of the RAF personnel captured by the Germans during WW II eventually came home. By comparison, one in every three taken by the Japanese did not. As the authors point out, these figures are even more depressing when it is appreciated that many of those who failed to return from captivity in Europe were aircrew who had died as a result of wounds, whereas the vast majority of the men taken in the Far East had been uninjured groundcrew. A particularly distressing factor embedded within the grim Far Eastern statistic is that at least one in five of those who died did so from friendly fire. In all, eleven ships carrying a total of 10 595 allied prisoners were sunk, mostly by submarines or aircraft, with the loss of 6023 lives; 362 of them were British airmen.

While a number of books dealing with RAF Far East Prisoners of War (FEPOW) have been published, many of them recounting the experiences of individuals (most of these being listed in an extensive bibliography), no one has previously provided an overview. Les Stubbs was captured by the Japanese in 1942 and he remained a FEPOW until 1945. He and his wife have researched and published this 282-page softback which provides an excellent factual summary of what happened to the RAF personnel involved. While some mention is made of the unsanitary conditions, the lack of medical attention, the starvation rations, the back-breaking work and the institutionalised brutality of the Japanese guards, these references are almost incidental. This book aims to quantify the situation rather than examining its nature. It does this, broadly speaking, by sketching in the numbers of RAF prisoners taken in each region and chronicling their subsequent movement between

regions, Java to the Moluccas, for instance, or Java to Singapore and then, in waves, onward from Singapore to Thailand and/or Japan. The details of these inter-regional shipments are tabulated as dates of sailing and arrival with the total numbers of FEPOW on board. The figures summarising each of these forced migrations are supported by a series of basic, but very helpful, maps and amplifying notes including, where practical, some indication of the level of RAF involvement. The conditions on board ship were so bad, incidentally, that, apart from those who were lost when their ships were sunk, a further 257 RAF personnel died in transit. The core of the book (180 pages) lists the 5102 men who were formally recognised as RAF FEPOWs in August 1946 (the total in the book actually being brought to more than 6000 by additional names, including those of Commonwealth personnel), providing in each case: full names; Service Number; unit (where known); some indication of the localities where he was held; and, where appropriate, the date of death and where he is buried or commemorated.

Clearly a labour of love and an admirable effort which is bound to be of particular interest to surviving veterans and their relatives and which will provide a useful reference to those studying the war in the Far East.
CGJ

STOP PRESS.

As this edition goes to press it has been announced that Airlife have gone into receivership, which is a shame as they were one of the better aviation publishers. It is understood that the receivers will continue to sell existing stocks of titles that are already in print but that no more print runs will be ordered. It is hoped to sell the company as a going concern, in which case there is a possibility that some titles may be sustained and/or reinstated, but this can only be conjecture.

ROYAL AIR FORCE HISTORICAL SOCIETY

The Royal Air Force has been in existence for over 80 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 £15 per annum and further details may be obtained from the Membership Secretary, Dr Jack Dunham, Silverhill House, Coombe, Wotton-under-Edge, Gloucestershire. GLI2 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:

1997 Wing Commander M P Brzezicki MPhil MIL
1998 Wing Commander P J Daybell MBE MA BA
1999 Squadron Leader S P Harpum MSc BSc MILT
2000 Squadron Leader A W Riches MA
2001 Squadron Leader C H Goss 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:

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