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SELECTED ABBREVIATIONS

A&AEE	Aircraft and Armament Experimental Establishment
AC	Army Co-operation
ACI	Army Council Instruction
ADGB	Air Defence of Great Britain
AGRA	Army Group Royal Artillery
ALG	Advanced Landing Ground
ALO	Air Liaison Officer
AMO	Air Ministry Order
AMWO	Air Ministry Weekly Order
AP	Air Publication
BAOR	British Army of the Rhine
BEF	British Expeditionary Force
BFI	Bulk Fuel Installation
CAS	Chief of the Air Staff
CG	Centre of Gravity
DOSD	Director of Organisation and Staff Duties
DRC	Sub-Committee of the Committee of Imperial Defence concerned with Defence Policy and Requirements
FR	Fighter Reconnaissance
JATE	Joint Air Transport Establishment
JEHU	Joint Experimental Helicopter Unit
JSP	Joint Service Publication
LRDG	Long Range Desert Group
OP	Observation Post
OPCON	Operational Control
ORB	Operations Record Book *aka* the RAF Form 540
OS	Ordnance Survey
PRO	Public Record Office
PRU	Photographic Reconnaissance Units
RA	Royal Artillery
SAS	Special Air Service
SASO	Senior Air Staff Officer
SEAC	South East Asia Command
TNA	The National Archives
TOW	**T**ube-launched, **O**ptically-tracked, **W**ire-guided (missile)
UTM	Universal Transverse Mercator
WD	War Department
WODC	War Office Dress Committee

THE RAF AND THE ARMY CO-OPERATION ROLES INHERITED FROM THE EARLY RFC

RAF MUSEUM, HENDON, 4 APRIL 2012

WELCOME ADDRESS BY THE SOCIETY'S CHAIRMAN

Air Vice-Marshal Nigel Baldwin CB CBE

Ladies and Gentlemen – good morning

My usual thank you, of course, goes to Air Vice-Marshal Peter Dye and his colleagues here at the Museum who give so willingly of their time and of their facilities to help our Society. We would be lost without them.

Today's subject heading is a bit of a mouthful but our aims are, first, to mark the centenary of the Royal Flying Corps by examining its original 'Army Co-op' functions (that is to say, permitting the General to 'see over the hill' and the direction of artillery fire) and, secondly, to trace the evolution of those specific roles over succeeding years.

Our Chairman for the day, Air Vice-Marshal David Niven, is very much a helicopter man, having flown them in Hong Kong, the Falkland Islands, Germany, Northern Ireland and on exchange with the Royal Navy. As a result, throughout his career, he has been closer to the British Army than most RAF officers. His staff appointments have focused on contingency and operational planning, not least during the first Gulf War alongside me, underground at High Wycombe, and he was then closely involved in establishing the UK's Permanent Joint Headquarters at Northwood. On promotion to air vice-marshal, he formed the team to establish the Joint Helicopter Command, with 350 helicopters and 12,000 personnel, and became its first Commander in October 1999. He retired from the RAF nearly ten years ago but last September he was appointed as the Air Officer Northern Ireland in the RAF Reserve.

He is as qualified as anyone I know to keep us on track today.

David - you have control

OPENING REMARKS BY SEMINAR CHAIRMAN

Air Vice-Marshal David Niven CB CBE BSc

Thank you Nigel, although, I'm not sure that I am actually all that well-qualified. I am pretty familiar with the Army post-WW II but I don't know a great deal about Army Co-operation before that, so I am really looking forward to this conference, as I expect to learn quite a lot.

As Nigel has said, we are here to mark the centenary of the formation of Royal Flying Corps and we are going to do it by tracing the evolution of just two of its key functions – roles, incidentally, which have evolved even further over the last ten years or so. But we are not here to study what has happened in the last ten years, nor are we going to consider any of the other functions that are facets of Army Co-operation. So we shall not be discussing air assault gliders, parachuting, airlift, support helicopters or close air support. That is not to say, of course, that they are unimportant, some have already been addressed by the Society and I am sure that the others will be in due course.

So, without more ado, let me introduce our first speaker.

CORPS RECONNAISSANCE 1914-18

Wg Cdr Jeff Jefford

'Jeff' joined the RAF in 1959 as a pilot but (was) soon remustered as a navigator. His flying experience included tours with Nos 45, 83 and 50 Sqns and instructing at No 6 FTS. Administrative and staff appointments involved sundry jobs at Manby, Gatow, Brampton and a total of eight years at HQ Strike Command. He took early retirement in 1991 to read history at London University. He has three books to his credit and has been a member of the Society's Executive Committee since 1998; he is currently editor of its Journal.

Although the aim of today's seminar is to consider the two earliest operational functions of the RFC – that is to say, permitting the general to 'see over the hill' and the direction of artillery fire – and the way in which these were later discharged by the RAF, we should acknowledge that even the RFC of 1912 had its antecedents, so it is appropriate to begin with just a little pre-history.

What is generally recognised as having been the first successful powered flight in this country was made by Sam Cody in 1908 and within two years a number of enthusiastic junior officers had begun flying on their own initiative. By that time, and contrary to what is often alleged about the Army's having a totally dismissive attitude towards aviation, the General Staff was sufficiently interested in the potential of the aeroplane to employ a few, albeit borrowed ones, during the annual manoeuvres of 1910 which were held on Salisbury Plain.

It was during these exercises, on 21 September, that Bertram Dickson, until very recently a captain in the Royal Horse Artillery, made what is generally accepted as having been the first military aerial reconnaissance sortie. Five days later, the notable actor/aviator Robert Loraine made the first air-to-ground wireless transmission in this country.

These events, and other considerations, led to military aviation being put on a firmer footing with the establishment of the Air

Battalion of the Royal Engineers in April 1911. That arrangement lasted only a year, however, and, a Royal Warrant of 13 April 1912 (that will be 100 years ago next week) established the Royal Flying Corps. Its organization was to include a Central Flying School to provide appropriate instruction and No 1 CFS Course was run at Upavon between August and December 1912. It was chiefly concerned with getting folk to fly without breaking their aeroplanes, or their necks, but there was a substantial amount of technical instruction in the workshops and about 50 hours of formal classroom time. Significant among these, from the perspective of today's seminar, were:

Functions of aircraft in war on land	1 hr
Map reading	2 hrs
Observation of artillery fire	3 hrs
Practical navigation	1 hr
Formations of foreign armies	1 hr
Conclusions drawn from use of aeroplanes on manoeuvres	2 hrs

In reality, I imagine that many of these 'lectures' will have been more in the nature of group discussions, because their was little practical experience, let alone doctrine, on which to base a syllabus as the military aviation community was still feeling its way.

For the manoeuvres of 1912, each side was assigned seven aeroplanes and an airship. The opposing generals, Haig and Grierson, both made use of them for reconnaissance work and many lessons were learned. For the war games of 1913 the RFC fielded no fewer than thirty-five aeroplanes and about 550 men. Again, much was learned, and increased attention was paid to the problem of communication. There was some more experimenting with wireless, but the most practical way at the time was to drop a scribbled note on a marker laid out on the ground near the HQ.

There were no manoeuvres in 1914, because war had broken out on 4 August. The BEF crossed the Channel to take up positions near Mons, with the French Army on its right and not much at all on its left, because the Belgians were falling back to the north west, toward Antwerp. The RFC's operational echelon, flew across to France where it set up shop at Maubeuge, about 10 miles behind the British line. The first reconnaissance sortie was flown on 19 August but it

appeared that it was ‘all quiet on the Western Front’. It did not stay that way for long, however, and on the 22nd, when twelve sorties were flown, crews reported German troops moving westwards from Brussels towards Ninove where they had turned south west, clearly indicating an intention to turn the exposed left flank of the British position.

The overall picture being established by aerial reconnaissance was clear, and, after a holding action at Mons, a withdrawal was ordered which, by preventing its position from being enveloped, undoubtedly saved the British Army.

The RFC was involved in this retreat, of course, and over the next three weeks it moved house – or tents – or barns – twelve times. But it kept flying reconnaissance missions and, while there was some initial reluctance to accept the reports of the airmen in some quarters, this was soon replaced by increasing confidence as these reports were repeatedly shown to have been correct. It was, for instance, the RFC that first reported that the German thrust had unexpectedly changed direction from south west to south east on 31 August, thus exposing its own right flank, and that the Germans had actually crossed the Marne on 4 September, leading to the battle of that name.

Despite the helter-skelter nature of the retreat, the RFC was learning on the job and with the German advance on Paris having been blocked by the Battle of the Marne, the next engagement, the Battle of the Aisne, changed the nature of the war. Neither side could make any headway, so they both dug in and by the end of October what had been a campaign of manoeuvre had become one of static trench warfare.

Now able to operate from a relatively stable location, the RFC began to expand its capabilities. Previously confined to visual reconnaissance and liaison flights, during the Battle of the Aisne, which was fought in mid-to-late September 1914, the RFC notched up several significant ‘firsts’.

- It took the first airborne photographs – of any consequence.
- It applied the concept of the gridded map.
- It made the first practical airborne W/T transmissions.
- It made the first attempts to direct artillery fire.

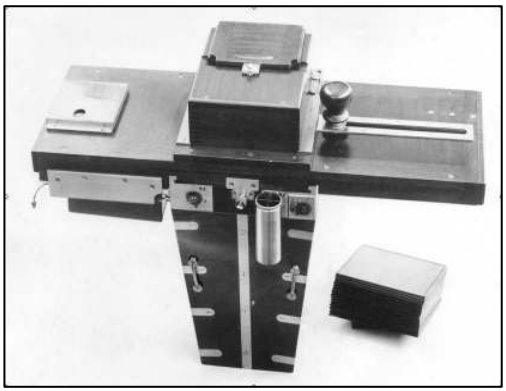
Some pre-war experimental work had been done in all of these fields, of course – but realistically speaking these were operational 'firsts', which we can consider in turn.

Photography

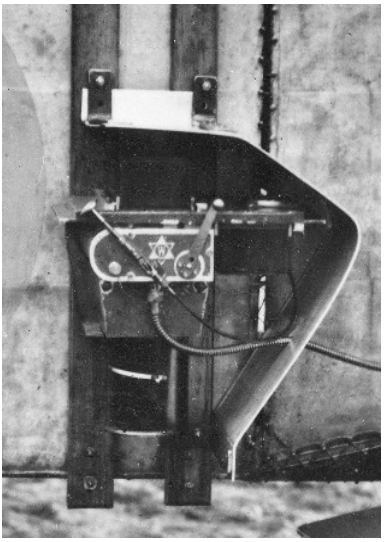
Photography was a very obvious way to enhance reconnaissance reports by creating images that recorded permanently, and in detail, what had been seen only fleetingly. What was of critical importance was the production of mosaics – overlapping vertical pictures – which were used to create maps. Photographic coverage, of the whole Front, was constantly repeated over the next three and a half years, sometimes on a daily basis, to permit the maps, or, to be more specific, the trench overlays to be updated.

It took time for the necessary cameras to be designed and produced in quantity, an evolutionary process that continued throughout the war. First up was the hand-held Type A of 1915. It was a hefty, brass-bound wooden box weighing about 10 lbs and changing the individual glass plates and resetting between shots required eleven distinct actions, which would have been no joke at sub-zero temperatures in a 70 mph gale.

It was soon superseded by the Type C which was fed by a magazine containing eighteen 5"×4" glass plates. Because of the eighteen-plate magazine, this one weighed 26 lbs, which more or less precluded its use as a hand-held camera so it was mounted on the



Left, the hand-held single-shot Type A camera; right, the magazine-fed Type C which was mounted on the airframe. (Barry Gray)



The Williamson Type L..

airframe. Operation was much-simplified, in essence you had only to change the plates after each exposure by sliding a handle across and, of course, to change the magazine, when it was empty.

The Type C was still in use in 1918 but a lot of progress had been made by then and it was rapidly being displaced by the Type L which was of metal construction and somewhat smaller. It could be operated manually, either directly, or remotely from within the cockpit via a Bowden cable, or the glass plates (still in magazines of eighteen 5"×4") could be changed mechanically after exposure by a windmill-powered flexible drive so that, if the aeroplane were flown in a straight line at a predetermined height and speed, it would automatically produce a series of pictures with the desired degree of overlap.

While the major customers were the planning and intelligence staffs, and the map-makers, artillerymen and balloon observers, also required photographs of their areas of local concern. Their demands sometimes involved oblique photographs to amplify specific details and they were also useful to record fleeting events. These were usually taken by the observer, using a P-series hand-held camera.

In the early days, photographic processing was carried out at a Wing HQ, the RFC having been decentralised into wings as early as November 1914. But as the scale of the task expanded the wing photographic sections became increasingly overloaded and this slowed down the rate at which they could turn out prints – and with intelligence product speed is of the essence. The answer was more decentralisation and in the spring of 1916 the task was devolved to squadrons who would now process pictures at unit level for relay directly to its customers. In 1916 the establishment called for a corporal and three men but by the summer of 1918 this had increased

to a sergeant, a corporal and fourteen men – per squadron.

The scale of the work carried out was remarkable and escalated as the war went on. The figures at Table 1, which were compiled shortly after the war, show that more than ten and half million prints had been made in France – and there would have been more in Italy, Salonika, Palestine and elsewhere.[1]

Year	**No of Prints**
1915	(Est) 80,000
1916	552,453
1917	3,925,169
1918	5,946,096
Total	**10,503,718**

Expansion and Reorganisation

It is appropriate to make a slight detour here in order to sketch in some of the background. The devolution of responsibility for photographic processing in early 1916 was symptomatic of a much more extensive reorganisation of the, by now, much larger RFC. In January of that year a brigade structure was introduced, one RFC brigade being assigned to each of the four armies that constituted the BEF by that time. While the RFC had been expanding, however, it had also been broadening the spectrum of operational functions that it could undertake and with squadrons beginning to specialise in particular activities, they were grouped into specialised wings, generally of four squadrons.

Army Wings operated under the direction of the Army HQ and delivered proper 'air power' functions, like reconnaissance in depth, bombing, strafing and mounting offensive and defensive fighter patrols, all of these becoming more clearly defined and refined as the war progressed.

The Corps Wings did the short range work. These were the units that worked directly with the troops. These were the 'army co-operation' squadrons and they were generally assigned one to each Corps within an Army.

I should perhaps make it very clear at this point that, despite the attention paid, at the time and since, and perhaps especially since, to the pilots who flew Camels, SE5as, DH9s and the big Handley Pages, the RFC – and the wartime RAF – was really all about supporting the

The much maligned BE2c was a very workmanlike aeroplane in its day. Unfortunately, its day was done by the end of 1915 but it was still in widespread use in the spring of 1917.

Army and the aeroplanes that actually did that were those that were flown by the far less glamorous corps reconnaissance squadrons.

So this is a good point at which to say a few words about those aeroplanes. While early use was made of sundry Blériots, Farmans, Avros, Moranes and the like, the RFC's workhorse for the first three years of the war was the BE2c and the later BE2e. Heavily criticised at the time, and since, the BE2 was not fundamentally a *bad* aeroplane. It did exactly what it said on the tin. The problem was that the tin was well past its sell-by date.

Geoffrey de Havilland had set out to make an inherently stable aeroplane that would carry two men, in safety, for three hours or more, and be relatively easy to dismantle, erect and maintain in the field. His BE2 did all of those things but the very sensible idea of putting the second crewman in the front seat, more or less on the centre of gravity, so that the aeroplane could be flown solo without incurring any balance problems, proved to be a severe handicap.

There had been little thought of aerial combat when the BE2 had been designed back in 1912 but when it was committed to action two

From the summer of 1917 until the Armistice 75% of the of the corps reconnaissance squadrons in France flew the RE8; this one belonged to No 3 Sqn AFC.

years later it proved to be virtually defenceless because it was practically impossible to wield a gun effectively from the front cockpit – and that highly desirable degree of *designed-in* stability had become a lack of manoeuvrability. That said, the BE2 was still a viable aeroplane in early 1915. The problem was that the RFC was still flying it two years later – hence 'Bloody April'.

By that time, however the RE8 had begun to appear, not that it seemed to be all that promising. The first to arrive in France had been issued to No 52 Sqn in late 1916 but they had suffered so many accidents that they were withdrawn and replaced by yet more BE2s. They were not that successful in combat either, No 59 Sqn lost twelve during April 1917 – six of them on a single photographic mission flying in formation for mutual protection. That was actually the problem. The RE8 was a significant improvement on the BE2; it had the observer in the back seat, where he could actually use a gun and it had a much better performance. But it was hardly a 'two-seat fighter'.

The new Bristol F2b, did turn out to be 'a fighter' – eventually – but it too proved to be a major disappointment when it was committed to action for the first time in April 1917. Flying in formation, just like the RE8s, when No 48 Sqn mounted its first patrol with its Bristols on the 5th four of them were shot down, and it happened again on the 11th when three more were lost.

At much the same time Armstrong Whitworth's FK 8 was also becoming available, although this one did manage to get itself

An Armstrong Whitworth FK 8 of No 82 Sqn. (Mike O'Connor).

established without any disastrous losses. These were all 'second-generation' aeroplanes, of course, but the RFC had not yet found out how to use these new tools. Having been obliged to persevere with the BE2 and the Sopwith 1½ Strutter, during 1916, it had become normal practice to fly in formation in the hope that the combined defensive fire power just might offset their increasingly inferior performance compared to the opposition's new Halberstadt and Albatros fighters.

It would take a while for the RFC to work it out but the answer was for the new RE8s and FK 8s to stick to corps work, which meant that they would stay relatively close to the lines, where we ought to be able to maintain control of the airspace, permitting the observation aircraft to operate alone. Longer-range reconnaissance would be conducted by the Army Wings using the Bristol Fighter which, when not constrained to flying in formation, could take care of itself quite well.

In fact the Bristol was so successful that it was intended to use it to replace the RE8 and FK 8, but industrial problems, mostly to do with the production of engines, meant that this plan was never realised and Bristols were only just beginning to trickle down to the corps squadrons as the war ended.

Maps and Grids

We can now return to our list of innovations introduced during the battle of the Aisne, the second of which was the use of gridded maps. If aviators and gunners were going to work together they needed to

use the same maps and be able to identify a specific feature without being able to jab a grubby finger at it – because one of the guys was up in the air.

Today we are accustomed to aeronautical charts being marked with latitude and longitude and the UTM grid and our Ordnance Survey maps having a National Grid overprint. But this was not the case in 1914. If you examine an OS map of that era it is very detailed, but there is no obvious way to create a map reference.

What Capt Donald Lewis of the RFC did at the Aisne was to draw a simple square grid in pencil on the available map, permitting him to define the co-ordinates of a target that could be interpreted by a gunner using a duplicate squared map provided by Lewis. And that principle came to be applied wholesale.

The provision of suitable mapping was a problem to begin with because existing Belgian and French mapping did not fit together, because they used different projections and, whereas most nations had agreed back in 1884 to treat Greenwich as the international prime meridian for measuring longitude, the French were still using Paris. Furthermore, continental mapping was in metres – and the Royal Artillery didn't speak French. As a result, before the end of 1914 the British had already decided that they would have to produce their own maps.

It was done by the Ordnance Survey which produced the famous 'trench maps', initially by using existing French material which was progressively refined by conventional field survey parties operating in friendly territory, information on the far side of the lines being derived from the mosaics created by the aerial photography of which we have already spoken.

It took about a year to map the whole Front, and the style of coverage evolved with time but the eventual outcome was that the OS produced base maps at a scale of 1 in 20,000 which were also printed in scaled-up and -down versions at 1 in 40,000 and 1 in 10,000 – see Annex A1. A scale of 1 in 10,000 is better than 6 inches to the mile – which is pretty big – the runways at Heathrow, for instance, would be well over a foot long. These options were not exclusive, of course; maps in even larger scales could be produced for specific operations – and the 'balloonatics' routinely used 1 in 2,000 maps (ie about 30 inches to the mile).

The classic illustration of the destructive power of artillery – Passchendaele in June and December 1917.

One last thought, the British trenches were originally shown in blue with the German lines in red. The French had got it the wrong way round, but in the interests of allied co-operation, in early 1918 we reversed our convention to conform with French practice.

Artillery Direction

Jumping to the fourth function on our list, the direction of artillery fire, I have to confess that I have absolutely no expertise in gunnery, beyond a few basic facts. One point worth making is that, despite the machine gun's evil reputation, the real damage was done by the artillery, which accounted for practically all the material devastation and is said to have been responsible for more than 60% of the casualties inflicted during the war.

There was a wide variety of guns available to the British Army, but the standard piece for the Royal Field Artillery was the 18 pounder. Later marks had a range of up to 11,000 yards, but 6,500 was a more

The 9.2" howitzer.

realistic figure for the, far more numerous, earlier versions – say 3½ miles – but that presupposed that you could see what you were shooting at. If there was no line of sight to the target you had to resort to indirect fire and that meant using a howitzer – that is to say a gun that shoots at high angles of elevation to produce an arcing trajectory and plunging fire.

There were lots of these to choose from running from the 4·5" howitzers of the Royal Field Artillery, through the Royal Garrison Artillery's 8" and 9·2" howitzers and even a few rail-mounted monsters.

The trick when using indirect fire, of course, is to know where the target is – because you can't see it – and to know whether you have hit it or missed and, if so, by how much – because you can't see it. And that is where the corps squadrons came in.

I hope that this is not going to be stating the obvious, but it may be useful to provide some idea of the geographical extent of the BEF's commitment on the continent, since that governed the operating parameters of the RFC. Using, and I must stress this, ballpark figures, the British manned a sector running more or less north-south for *about* 100 miles between the coast (actually a few miles inland – the coastal strip was held by the Belgians) and the River Somme, roughly Albert.

From 1916 until the end of the war, the British had five (at times temporarily only four) armies in the field, so each one had a front of *about* 20 miles. While the length of the BEF's front was relatively constant, the expansion of the RFC/RAF meant that the numbers of aeroplanes deployed along that front increased with time and it was also possible to concentrate force in support of a particular sector when an offensive was launched. For the Battle of Arras in April 1917, for instance, the effective strength of some of the corps reconnaissance units within I, III and IV Bdes was increased from the

usual eighteen aircraft to twenty-one, and in some cases twenty-four.[2]

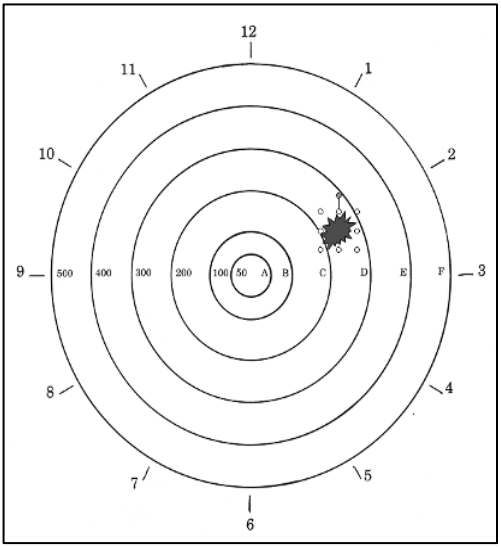
But that 'usual eighteen' aircraft was in itself a symptom of the RFC's expansion that tends to be overlooked. We tend to focus on the number of squadrons in the field but while there were more of them, they were also becoming much larger. In 1914 a squadron was established to have twelve aircraft. In 1916 this was raised to eighteen and in 1918 to twenty-four, although most had reached only twenty-one before the war ended. By the time of the Armistice, the RAF had twenty dedicated corps reconnaissance squadrons in France fielding between them more than 400 aeroplanes.[3] So what did that mean?

The composition of an Army was not set in stone, of course, but, in general terms, an Army had four Corps, so each of those would have had a front of *about* 5 miles and, since each Corps was assigned a squadron, that more or less determined the width of that squadron's area of concern.

So if it was 5 miles wide, how long was it? That was determined by the range of the guns. That varied, of course, but the main counter-battery guns, the 9·2" howitzers, could fire up to *about* 8 miles – and the opposition would have had much the same capability, so you finish up with a box of airspace, *very* roughly 5 miles by 10, divided by No Man's Land.

That was a very small area, of course, and it could be even smaller. Bearing in mind that a corps reconnaissance squadron of 1918 would (should) have had a strength of twenty-one aeroplanes, of which about 90% would have been serviceable (that is a reasonable figure for the period) it would actually have had about eighteen to play with. They could be operated in three, three-hour shifts, of six aeroplanes each. Six crews might go up at dawn, say 5am, and land at 8am; they would have six hours on the ground while the second and third teams were on station, then go up again between 2pm and 5pm, and so on.

Six aeroplanes spread across the squadron's 5 mile sector of the front meant that they would each cover a strip *about* 1,500 yds wide[4] and, with some reinforcement when a big push was on, that could easily be reduced to 1,000 yds, or even less, and that density of cover could be maintained throughout the hours of daylight.[5] Once again, I have to stress that these are ballpark figures, and that operations at that level of intensity could hardly have been sustained indefinitely, but it was certainly feasible on a 'surge' basis.



The clock face was oriented with 'noon' at True North and the miss distance was related to the lower of the two range rings; in this case C2.

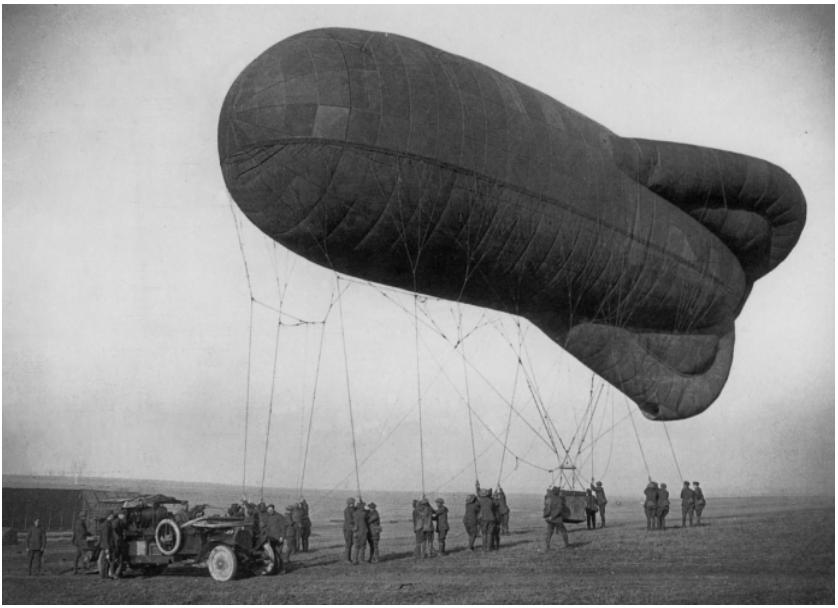
So, how was a shoot actually conducted? Before describing that, we need to discuss wireless, the third item on our list of significant 'firsts' achieved in 1914. For the moment, suffice to say that the key tool in the box was the clock code, which was first used at Neuve Chappelle in March 1915. The precise location of the target having been established using the squared map, the aircrew and the gunners referred to it by super-imposing on the map a series of imaginary con-centric lettered range circles centred on that position and oriented to True North. This was often done using a transparent overlay – but for a pre-planned target, the rings were sometimes printed on a photograph.

When the crew observed the impact of a shell, it would be plotted on the map and the miss distance passed to the battery by reference to the clock face and the lower of the two lettered rings bracketing the shell burst.

Balloons

I need to make another slight diversion at this stage to register the fact that, apart from aeroplanes, the RFC – and the RAF – made extensive use of balloons for the direction of artillery fire, as did the Germans. Indeed the first generation of balloons used by the British were pirated-versions of the German *Drachen*.

Their initial introduction was a little awkward as the Admiralty had been given responsibility for all lighter-than-air aviation in January 1914, so when the Army wanted to see what balloons could do, they



A Caquot Type M observation balloon.

had to ask the Navy to oblige. The first RNAS Kite Balloon Section was deployed at the front in May 1915 and there were four such units in the field before control of all balloons in France was reassigned to the Army in October. In 1916 the original *Drachens* were superseded by a superior French design – the Caquot – which was pretty much the barrage balloon of WW II.

In action, a kite balloon might remain aloft for as long as ten hours at a stretch. Suspended above the lines, typically at about 3,000 feet, although there was enough cable to get up to 5,000, beneath some 30,000 cu ft of highly inflammable hydrogen (think *Hindenburg*) in what amounted to a laundry hamper that swung wildly in windy conditions, the balloon observer's working environment was not an enviable one.

Furthermore, balloons were vulnerable to marauding enemy fighters, at some risk from the friendly anti-aircraft guns that were supposed to ward off these attackers and occasionally in the direct line of fire in an artillery duel. Many were shot down and damage to cables caused others to slip their moorings and drift away over the battlefield,

'Balloonatics' were suspended above the lines at about 3,000 feet in what amounted to a laundry hamper.

usually towards the enemy lines as a result of the prevailing westerly winds. To cater for these situations, balloon observers were unique among aviators of the period in that they were provided with parachutes, and while these were far from perfect, they did save many lives.[6]

What a balloon observer did was pretty much what the crew of an aeroplane did, but he observed his relatively restricted patch from a fixed vantage point, and thus became very familiar with the lie of the land and able to detect the most subtle of changes. Using much the same squared map and clock code as an aeroplane observer, he was provided with a land line, permitting him to phone-in his observations

directly to the battery.

In fact, by 1918, rather than being connected to the battery, he was often plumbed into a mobile telephone exchange that could patch him through to any extension on the entire network. That was quite a sophisticated arrangement for the time and far more convenient than the facilities available to aeroplane crews who had to use Morse.

Air-to-Ground Communications – Wireless

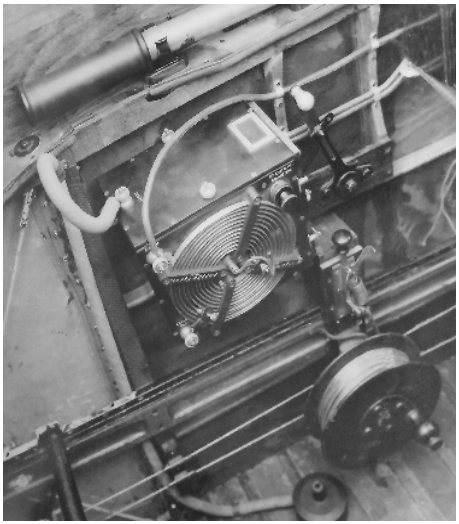
Which takes us to the third item on our list of significant firsts at the Aisne. Since these were all achieved before the end of 1914 they were all pretty tentative at that stage, but they established the possibilities and, as with the cameras, the necessary wireless equipment was designed and introduced, and operational procedures for using it were worked out.

Until wireless started to become relatively commonplace, which was not until mid-1915, the primary method of air-to-ground communication remained the message bag but, for registering the fall of shot, some use was made of pyrotechnics – Very lights. Green Red, for instance, meant 'Over to the Left'. A double Red meant 'Over to the Right'. Red Green meant 'Short to the Right', and so on, with a direct hit being Red Green Red. It was a bit vague – there was no miss distance and only a crude indication of direction – but it was better than nothing, and, if necessary, more complex messages could be passed by Morse using a signal lamp and coded one-, two- or three-letter groups. But by 1916 these relatively crude methods of communicating had been largely superseded by wireless.

The standard equipment was the Type 52, named, after its manufacturer, as the Sterling set. It worked on a wavelength of between 140 and 260 metres using a 120-foot trailing aerial (think quarter-wave or less) that you had to wind out *(and back in when you were done).* Powered by a 6-volt accumulator, it had a range of up to 10 miles – which was adequate for that roughly 5 by 10 airspace box within which a corps squadron operated. The system had a number of limitations but the greatest of these was that it was one-way air-to-ground only. It used Morse at a notional 8 words per minute, which was the pass rate for aircrew – compared to the 20 or more that was the norm for a professional wireless operator.

It was necessary for the crew and the ground operator to agree the

frequency to be worked and once airborne, positive contact had to be established, bearing in mind that there would be other aeroplanes operating in adjacent orbits on very similar, if not the same, frequency. Since the aircrew had no receiver, whenever they transmitted they were quite likely to do it over the transmissions of another crew – so that they jammed each other. That aside, with several aeroplanes on task, there was clearly potential for confusion – who was talking to whom? The impact of this could be minimised by rigid discipline, particularly the use of callsigns, which were frequently changed for security purposes.



The Sterling Telephone & Electric Co Ltd's Transmitter Type 52.

But the situation was considerably eased in 1916 by the introduction of a device called the clapper break. What this did was to alter the tone/the pitch of an aeroplane's transmission. This could be detected aurally by the ground operator permitting him to filter out irrelevant traffic.

That called for a great deal of skill, of course, and I should make it clear that the ground operators were RFC personnel deployed in the field with the artillery batteries. So, while service in the RFC usually implied the relatively safe environment and comfortable lifestyle associated with working on an aerodrome ten or more miles behind the lines, like the balloon handlers and observers, hundreds of RFC wireless operators shared the rigours of the trenches and the dangers of working on what was actually a prime target for enemy guns.

The length of wireless transmissions was reduced to a minimum by the use of one, two or three-letter groups which had predetermined meanings. These were largely the ones that had been established earlier for use with a signal lamp.

Are you receiving my signals?	R
Am returning to landing ground	CI
Are you ready to fire?	KQ
Fire	G
Stand by	A
Stop firing	MQ
Battery Fire	BF
Salvo	VO
Guns at pre-arranged target No 'x'	N
Guns firing in position (co-ords)	NF
Guns not firing in position (co-ords)	NT
Continue firing in your own time	GO
Over	O
Short	S
Right	R
Left	Q
All available batteries to fire (Zone Call)	LL

Representative code groups for transmission by wireless (or, in some cases, originally by signal lamp)

The Conduct of a Shoot

So now – finally – we can look at how a shoot was actually conducted. There was close direct – personal – liaison between the crews of a corps reconnaissance squadron and the men of the batteries with which it was working and the target – or targets – for a particular sortie would be identified before the flight. Typically, these might be a particular stretch of a trench, a dug out or one or more German gun sites. All of these were plotted and annotated on the trench maps which were constantly being revised and updated – so a particular sortie might anticipate firing on, for instance, pre-designated targets Nos 3, 7 and 9 within a particular Zone.

So what was a Zone? Each map was overprinted with *lettered* 6,000 yard squares, each of which was divided into 36 *numbered* 1,000 yard squares and, superimposed on this, was a 3,000 yard quadrant *lettered* A to D (or W to Z). That was a target Zone – a specific 3,000 yard square identified by a two-letter group, the first

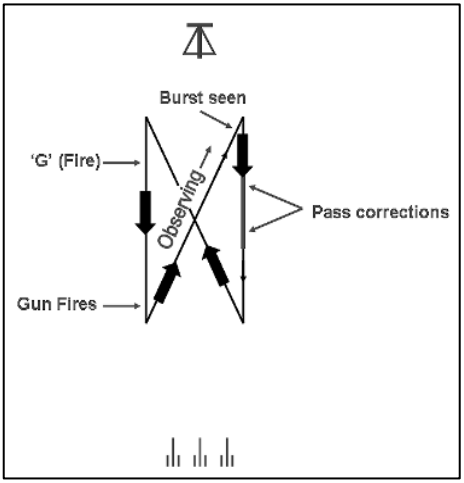


Fig 1. Schematic (not to scale) of a typical pattern flown during an artillery shoot.

letter indicating the 6,000 yard square and the second the quadrant within it – see Annex A2.

Once the crew was on task, they set up a flight pattern, typically, an elongated figure of eight, and established contact with the ground operator. The aeroplane headed first towards the battery and transmitted the order to fire – the Morse letter 'G'. The crew watched and noted when the gun fired, at which point they reversed direction so that they could see where the shell would fall. They knew precisely when that would be, because it was part of the stock in trade of a corps aviator to be familiar with such arcane issues as a shell's time of flight over a given range, and they needed to be sure that it was their battery's shell that they were seeing and not a miss from the gun next door.

Having observed the shell burst, they headed back towards the battery, plotted the fall of shot on their map and, using the clock code, passed the miss distance to the gunners by wireless. They would then return to the start point and repeat the exercise for each gun in the battery until all the shells were registering pretty much on the target, at which point, instead of sending 'G', they might order 'BF' for 'battery fire' or 'VO' for salvo. When the damage had been done, the instruction would be 'stop firing' – 'MQ' and when the crew's slot time expired they would signal 'CI' for 'I am going home'. These are just examples; there were many other standardised groups.

The system made provision for a crew to engage an unplanned target. There were a number of variations on the theme, but the classic case was the Zone Call – which, could redirect the fire of all batteries (or, however many guns, local RA standing orders laid down) assigned to engage targets within that Zone, which, you will recall was

a 3000 yd square. If, for instance, while carrying out a routine bombardment of a number of known artillery positions, the crew observed that a site, that was not included in their briefed task, had actually opened fire, they might consider that it should be neutralised as soon as possible in order to save the lives of the troops on the receiving end.

Under those circumstances, a Zone Call might read 'LL NF WB16', which translates as (LL) all guns to engage (NF) guns now firing at (WD16) known site Number 16 in the lower right hand quadrant of map square W. That gave an RFC 2nd/Lt the *de facto* authority of a brigadier general – so he needed to be sure that a Zone Call really was justified – because he had just disrupted the general's pre-planned firing programme for the day. In short, it was a judgement call, and there was provision for dealing with targets of opportunity with less urgency. In this case, the crew might have elected not to have invoked the 'executive' LL and merely sent 'NF WB16'; that is to say they would simply have advised the gunners of an opportunity and left the decision to them.

If on the other hand, the crew had seen a large column of infantry on the move, they might consider that too good to miss, in which case the call might be 'LL MD COL 2000 FAN E W29a24'. That translates as (LL) all guns to engage (COL) a column (2000 FAN) of 2,000 infantry (E) moving east at (W29a24) a map reference to an accuracy of +/-50 yards. The interpretation of trench map references is something of an art form – see Annex A2.

Having previously noted the way in which the air service expanded, it is worth providing some indication of the scale of the work that it was able to carry out. This varied, depending upon the level of activity on the ground and could be heavily influenced by factors affecting visibility, so low cloud and fog would seriously interfere with observation.

By the early summer of 1917 the RFC had nineteen corps reconnaissance squadrons in France, all of them with a notional establishment of eighteen aeroplanes, and all but one of them now equipped with the new RE8 or FK 8. Routine daily activity fluctuated wildly but on a typical day aeroplane crews might direct the artillery to engage between 70 and 100 targets, mostly hostile batteries, and balloon observers another 20 to 40, but much more could be achieved

	Targets Engaged By	
Date	**Aeroplanes**	**Balloons**
3 Jun 17	193	107
4 Jun 17	214	164
5 Jun 17	180	208
6 Jun 17	161	135
7 Jun 17	247	27
8 Jun 17	154	53
9 Jun 17	112	13

Fig 2. Artillery shoots directed by the RFC during the run up to, and the first three days of, the Battle of Messines.

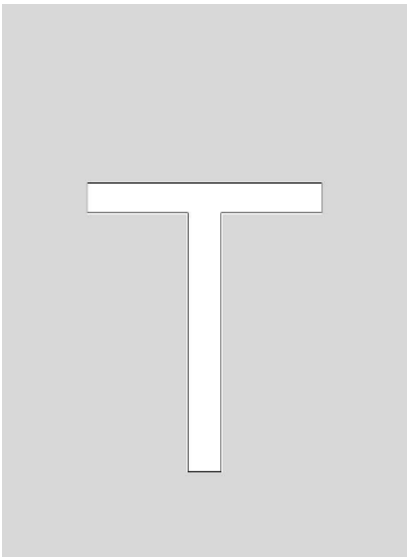
when associated with an offensive. The figures at Figure 2 reflect the work done during the run up to, and the initial stages of, the Battle of Messines, which was fought between 7 and 14 June 1917.[7]

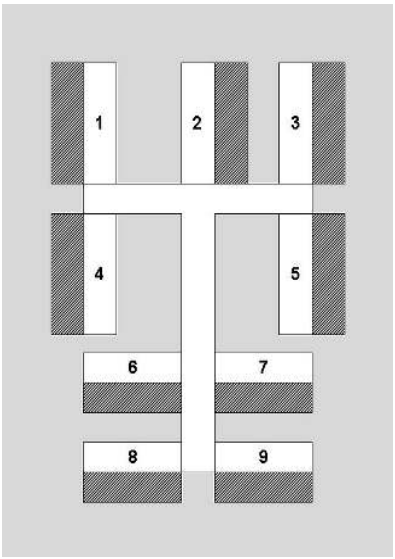
Contact Patrols

Although it did not feature as one of the innovations introduced on the Aisne, there is one other role that qualifies as one of the early activities that would become core functions of the RFC – keeping the general posted on the tactical situation by permitting him to 'see over the hill' or, to be more precise, to keep track of the front line.

While the war had become a mutual siege before the end of 1914, both sides would occasionally try to break the stalemate by mounting an offensive. Until 1918, these never met with much success, but whenever there was some movement on the ground commanders needed to know exactly how far the troops had advanced or retreated, not least to ensure – or attempt to ensure – that they did not shell their own men.

Keeping track of the ground picture required the RFC to fly contact patrols. Various methods were tried, including having the troops display white panels or wear shiny metal discs on their backs, or the use of coloured flares which were to be ignited at pre-determined intervals after H-hour – or, better still, in response to a klaxon being sounded by an aeroplane. That permitted the air observer to determine the positions of the leading elements, plot these on a map and drop it to the relevant HQ in a message bag. The first serious attempt to mount contact patrols was at the Battle of Loos in 1915. This met with only mixed success but, as with all the other procedures, techniques improved with time. That said, it was rarely 100% successful because of the instinct for self-preservation. A soldier under fire in No Man's





Above, the 'T' or Popham Panel. and, below, the pad used by aircrew to record the succession of symbols.

Pilot .....
Observer .....
Date ..... Time .....

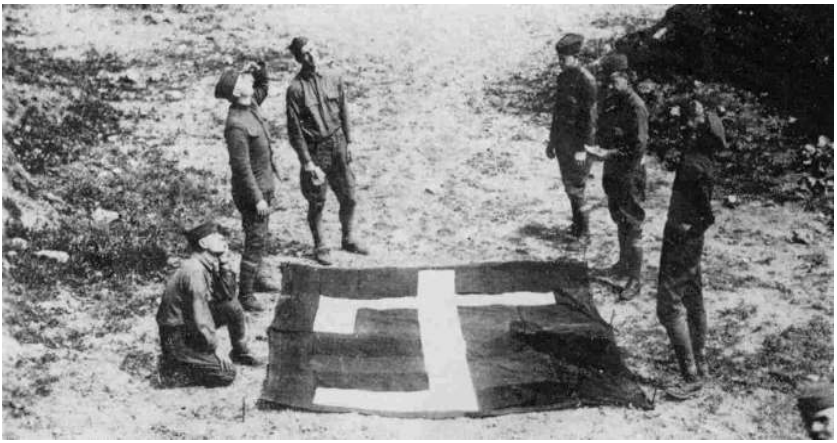
T	T	T	T
T	T	T	T
T	T	T	T

Brigade ..... Battn .....
Map Ref .....

Land might well consider that, if he revealed his position to the crew of a friendly aeroplane, he could just as easily be seen from a German one, and there was always the risk of a sniper. Perhaps unsurprisingly, some soldiers were reluctant to light flares or wave flags.

Ground-to-Air Communications

Apart from the need to indicate their position, there was also a requirement for troops to be able to send much more complicated messages. This applied to the gunners, as well as the infantry, and later on to cavalry and tank crews. Since the available wireless facility was air-to-ground only, however, this had to be done using visual signals. In the case of an artillery shoot, therefore, the patrol orbits at Figure 1 had to be elongated sufficiently for the crew to be able to see



248 – 'have gained final objective'. The soldiers are Americans.

the guns in order to receive any messages. These could be sent by Morse, using a signal lamp, or by laying out pre-arranged patterns on the ground using strips of white cloth.

Several variations on this theme were tried but the eventual answer was the 'T', or Popham, Panel and this remained in use until it was finally superseded by the increasingly widespread availability of two-way R/T from the late 1930s onwards.

It was an 8 ft × 10 ft rectangle of dark blue cloth with a white 'T' of 'American cloth' (ie glazed fabric or oilcloth) sewn to it. Nine additional white extension arms were sewn to the basic 'T'. Each of these extensions was numbered and flanked by a strip of dark cloth, forming a loose flap which could be folded over to obscure the adjacent numbered white arm.

Thus, by covering and exposing particular combinations of arms, a large number of 'numbered' patterns could be created, many of which were assigned universally understood predetermined meanings. A message might involve a sequence of a dozen patterns, with all arms being covered by flaps to present the basic 'T' between each coded symbol.

Aircrew were not required to read/interpret these messages. Their function was to record the succession of patterns on a pre-printed pad, omitting the intervening 'T's, and then deliver the message, in a bag, to the Dropping Station of the relevant HQ for them to decipher. For

example, 137 meant ‘our troops retiring’ (followed by a direction sign, eg 1239 for ‘south west’), 346 meant ‘further bombardment required’ and 567 ‘am about to advance’; there were many others.

Conclusion

As ever, the constraints of time prevent us from digging any deeper but I should stress that the techniques and procedures that I have outlined were those that were devised to prosecute the positional warfare that dictated the nature of the Western Front for three and a half years. When the stalemate was broken by a German offensive in March 1918 the system was put under considerable strain.

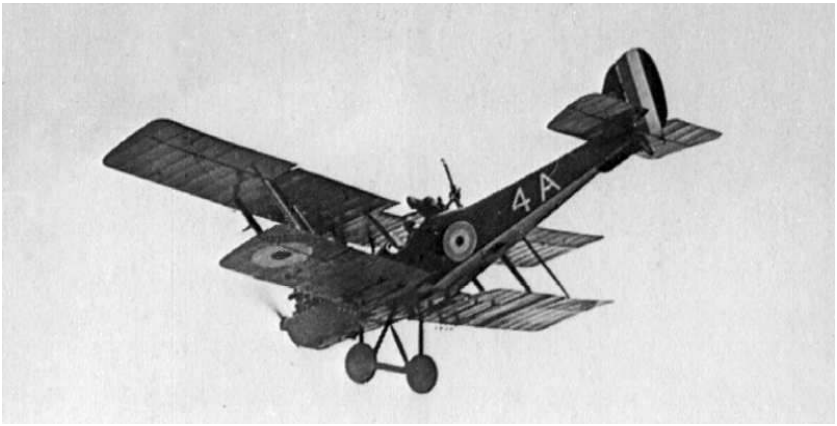
Balloons were very cumbersome things to move. They had either to be completely deflated and packed, which meant that they were not immediately available when they reached their new location, or kept on a short lead and moved at walking pace by a large party of handlers.

Similarly, the wireless-based system of artillery direction also tended to break down, because the W/T aerials had to be dismantled in order to retreat, and land communication between squadrons and batteries, all of which were repeatedly relocating, was impeded by the need to re-lay the copper wire upon which the field telephone links depended. Similar problems had to be coped with in the summer when the Allies began to advance and that also meant expanding the well-established concept of infantry contact patrols to deal with cavalry and tanks, an ever-increasing involvement in, what we now call Close Air Support, while, at the same time, beginning to introduce Radio Telephony – R/T in place of W/T. But all of these were post-1915 developments for consideration on another occasion.

And there I have to stop. But the message that I hope that I have conveyed, and that I want to leave you with is that, while the foundations of, what would become, ‘air power’ were laid between 1914 and 1918, the air war was on a relatively small scale. That is not to say that the RFC’s (and the RAF’s) contribution was not significant. It was, indeed, it was crucial, but the Great War was all about the Army and, specifically, the artillery, and it was only in that context that air power made a real difference.

It is no coincidence that of the sixteen most senior numbered squadrons in the RAF, twelve spent the whole of WW I on corps

reconnaissance work. It follows that the iconic image of the First War in the Air really should be the RE8 – and not the Sopwith Camel.



The iconic image of the RFC should be the RE8.

Notes:

[1] AIR1/724/91/6/1.

[2] Nos 2, 7, 9 and 59 Sqns were to have twenty-one aircraft while Nos 8, 12, 13 and 16 Sqns were to have twenty-four. Apart from No 59 Sqn, which had RE8s, all of these units were still operating, mostly late-model, BE2s.

[3] Nos 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 21, 35, 42, 52, 53, 59, 82 Sqns RAF and No 3 Sqn AFC.

[4] $\frac{5 \text{ mls} \times 1760 \text{ yds}}{6 \text{ (aeroplanes)}} = 1466 \text{ yds}$

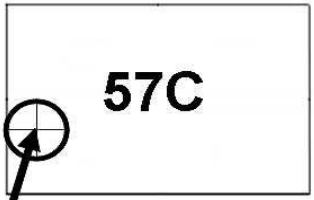
[5] TNA AIR1/2217/209/33/6. A 'History of Wireless Telegraphy: RNAS, RFC and RAF' states that 'one machine per 400 yards of front worked quite successfully without undue jambing.'

[6] Alan Morris notes, in *The Balloonatics* (Jarrolds, London, 1970), that 106 parachute descents were made between June 1916 and June 1917 within 2nd (Balloon) Wing alone, 2/Lt S Jolley making five (of an eventual total of seven) jumps in the course of a mere 97 hours of airborne time in May-June 1917.

[7] Figures drawn from *Royal Flying Corps Communiqués 1917-1918* (edited by Chaz Bowyer; Grub Street, London, 1998), so they will, probably have been tinged with a degree of optimism. It seems unlikely that, while they may have been silenced, all 1,768 targets noted in the table will actually have been 'destroyed' in the seven-day period that it covers. On the other hand, the engagements will all have taken place and the results will have been reported in good faith.

Annex A1

1:40,000 sheet
4 × 1:20,000
16 × 1:10,000 sheets
NW
NE
SW
SE
NW1
NW2
NW3
NW4
NE1
NE2
NE3
NE4
SW1
SW2
SW3
SW4
SE1
SE2
SE3
SE4
24,000 yds
36,000 yds
12,000 yds
18,000 yds
3,000 yds
4,500 yds
6·3" = 1 ml
Sheets, in all scales, approx 3ft × 2 ft



'57C' identifies the 1:40,000 sheet (usually unnecessary)

We are here

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S	T	U	V	W	X

Each 1:40,000 sheet has an overprint of 6,000-yd lettered squares.

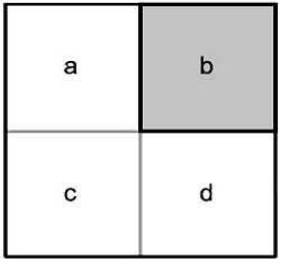
NW1	NW2	NE1	NE2
NW3	NW4	NE3	NE4
SW1	SW2	SE1	SE2
SW3	SW4	SE3	SE4

'M' identifies the 1:10,000 sheet.

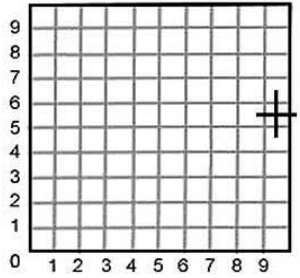
57C M22b94.56

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

'22' identifies the 1,000-yd numbered square within 6,000-yd square M.



'b' identifies the 500-yd quadrant of square '22'.



'94.56' are 'along and up' co-ordinates, to an accuracy of 5 yards, within square 'b' (but '95' would usually suffice).

‘ALL UNDILUTED NONSENSE’?

THE ROYAL AIR FORCE IN THE ARMY CO-OPERATION ROLE, 1919-1940

by Clive Richards

Clive Richards graduated from Brunel University in 1989. Following a brief career in the financial services sector, he joined the RAF Museum in 1993 as a curator in the Department of Research and Information Services. In 1996 he left the Museum for the Air Historical Branch, being employed as its senior researcher until December 2008. He is now a postgraduate researcher in the Department of History, University of Exeter; the subject of his research being the history of the Air Ministry between 1932 and 1949.

Introduction

On reviewing the historiography of the Royal Air Force, it can be seen that the preparations made by the Royal Air Force during the 1920s and 1930s to support a British Army expeditionary force in the field in the event of a major conflict overseas have been subjected to severe criticism. Much of this has centred upon the reluctance of the RAF to develop any form of dedicated close air support capability.[1] However, the Royal Air Force and Air Ministry have also come under fire for their failure to prepare for the demands of what can be considered as the RAF’s more ‘traditional’ army co-operation duties.

One such critic was the late Sir Maurice Dean. Dean was an Air Ministry insider during the interwar period, having been appointed to that department as an Assistant Principal in October 1929.[2] In 1934 he became the private secretary to the Chief of the Air Staff, serving both Sir Edward Ellington and Sir Cyril Newall in this capacity before becoming the Principal of S6 – the secretarial division allotted to the Air Staff – in January 1937.[3] In his account of *The Royal Air Force and Two World Wars*, completed shortly before his death in 1978, Sir Maurice asserted that during the interwar period the Royal Air Force relegated Army Co-operation to the status of ‘a specialist art carried on, figuratively speaking, in dark corners and, to be plain, not taken

very seriously.' The activities of the RAF's specialist Army Co-operation squadrons were, in his judgement, 'all undiluted nonsense' and the methods that they practiced 'belonged to the world of fantasy.'[4]

Sir Maurice was far from alone in his damning judgement of the RAF's efforts in the army co-operation field. However, is this criticism just? In order to assess this, it is necessary to take a closer look at the way in which the RAF approached army co-operation. Although specialist army co-operation squadrons were stationed overseas as well at home during the 1920s and 1930s, this paper will focus primarily on the activities in the UK and the subsequent deployment of UK-based squadrons to the continent in support of the British Expeditionary Force (BEF).[5] First, I will consider briefly the way in which the Royal Air Force defined 'Army Co-operation'. From this, I will go on to outline the scale of the Royal Air Force's commitment to this task; the manner in which Service's specialist army co-operation squadrons were manned, trained and equipped; the employment of these squadrons in expeditionary operations; the expansion of the army co-operation force immediately prior to the outbreak of the Second World War; and this force's baptism of fire in the skies over France during the first year of that conflict.

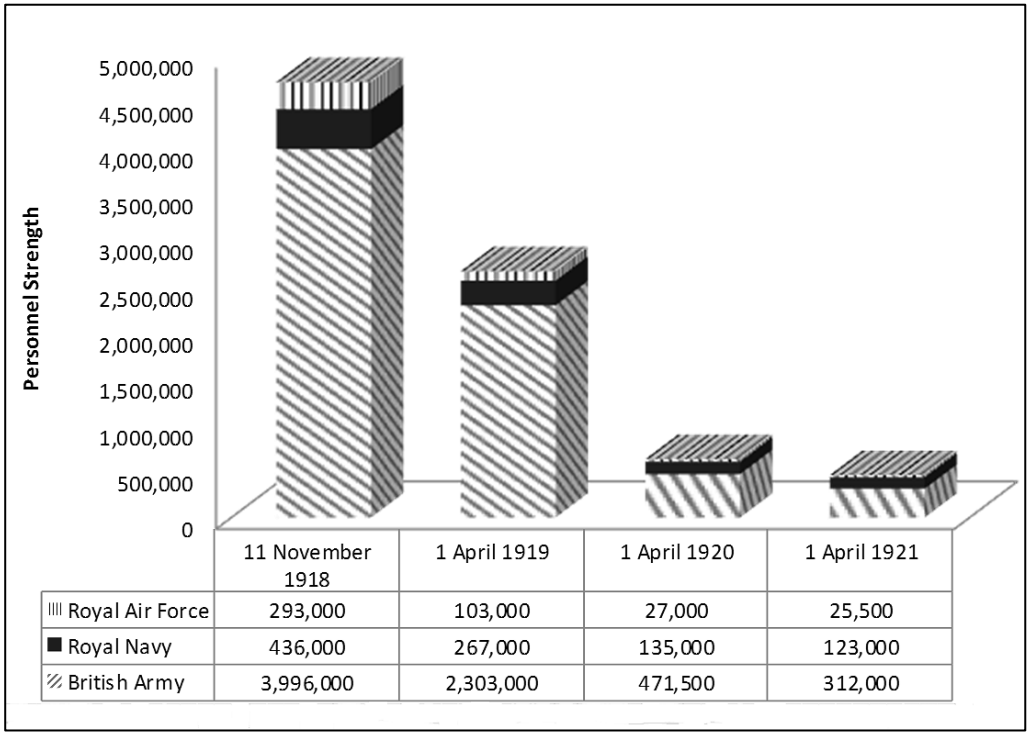
From war to peace

By the end of the First World War, the Royal Air Force could boast a sizeable force dedicated to providing direct support to the British Army; of the 194 operational squadrons extant as at 22 October 1918, no fewer than 31⅓ (over 16%) were devoted to the corps reconnaissance role.[6] Air Staff planning in the immediate post-war period acknowledged that the need for such a capability would continue in peacetime. The Chief of the Air Staff, Air Mshl Sir Hugh Trenchard, laid out his 'view…of the future Air Force' in a letter to the First Sea Lord (Admiral of the Fleet Earl Beatty) dated 22 November 1919. Trenchard described a Royal Air Force comprising 'three branches'; a 'portion which will be trained for, and work with, the Navy, as an arm of that Service'; a 'portion which will be trained for, and work with, the Army, as an arm of that Service'; and a 'main portion, which will be an Independent Force (that may work independently or in co-operation with either the Navy or the Army),

and Research.' Trenchard insisted that those squadrons established specifically to operate with the Army and the Royal Navy would continue to 'be trained and supplied by the Air Ministry' and that the 'Air Ministry would present the estimates, and justify them.'[7]

Despite this continued commitment, however, by the beginning of 1920 the RAF's corps reconnaissance capability had been dismantled. This was due largely to one key factor – demobilisation. The wholesale demobilisation of the UK's armed forces in the aftermath of the First World War had a double effect on the RAF's corps reconnaissance squadrons. On the one hand, they were not immune from the effects of the rapid rundown in RAF personnel. As Figure 1 illustrates, by 1 April 1920 the strength of the Royal Air Force had fallen to less than 10% of that at the time of the Armistice; as personnel numbers fell, the number of squadrons reduced accordingly.[8] In an article published in the May 1931 issue of the *Journal of the Royal United Service Institution*, the then Squadron Leader, John Slessor likened 'the history of the Royal Air Force in the years immediately following the Armistice' to 'a practical experiment in "disarmament by example"' and stated that 'British air power…apart from the comparatively few squadrons in India and in our other overseas garrisons – literally almost ceased to exist.'[9]

The corps reconnaissance squadrons were not affected only by the reduction in the size of the Royal Air Force as a whole. As Figure 1 also illustrates, demobilisation was not restricted to the RAF. Between 11 November 1918 and 1 April 1920 the strength of the British Army fell by over three and a half million; by 1 April 1926, it had further reduced to only 151,100 men – some 23,500 fewer than in 1914.[10] Moreover, most of the remaining troops were deployed outside the UK mainland. The concomitant disbandment of higher Army field formations at home had significant ramifications for the RAF's army support component, insofar as Air Staff policy related directly the size of this component to the number of Army formations that it would be required to support. In his 1919 memorandum detailing the 'Permanent Organization of the Royal Air Force', Sir Hugh Trenchard advocated the eventual creation of sufficient army co-operation squadrons to provide 'a flight per division for work with the troops at all stages of their training, and in addition one or more squadrons for co-operation with the artillery both during their winter training and



	11 November 1918	1 April 1919	1 April 1920	1 April 1921
Royal Air Force	293,000	103,000	27,000	25,500
Royal Navy	436,000	267,000	135,000	123,000
British Army	3,996,000	2,303,000	471,500	312,000

Figure 1: Personnel strength of the UK Armed Forces, 11 November 1918 – 1 April 1921.[11]

their annual gun practice.' In the short term, he proposed to form just two UK-based army co-operation squadrons; 'one at Farnborough for co-operation with the troops at Aldershot and Salisbury, and the second at Stonehenge for work with the artillery.'[12] In the event, however, the deployment of the first of these squadrons was disrupted by unrest in Ireland. On 1 February 1920, No 105 Sqn at Oranmore disbanded and immediately reformed as No 2 Sqn, the RAF's first UK-based squadron dedicated to the army support role, operating in support of the sizeable British garrison.[13] Subsequently, in April 1920 No 4 Sqn was re-established at Farnborough (with detachments at Stonehenge, Aldergrove and Baldonnel) to become the second squadron.[14] Both of these squadrons were equipped with the aircraft that would be synonymous with the army co-operation role for much of the following decade; the Bristol Fighter.

The Army Co-operation Role

The term 'army co-operation' would appear to have entered the official lexicon of the RAF in 1923. An Air Ministry Weekly Order promulgated in July of that year proscribed any further use of the terms 'corps squadron' and 'close co-operation squadron' and instead stipulated that in future 'A squadron allotted to co-operate with a corps or division will be known as an "army co-operation squadron."'[15] Guidance with regard to the RAF's definition of 'army co-operation' prior to the Second World War can be found in the Service's own training manuals of the time. The primary source with regard to 'army co-operation training in the Royal Air Force' in preparation for 'a war of the first magnitude' was Air Publication AP1176, *Royal Air Force Manual of Army Co-operation*. The second edition of this manual, published in 1932, divided Army co-operation duties into the following six categories.

a. **Strategical** (*sic*) **Reconnaissance**, which focused upon 'the enemy's concentration and base areas, with the movement of troop and military material into the theatre of war and from the back areas into the zone of operations' and was 'normally carried out by day-bomber squadrons operating under air headquarters'.

b. **Tactical Reconnaissance**, which was further subdivided into medium reconnaissance 'concerned with the movements of enemy

reserves and with his supply organization in the area behind the actual battlefield' and close reconnaissance 'normally confined to the zone immediately ahead of the forward troops'.

c. **Night Reconnaissance**, with the dual aim of maintaining 'general air surveillance of the enemy (…) during the night hours' and gathering 'considerable detailed information' in the event of an enemy attack or withdrawal.

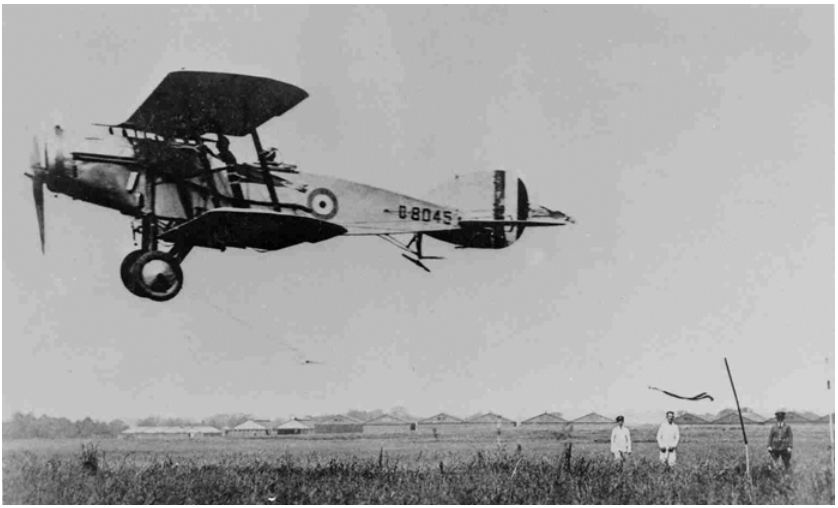
d. **Artillery Reconnaissance**, 'primarily directed towards the location of suitable targets for the artillery and the direction of fire upon them'.

e. **Air Photography**, as a supplement to visual reconnaissance. Photography was an important tool in strategical reconnaissance, 'in locating targets for the artillery and supplying data for shooting without observation', and in conducting aerial surveys for mapping purposes.

f. **Supply Dropping** 'to bodies of troops when no other means of supplying them is available.[16]

A key aspect of the work of the interwar Army co-operation squadrons remained artillery observation. The methods employed during this period were much the same as those employed by their predecessors during the First World War. The way in which 'sorties of the Army Co-operation squadrons were conducted…throughout the interwar period' is summarised in the *History of the Royal Regiment of Artillery*:

> 'The pilot called for fire and observed the fall of shot using one-way radio communication. The call was answered by the batteries detailed to respond. The co-ordinates given and the observations by clock code were translated into fire orders at the gun position. There were two ways if engaging targets from the air. The first was designed to direct fire on to hostile batteries seen by the observer to be firing. The initial call was prefixed by the letters GNF (guns now firing), and was answered by such batteries as had been detailed to engage such targets, each being responsible for a defined area. As soon as the pilot's observations of the ranging rounds satisfied the GPO



The Bristol Fighter, seen here picking up a message, was standard equipment for army co-operation units at home and abroad for much of the 1920s.

> (Gun Position Officer) that the range had been found, fire for effect was followed until the pilot was satisfied.
>
> The second form of fire was that related to an important, and often fleeting, target of any kind which demanded a heavy concentration of fire. Calls for such fire were prefixed by the code letters LL and were answered by all disengaged batteries within range, each shooting to the best of its ability off the map co-ordinates of the target given. No ranging was possible but observations of general effect were sometimes given.'[17]

One notable omission from the above list is any reference to ground attack. It was certainly the case both that army co-operation aircraft were equipped to strafe and bomb ground targets, and that squadrons practised this role. However, during the interwar period ground attack was regarded as something to be undertaken by the army co-operation squadrons only *in extremis*. 'Multitudinous as are the functions of an army co-operation squadron', *Flight* correspondent Major Frederick de Vere Robertson noted in 1933, 'it is not held that "ground-straafing" (*sic*) or attacking ground troops with machine guns

Location	Number of Squadrons
United Kingdom	2
India	4
Palestine	2
Iraq	1
Aden	¼
Total worldwide	**9¼**

Table 1: RAF Army Co-operation Squadrons as at 30 September 1923.[18]

and light bombs, is a primary part of those duties':

> 'The army machines can do this work, of course, but the idea is that this work ought rather to be carried out by fighters. Reconnaissance is of the utmost importance to an Army, and the machines which can bring in information or can put the guns on to a target ought not to waste their time and, incidentally, risk their own safety in detailed destruction of troops. Shrapnel is a far better man-killer than are machine guns fired from the air, and the aeroplanes which can direct the guns are too valuable to be risked on minor operations.'[19]

The Army Co-operation Squadrons

Following the conclusion of the Anglo-Irish Treaty in December 1921, in February of the following year No 2 Sqn left Ireland for Digby. This did not mark the end of the squadron's association with Ireland, however, for it returned in June and subsequently continued to maintain a detachment at Aldergrove following its relocation to the UK mainland – on this occasion, to Farnborough – in September 1922.[20] Although the size of the RAF's army co-operation force stood at 9¼ squadrons by 1923, the majority of these were overseas and only these two squadrons were available to support British Army training at home and to accompany any expeditionary force sent from the UK (see Table 1).

By 1924 the British Army in the UK had been re-organised into four infantry divisions and steps were taken accordingly to bolster the army co-operation force. On 1 April 1924 the Co-operation Squadron belonging to the School of Army Co-operation at Old Sarum was expanded to three flights and redesignated No 16 (Army Co-

Location	Unit
Farnborough	HQ No 22 (AC) Group School of Photography Experimental Section, RAE No 4 (AC) Sqn (Bristol Fighter)
Andover	No 13 (AC) Sqn (Bristol Fighter)
Larkhill	School of Balloon Training[21]
Manston	No 2 (AC) Squadron (Bristol Fighter)
Old Sarum	School of Army Co-operation No 16 (AC) Sqn (Bristol Fighter)

Table 2: No 22 (Army Co-operation) Group as at 12 April 1926.[22]

operation) Squadron; however, it did not become self-accounting at this time but rather continued to function as 'an integral part of the School of Army Co-operation.'[23] On the same day the Signal Co-operation Flight attached to No 24 (Communications) Squadron at Kenley became No 13 (Army Co-operation) Squadron, although its strength remained at a single flight and it continued to be attached to No 24 Squadron until it relocated to Andover on 30 May 1924.[24] In 'some rough notes that have been dictated by me and added to by the various staffs' for the information of Sir Samuel Hoare on his return to the Air Ministry as Secretary of State in November 1924, Trenchard reported that three of the four extant squadrons were allotted permanently to the Army's Eastern, Southern and Aldershot Commands and that during the year 'a considerable amount of Army Co-operation work had been carried out with the Army.'[25]

Prior to 1926, no higher formation dedicated specifically to the army co-operation role existed in the metropolitan air force. On 5 January 1925 a wing headquarters – HQ 1 Wing – was formed at Farnborough, its Officer Commanding being charged with 'the co-ordination of the air work required by the Aldershot Command, and (…) the direction of the co-operation of Nos 4 and 13 Squadrons with that command' and having the status equivalent to that of a Station Commander.[26] This wing was to be short-lived, however, for in the following year a more fundamental change was made to the manner in which the army co-operation squadrons were commanded. As part of the wholesale revision of the RAF's home organisation that took place

An Atlas of No 2 Sqn. (RAF Museum pc73-4-41)

in 1926, at South Farnborough on 12 April of that year 'No 22 Group formed, on the disbandment of No 7 Group, Andover, under Inland Area, for the purpose of controlling all Army Co-operation work'; No 1 Wing also disbanded on the same date.[27]

Subsequently, a fifth unit – No 26 (AC) Sqn – was established at Catterick in October 1927 'to cooperate with the Northern & Scottish Commands'.[28] The formation of No 26 Sqn also marked the introduction into service of a new army co-operation aircraft. During the early 1920s, aircraft were designed by Shorts, Hawker and Armstrong Whitworth to meet Air Staff specifications for army co-operation aircraft; none of which were found to be suitable.[29] Subsequently, in 1924 a new specification – 30/24 – was issued by the Air Staff. Prototypes from five manufacturers were tested by the A&AEE between 1925 and 1927, from which one emerged as being 'admirably suited to army-co-operation duties'; the Armstrong Whitworth Atlas.[30] A total of 271 Atlases was built for the army co-operation role, serving with all of the UK-based army-co-operation squadrons and the School of Army Co-operation in the UK, as well as with No 208 (AC) Sqn in the Middle East.[31]

No 22 Group continued to form part of Inland Area until 17 February 1936, when the group was transferred to the Air Defence of Great Britain (AGDB).[32] This transfer presaged a wholesale change in

the organisation of the RAF in the UK. On 13 July 1936 ADGB itself disbanded, and on 14 July No 22 Group became a part of RAF Fighter Command – one of the two functional commands that were formed on that day.[33] To Robertson, this change illustrated 'the embarrassment caused to the Air Ministry by the Army Co-operation Squadrons. Formerly they were given to the Inland Area; now they are given to the Fighter Command, although their work has nothing to do with air fighting. Still, the Air Ministry must put them somewhere.'[34] However, although administrative responsibility for the Group now rested with HQ Fighter Command, operational control remained with the Air Ministry.[35]

Manning the Squadrons

Army co-operation pilots – who were all commissioned – were drawn from two sources. Although most came from within the Royal Air Force itself, from 1921 onwards they were joined by a number of Army officers (usually second lieutenants, lieutenants or captains) who volunteered to serve on secondment with the RAF for a period of four years.[36] On their secondment these officers were appointed to temporary commissions in the RAF in addition to their existing Army commissions. Although intended to produce a cadre of Army officers with hands-on experience in military aviation, it also served to create a pool of talent upon which the RAF itself could draw in time of need; this was particularly true in the case of those officers who returned to the RAF for a second (or, indeed, in the case of at least one officer, third) secondment, during the course of which they filled executive positions in the squadrons with which they served. A number of these officers were re-seconded to the RAF prior to or shortly after the outbreak of war, and four were commanding Army Co-operation squadrons in May 1940.[37]

A key factor in shaping the manning and training of the RAF's army co-operation squadrons was the policy adopted by the RAF in the immediate aftermath of the First World War with regard to the specialist observer. The 'tendency for pilots to assume responsibility for conducting artillery shoots' had become 'a fairly widespread practice' as early as 1917 and by 1920 it had been 'made quite clear that there was to be no place for observers in the exclusively 'pilots only' club which the peacetime RAF had become.'[38] The banishment

of observer officers altered markedly the composition of aircrews engaged on army co-operation duties. According to Robertson,

> 'During the war an observer was carried, whose primary duty was to observe, while he also operated the signals. Then the pilot flew as the observer directed him, and concentrated his attention on piloting the machine.
>
> The whole theory is now different. The pilot is not considered an overworked man. The piloting of the machine must be done almost automatically, without having to think about it, and is not counted among his anxieties. He concentrates on his reconnaissance, his signals, and his report writing. But he cannot give his whole mind to these matters if he is in any anxiety about his safety from an air attack. His reconnaissance is not likely to be complete if half his attention is given to looking out for possible enemy aircraft which may attack him. Therefore the man in the back seat is an air gunner pure and simple. He is the sentry who keeps a look out for enemy aircraft, and so relieves the pilot of any anxiety on that score. The psychological benefit to the pilot is tremendous.'[39]

Responsibility for providing specialist training to the flying personnel selected to serve in the army co-operation squadrons was vested in the School of Army Co-operation at Old Sarum. The origins of this school can be traced to the Wireless School established at Brooklands in on 20 November 1915 'to instruct Wireless Officers for the Royal Flying Corps, and to develop experiment and design in wireless telegraphy.'[40] Peacetime courses commenced in October 1921, 'The policy laid down for the School' being 'that there should be three Courses each year lasting approximately three months, and that 20 RAF Officers'.[41] Following flying training, *ab initio* army co-operation pilots were attached to Old Sarum prior to (or immediately after) joining their squadron for a twelve-week course encompassing air reconnaissance, artillery reconnaissance, photography, signals and military organisation and tactics.[42] However, the work of the school was not restricted to training pilots, courses also being run for the Army Air Intelligence Liaison Officers posted to all Army Co-operation squadrons 'for the purpose of briefing and interrogating the pilots, and of generally interpreting the army's requirements to the

RAF'.[43] In addition, the school was tasked with evaluating the possible use of new aircraft and techniques in the army co-operation role.

The Work of the Squadrons

On completing the Old Sarum course army co-operation officers returned to their squadrons. Here, their specialist training continued. The activities of each squadron were orientated around the training cycle of the Army corps to which it was attached. The normal pattern of activities for a UK-based squadron would involve individual training between October and March. In April, the squadron would attend an Armament Training Camp, and between May and August one or more of the squadron's flights would be detached in support of artillery practice camps, while the remaining flights would support infantry training at battalion and brigade level. August and September marked the divisional training period, during which the squadron would deploy in the field under canvas.

In addition to these training activities, Army Co-operation squadrons were deployed overseas in support of Army expeditionary operations on two occasions during the 1920s. During the Chanak Crisis, two army co-operation squadrons (No 4 Sqn from the UK and No 208 Sqn from Egypt) deployed to Turkey in September and October 1922 as part of a force of seven squadrons deployed to assist British forces safeguarding the neutral zone around Gallipoli (the Constantinople Wing), withdrawing in the following year – the RAF's 'first real post-war test of its capability to mobilise and transfer a fighting formation to any foreign trouble spot in [a] short time'.[44] Subsequently, in 1927 No 2 Sqn was despatched from the UK to join the Shanghai Defence Force (SDF), a divisional-size formation sent from the UK to secure the International Settlement in that city. On arrival, the squadron took up residence at the improvised airfield already established on the International Settlement's racecourse; however, the unsuitability of this airfield for Bristol Fighter operations – together with the desire on the part of the GOC SDF to avoid a direct confrontation with the Chinese Nationalist forces surrounding the city – greatly limited the squadron's activities and it was withdrawn later in the same year.[45]

The Audax provided the backbone of the AC force during the Expansion period. This one belonged to No 4 Sqn.(RAF Museum P11214)

Re-equipment and Expansion

In 1931 the army co-operation squadrons began to exchange their Atlases for the Hawker Audax, a member of the Hart family modified for army co-operation duties. These aircraft were replaced from 1937 onwards by another aircraft from the same stable – the Napier Dagger-engined Hawker Hector. However, more radical changes in the equipment of the army co-operation squadrons were in the pipeline. In 1934 the Air Ministry issued Specification A.39/34 (to Operational Requirement 18) for a new two-seat army co-operation aircraft to replace both the Audax and the Hector.[46] One of the companies invited to tender to this Specification was Westland. The company's then Chief Test Pilot, Harald Penrose, later recalled that

> 'Visits were made to Army Co-operation squadrons to study operational problems in order to decide the formula best satisfying the requirements of piloting, maintenance, and arming. There was no unanimity among the pilots except a general indication that they needed unobstructed forward and downward view, preferably from a high-winger which must be easy to handle and have [the] ability to land in small spaces.'[47]

The first prototype of Westland's resulting design, the P8, made its

maiden flight on 15 June 1936 and was subsequently selected over a rival Bristol design (the Bristol 148), a contract for 144 aircraft being placed in September of that year. In February 1938 the second prototype Lysander (K6128) was sent to Old Sarum for trials at the School of Army Co-operation 'to ascertain the suitability of this type of aircraft for Army Co-operation duties generally.'[48] The results of these trials were reported to HQ 22 Gp by the Old Sarum's Station Commander (and the Commandant of the School of Army Co-operation), Gp Capt Arthur Capel, in a letter dated 15 February 1938.[49] Capel stated that the two Service pilots who had flown the aircraft – Sqn Ldr John Fyfe, OC 59 Sqn, and Flt Lt Peter Donkin, a Flight Commander with No 16 Sqn – were in agreement that 'The aircraft handled nicely and appeared suitable for Army Co-operation work in this respect.' Capel's letter was forwarded subsequently to the Air Ministry on 10 March; the AOC 22 Gp, AVM Bertine Sutton, concluding in his covering letter 'that this type of aircraft is suitable for Army Co-operation duties generally and during the short time that this aircraft was available, few disadvantages for this type of work were discovered.'[50]

However, the Old Sarum report did highlight two concerns that would later prove significant. Firstly, reservations were expressed with regard to the Lysander's cruising speed of 170 mph, which appeared 'slow in comparison with that of other modern aircraft (…) it is considered that the Army Co-operation pilot working alone in war time would require a considerably greater turn of speed.' Secondly, it was questioned whether the prototype aircraft's rear armament – a single 0·303" machine gun – was sufficient; 'in view of the modern Fighter (*sic*) equipment a quadruple mounting and guns would instil more confidence in the crew.'

The first Lysanders to reach the front-line entered service with No 16 Sqn in June 1938.[51] However, they were not the only new aircraft to be employed in the army co-operation role. In 1939 they were joined by a type not designed originally for army co-operation duties; the Bristol Blenheim. This was the result in part of a report by the Sub-Committee on Defence Policy and Requirements (DRC) of the Committee of Imperial Defence which recommended the conversion of '5 Army Co-operation Squadrons on 18 aircraft establishment to 7 of 12 aircraft establishment, and to raise 4

Auxiliary Army Co-operation Squadrons.'[52] After reviewing papers from a variety of sources relating to 'the reconnaissance requirements of the Field Force', in a minute to the Chief of the Air Staff dated 7 May 1936 the Director of Staff Duties (Air Cdre W S Douglas) stressed 'the question of night reconnaissance – its growing importance, how is it to be provided, and what aircraft shall carry out the work.' He recommended that 'of the seven squadrons allotted to the Field Force, two should be equipped with a light medium twin such as the Blenheim':

> 'These squadrons would normally be the squadrons working with Corps Headquarters. They would thus be suitably equipped and trained to undertake all tactical night reconnaissance; and, in addition, being better equipped defensively would be able to undertake most, if not all, of the photography required by their respective Corps. Further, when circumstances require two-way communication over 50 miles, they could be used for medium reconnaissance by day, which at such distances will normally be a Corps requirement.'[53]

No 53 Sqn duly reformed at Farnborough on 28 June 1937.[54] No 59 Sqn came into being at Old Sarum, also on 28 June 1937, 'as a Night Reconnaissance Squadron to work with the 2nd Corps (Southern Command in peace time).'[55] Both were initially equipped with Hectors, exchanging these for Blenheims in January and May 1939, respectively. To make room for the new squadrons, Royal Air Force Odiham had been taken over by No 22 Gp on 31 December 1936.[56] On 11 January 1937 a new wing headquarters – No 50 (AC) Wg – was established there, and on 9 February 1937 Nos 4 and 13 Sqns transferred to that station from Farnborough and Old Sarum respectively. [57] They were joined at Odiham by No 53 Squadron in April 1938.[58]

Further to the DRC's recommendations, the Royal Air Force's army co-operation capability was also bolstered on 1 June 1937 with the formation of three new army co-operation squadrons in the Auxiliary Air Force: No 612 (County of Aberdeen) (AC) Sqn at Dyce, No 614 (County of Glamorgan) (AC) Sqn at Pengam Moors and No 615 (County of Surrey) (AC) Sqn at Kenley. In keeping with their Auxiliary status, all three squadrons were administered by Bomber

No 53 (AC) Sqn's twelve smart new Blenheim IVs lined up for the Press at Odiham in early 1939. (RAF Museum P020547)

Command's No 6 (Auxiliary) Gp, rather than by No 22 Gp, but operational control was vested in the latter.

From Munich to War

By September 1938, therefore, the composition of No 22 Gp was as at Table 3. During the latter part of that month, the normal training routines of the army co-operation squadrons were disrupted by events in Europe. Escalating German demands with regard to Czechoslovakia led to the prospect of war; and from the weekend of 24-25 September the country as a whole began to prepare for a new conflict in Europe.[59] The UK's armed forces were also alerted. Some idea of the

Location	Unit
Farnborough	RAF Station HQ HQ No 22 (AC) Gp School of Photography Experimental Section, RAE No 1 Anti-Aircraft Co-operation Unit
Catterick	No 26 (AC) Sqn (Hector)
Hawkinge	RAF Station HQ No 2 (AC) Sqn (Lysander I/Hector)
Odiham	RAF Station HQ/HQ No 50 (AC) Wing No 4 (AC) Sqn (Hector) No 13 (AC) Sqn (Hector) No 53 (AC) Sqn (Hector)
Old Sarum	RAF Station HQ School of Army Co-operation No 16 (AC) Sqn (Lysander I/Audax) No 59 (AC) Sqn (Hector)

Table 3: No 22 (Army Co-operation) Group as at September 1938.[60]

seriousness of these precautions can be gleaned from the F540 compiled by No 16 Squadron. From 26 September, aircraft belonging to the squadron

> 'were camouflaged according to [the] new scheme of War markings. All leave was stopped and personnel on leave were recalled. Officers were not allowed more than 5 miles from the Station and were required to be on the telephone. The hangars and most buildings were darkened. Blue lamps were issued for use at night.'[61]

For at least two of No 22 Gp's squadrons, the crisis led to the temporary adoption of a new role – that of air defence. The Air Historical Branch narrative relating to the development and operations of RAF Fighter Command up to the end of the Battle of France notes that Army Co-operation squadrons were tasked with guarding 'each extremity of the fighter line, at Turnhouse near Edinburgh and at Old Sarum' for the duration of the emergency.[62] In the event of war, operational control of those Army Co-operation squadrons not

deployed overseas in support of an expeditionary force would have switched from the Air Ministry to that of the AOCinC Fighter Command, Air Chf Mshl Sir Hugh Dowding.[63]

A number of changes to the Auxiliary Air Force component of the RAF's army co-operation force took place in the autumn and winter of 1938. On 1 November, No 602 (City of Glasgow) (Bomber) Squadron left No 2 (Bomber) Gp and traded in its Hinds for Hectors, joining No 22 Gp as No 602 (City of Glasgow) (AC) Sqn; however, this change was to prove temporary, for on 14 January 1939 the squadron moved again, this time to No 12 (Fighter) Gp as a fighter squadron.[64] The status of the three existing AAF army co-operation squadrons was also in flux. Although all were transferred out of No 6 (Auxiliary) Gp in November 1938, only one – No 614 Sqn – went to No 22 Gp; No 612 Sqn was re-rolled as a general reconnaissance squadron in No 18 (Reconnaissance) Gp, while No 615 Sqn became a fighter squadron in No 11 (Fighter) Gp.[65]

In addition to the normal aerial resupply tasks undertaken by the army co-operation squadrons, in the summer of 1938 No 53 Sqn at Odiham engaged in trials with a rather larger aircraft. Between 28 May and 11 August 1938 one of the squadrons' Hectors was replaced by a Vickers Valentia; sorties being flown with the latter on 47 days during which a total of 5,160 troops were carried.[66] In addition, at the beginning of August the Valentia 'operated for three days dropping supplies, with and without parachutes, for the Scottish Command and for the Mobile Division. The tests were successfully completed and much useful information was obtained.' A report which appeared in *Flight* in October 1938 shed further light on these trials:

> 'Everyone who has seen a Hendon Display is familiar with the small canisters and parachutes used for dropping supplies to ground troops. Only small quantities can be dropped at one time, so during the past summer experiments were made in dropping various types of stores in bulk from a Valentia, without using parachutes. The aeroplane flew as slowly as possible into the wind at Turnhouse, and as low as possible. Tinned beef (the familiar "bully"), was only 10 per cent, damaged, biscuits were broken but were eatable, tea and sugar

A Lysander of No 225 Sqn. In effect, a state of the art RE8, the Lysander was just as vulnerable to anti-aircraft fire as the RE8 had been and it was even less able to cope with enemy fighters than its predecessor.

> could be dropped without damage if properly wrapped. It was found that one Valentia could thus drop enough food on one trip to supply 980 men for 24 hours. Condensed milk, jam, margarine, petrol and oil had to be dropped by parachute.'[67]

The despatch and return of the Air Component, 1939-1940

Following the outbreak of war a British Expeditionary Force consisting of two Corps was despatched to the Continent to operate in support of the French Army. Part of this force was an Air Component under the command of AVM C H B Blount. By May 1940 the Air Component included seven army co-operation squadrons: five equipped with the Lysander (Nos 2, 4, 13, 16, and 26 Sqns) and two with Blenheims (Nos 53 and 59 Sqns).

However, not all of the army co-operation assets available to the AOC were drawn from No 22 Gp. As long ago as 1932, Nos 18 (Bomber) and 57 (Bomber) Sqns – then co-located at Upper Heyford and equipped with Harts – were nominated for inclusion 'in the Royal Air Force complement of Contingent "A" of the Expeditionary Force.'[68] Whilst continuing to function as bomber squadrons within ADGB's Wessex Bombing Area (and later Bomber Command's No 1

(Bomber) Gp), during the 1930s personnel from both squadrons received training in army co-operation techniques and participated in exercises in order to prepare them for their role as part of the leading RAF echelon of any future Air Component.

The despatch of the Air Component did not mark the end of No 22 Gp, which continued to control the army co-operation assets remaining in the UK. These included both of the Auxiliary Air Force army co-operation squadrons. These were embodied prior to outbreak of war and relocated from their peacetime locations (at Ringway and Cardiff) to Odiham on 2 October 1939.[69] Here, they were joined by a new army co-operation squadron, No 225 Sqn, which formed on 3 October 1939 from 'the only available officers, NCOs and airmen of "B" Flight of the original 614 AC Squadron'.[70] In addition, an independent army co-operation flight – No 416 Flight – formed at Hawkinge on 1 March 1940, equipped with six Lysander IIs with a further three aircraft in reserve. Although disbanded on the last day of March, the flight was resurrected, again at Hawkinge, on 17 April, with the same aircraft establishment.[71]

In addition, No 22 Gp remained responsible for training aircrews for the army co-operation squadrons. In September 1939 an Army Co-operation Pool was established at Old Sarum as part of the School of Army Co-operation, charged with 'providing the replacement crews' for 'all single-engined Army Co-operation Squadrons', 'all twin engine Army Co-operation Squadrons and the 'twin-engined strategical reconnaissance Squadrons (At present Nos 18 and 57 Squadrons).' Given 'the limited size of Old Sarum aerodrome', twin-engined training was to be switched to Andover for daylight training, with Boscombe Down being used for night training 'until such time as the aerodrome at Andover had been sufficiently enlarged for night flying to be undertaken at that Station.'[72] Subsequently, the twin-engined training detachment at Andover became No 2 School of Army Co-operation in October 1939.[73] However, army co-operation training was hampered by the paucity of aircraft (particularly the Blenheims and Ansons required for twin-engined training), equipment and instructors available, and by the inclement weather experienced during the winter of 1939-40.

Due both to the chaotic nature of the Battle of France (which hampered accurate record keeping) and the subsequent loss of most of

the Air Component's records with the withdrawal of the latter's headquarters to the UK, it is difficult to comment with precision on the activities of the army co-operation squadrons after the opening of the German offensive in the west.[74] However, on reviewing the surviving squadron ORBs and other material it would appear that most of the sorties flown after 10 May 1940 were for tactical reconnaissance purposes, with comparatively little if any artillery co-operation work being undertaken. In July, an Air Ministry committee was established, under the chairmanship of Air Chf Mshl Sir Robert Brooke-Popham, to investigate the conduct of the air war up to the end of the Battle of France. It concluded that the Lysanders had been unable to carry out the normal duties of Army Co-operation aircraft after 10 May'[75]:

> 'Fighter escorts were nearly always necessary for enabling Lysanders to operate over the enemy. Generally speaking when no protection was afforded reconnaissance was carried out from over our own troops and in some cases fighter protection was necessary even then, as our Lysanders were frequently attacked on our side of the lines as existed.'[76]

Losses during the first nine days of the campaign were significant, and as the BEF withdrew towards the coast the number of secure airfields available to the Air Component dwindled. On 19 May 'Gort [the General Officer Commanding the BEF], Blount and the Air Ministry were in agreement that the Component could operate as effectively, and with a great deal more security, from the South of England'; squadrons began to evacuate by air and sea the next day, and 'By the evening of 21st May a few Lysanders of No 4 Squadron assigned to GHQ were the only Component aircraft left in France.'[77]

However, this did not mark the end of the Air Component's operations over France. Following their return to the UK, its Lysander squadrons continued to fly sorties over France from Bekesbourne (No 2 Sqn) and Lympne (Nos 16 and 26 Sqns) in Kent, supplemented by the Hectors of No 613 Sqn. Although the Blenheim squadrons were somewhat further away at Andover (Nos 53 and 59 Sqns) Watton (No 18 Sqn) and Wyton (No 57 Sqn), all nevertheless continued to fly sorties in support of the BEF, using Hawkinge as an advanced landing ground.[78] The Lysanders continued to fly tactical reconnaissance,

bombing and resupply sorties in support of the BEF until Operation DYNAMO came to an end on 4 June 1940. A graphic example of the nature – and danger – of the sorties flown by the Air Component squadrons at this time, and the confusion that often surrounded them, can be found in the account of the events of 27 May 1940 contained in the British official history of the Battle of France:

> 'At first light on May the 27th, in response to a request from the War Office received on the evening of May the 26th, twelve Lysanders dropped supplies of water in Calais and at ten o'clock in the morning seventeen Lysanders dropped supplies of ammunition in the Citadel while nine Fleet Air Arm Swordfish bombed enemy gun posts near the town. Three Lysanders failed to return and one of the Hectors which accompanied the Swordfish crashed at Dover. But unknown to Whitehall the Citadel had fallen before the War Office request was made to the Air Ministry; Calais was in enemy hands on the evening before the Lysanders set out on their costly mission.'[79]

Conclusion

I would like to conclude by returning to the charges levelled by Sir Maurice Dean. Was Army Co-operation 'a specialist art carried on, figuratively speaking, in dark corners and, to be plain, not taken very seriously'? It was certainly the case that Army Co-operation was something of a specialist art, but even the most cursory review of the mass of papers on this subject now closeted in The National Archives suggests that the Air Staff – many of whom, it should be remembered, were themselves former Army officers – took the issue rather more seriously than Sir Maurice's comments would suggest.

Were the activities of the RAF's specialist Army Cooperation squadrons 'all undiluted nonsense'? I would argue that this is unfair. The techniques that they were practising were established during a major conflict that wracked Europe only a matter of years before. I would suggest that Sir Maurice's judgement may reflect a problem with which all who now look back at the interwar period must grapple – the awareness that the period ends with a catalogue of British military failure. While that is, of course, the case, we need to recognise that hindsight is something of a distorting mirror; and that

the debacle of the Battle of France does not mean *per* se that all of the activities practised prior to that campaign were 'undiluted nonsense.

Notes:

[1] For example, when considering the evolution of close air support in the UK, the USA and Germany prior to the Second World War, Richard R Muller notes that 'compelling external factors led the RAF to neglect the mission of close air support' and as a consequence 'When the war broke out in September 1939, the RAF possessed a modern fighter defense system, as well as the foundation of a "strategic bombardment" force. But it possessed virtually nothing in the way of an army support capability, despite the strides made in a somewhat related area of air power application, "air control."' ('Close air support: The German, British and American experience, 1918-1941', in Murray, Williamson, and Allan R Millet (eds), *Military Innovation in the Interwar Period* (Cambridge: Cambridge University Press, 1996), pp163-64). James S Corum charges that the RAF was 'reluctant to work closely with ground forces or create an army support doctrine lest the airmen lose their independence and be made to serve under the command of ground officers' ('A Comprehensive Approach to Change: Reform in the German Army in the Interwar Period', in Winton, Harold R, and Mets, David R (eds), *The Challenge of Change: Military Institutions and New Realities, 1918-1941* (Lincoln, Nebraska: University of Nebraska Press, 2003), p52).

[2] *The London Gazette*, Issue 33549, 5 November 1929, p7080; Cooper, Sir Frank, 'Dean, Sir Maurice Joseph (1906–1978)', *Oxford Dictionary of National Biography*, Oxford University Press, 2004 [http://www.oxforddnb.com/view/article/31017, accessed 2 April 2012].

[3] Cooper, *op cit*; Air Ministry, *Department of the Chief of the Air Staff. List of Staff and Distribution of Duties*, Part II, July 1939 (Air Historical Branch collection), p1.

[4] Dean, Sir Maurice, *The Royal Air Force and Two World Wars* (London: Cassell, 1979), pp215-16.

[5] In his *Strategy for Victory: The Development of British Tactical Air Power, 1919-1943* (Westport, Connecticut: Praeger, 2008), David Ian Hall asserts that during the interwar period 'What little co-operation there was [between the RAF and the British Army] took place in the United Kingdom' (p22).

[6] Appendix 'A', 'Service Strength of the Royal Air Force by Squadrons: 22nd October 1918', *Memorandum by The Chief of the Air Staff on Air Power Requirements of the Empire*, Air Ministry, 9 December 1918 (The National Archives (henceforth TNA) WO32/5247). According to this source, 24 corps reconnaissance squadrons were deployed with the Expeditionary Force (including those squadrons in Italy and Salonika); 2 in India; 2 in Mesopotamia; and 3⅓ in Egypt.

Use of the term 'corps reconnaissance squadron' by the post-war Royal Air Force would appear to have been formalised in Air Ministry Confidential Order No 9, 'Nomenclature of Service Squadrons – France and Independent Force', promulgated by the Air Ministry on 15 November 1918 (Ministry of Defence Air Historical Branch (RAF) (henceforth MOD AHB(RAF)) collection). This order revised the terminology to be applied to squadrons serving with the British Expeditionary Force and the

Independent Force according to their function. Reconnaissance squadrons were divided into Corps Reconnaissance Squadrons, which equipped with RE8s, FK8s and/or Bristol Fighters; and Fighter Reconnaissance Squadrons which were (or were to be) equipped with Bristol Fighters, DH4s and/or DH10s.

[7] Reproduced in Ranft, B McL (ed), *The Beatty Papers: Selections from the Private and Official Correspondence and Papers of Admiral of the Fleet Earl Beatty*, Volume II, 1916-1927 (Aldershot: Scolar Press, for the Navy Records Society, 1993), Document 33, pp82-3. The original of this document can be found in TNA AIR8/17.

[8] According to Wg Cdr C G Jefford 'The RAF's nadir was on 1st March 1920 when it numbered just twenty-nine squadrons. Of these eight were in India; six in Egypt; two in Mesopotamia; one in Palestine; one in Malta; one in Germany; eight in the UK and two in Ireland. Seven of these squadrons existed only as cadres and few of the others were at full strength.' *RAF Squadrons: A Comprehensive Record of the Movement and Equipment of all RAF Squadrons and their Antecedents since 1912* (2nd Edition, Shrewsbury: Airlife, 2001), p12.

[9] Slessor, Squadron Leader J C, 'The Development of the Royal Air Force', *Journal of the Royal United Service Institution,* Volume LXXVI, No 502, May 1931, p324.

[10] Table II, 'Particulars of (I) Personnel of the Army, Navy, and Air Force and (II) Staffs (other than Industrial Staff) employed in various Government Departments'; in Cmd 2718 *Memorandum on Present and Pre-War Expenditure with Particulars of Governments Staffs at Certain Dates* (London: HMSO, 1926), p10.

[11] Source: Table III, 'Particulars of (I) Personnel of the Army, Navy, and Air Force and (II) Staffs (other than Industrial Staff) employed in various Government Departments'; in Cmd 1304 *Memorandum on Present and Pre-War Expenditure with Particulars of Governments Staffs at Certain Dates* (London: HMSO, 1921), p9.

[12] Cmd 467 *Royal Air Force. Permanent organization of the Royal Air Force: Note by the Secretary of State for Air on a Scheme Outlined by the Chief of the Air Staff* (London: HMSO, 1919), p3.

[13] Jefford, *RAF Squadrons*, *op cit*, p26; Hans Onderwater, *Second to None: The History of No II (AC) Squadron Royal Air Force, 1912-1992* (Shrewsbury: Airlife, 1992), p27. Although it is customary for the number of this unit to be written in Roman numerals, for consistency and clarity Arabic numerals are employed in this paper. On p18 of his *British Military Policy between the Two World* Wars (Oxford: Clarendon Press, 1980), Brian Bond, notes that the British garrison in Ireland 'totalled 53,000 troops in May 1919 and increased to the colossal total of 80,000 in July 1921'.

[14] Jefford, *ibid*, p27.

[15] AMWO 445/1923 'Nomenclature – Army Co-operation Squadron', 19 July 1923, paras 1-2. Paragraph 3 of this order went on to state that 'The aeroplanes of an army co-operation squadron will be known as "close reconnaissance", "artillery reconnaissance" or "photographic reconnaissance", according to the work they are engaged upon. The terms "contact" and "counter attack patrol" will no longer be used.'

[16] AP 1176, *Royal Air Force Manual of Army Co-operation* (2nd Edition, Air Ministry, October 1932), Chapter III, paras 9-15.

[17] Hughes, Major General B P (ed), *History of the Royal Regiment of Artillery: Between the Wars, 1919-39* (London: Brassey's (UK) in conjunction with The Royal Artillery Institution, 1992), p209.

[18] Source: 'RAF Squadrons, Flights & Carriers as at 30th September 1923' (TNA AIR9/36 Enc 26). The identities of the units in question were as follows: UK – Nos 2 and 4 Sqns; India – Nos 5, 20, 28, and 31 Sqns; Palestine – Nos 14 and 208 Sqns; Iraq – No 6 Sqn; and Aden – Aden Defence Flight.

[19] Robertson, Major F A de V: 'No 26 Army (Co-operation) Squadron', *Flight*, 10 August 1933, pp808-09.

[20] Jefford, *RAF Squadrons*, *op cit*, p26. Onderwater, *op cit*, states that 'two Flights of the Squadron returned to Farnborough in September 1922 while one Flight stayed in Ireland until February 1923' (p28).

[21] The School of Balloon Training was redesignated the RAF Balloon Centre on 3 November 1931 (Sturtivant and Hamlin, *op cit*, p76). On 19 November 1936 *Flight* reported that 'The RAF Balloon Centre, Rollestone Camp, has been renamed No 2 Balloon Training Unit with effect from November 1' and that 'No 2 Balloon Training Unit, together with Rollestone Camp, was transferred from the Fighter Command, No 22 (Army Co-operation) Group, to the Training Command and placed in No 24 (Training) Group on the same date' ('RAF Balloon Centre', p557).

[22] AMWO 354/1926 'Organisation of Air Defences and Inland Area Commands, 1926-27', 24 June 1926, as amended by AMWO 410/1926 'Organisation of Air Defences and Inland Area Commands, 1926-27', 22 July 1926; Jefford, *RAF Squadrons*, *op cit*, pp 26, 27, 31 and 32 .

[23] AMWO 250/24 'Formation of Nos 13 and 16 (Army Co-operation) Squadrons', 10 April 1924. No 16 (AC) Sqn continued to be tethered to the School of Army Co-operation for the next ten years. However, an entry in the squadron's ORB for 1 June 1934 (TNA AIR27/222) states that on this date 'No 16 (AC) Squadron ceased to be included in the establishment of the School of Army Co-operation and was allotted a separate establishment as an Army Co-operation Squadron at home. Workshops, Stores and Pay Accounting and certain other headquarters personnel although borne on the Squadron strength continued to be employed by the School of Army Co-operation. The Squadron, however, became entirely responsible for its personnel records, posting etc.'

In his *RAF Squadrons* (*op cit*) Wg Cdr C G Jefford notes that the policy of incorporating the official role of a squadron in the title of the latter came into effect from 27 March 1924 with the promulgation of in AMWO 218. This practice was 'officially terminated in May 1939 by AMO A185 which stated that roles were no longer to be reflected in the titles of units' (p16).

[24] AMWO 250/24, *op cit*.

[25] Chapter 3, 'Army Co-operation', attached to a memorandum from CAS to the Secretary of State for Air, 12 November 1924 (TNA AIR19/107). Hoare returned as Secretary of State for Air on 7 November 1924, having previously served in that position between 2 November 1922 and 22 January 1924; he relinquished it on 7 June 1929. Remarkably, Hoare would later become Secretary of State for a *third* time, holding the position for five days between 5 and 10 May 1940. List 2A, 'Secretaries

of State for Air', in D C Bateman (compiler), *Members of the Air Council and the Air Force Board of the Defence Council, 1918-* (MOD Air Historical Branch (RAF), September 1973), p6.

[26] AMWO 87/1925 'Formation of Army Co-operation Wing at Farnborough', 29 January 1925, as amended by AMWO 421/1925 'Formation of Army Co-operation Wing at Farnborough', 2 July 1925; Air Order 1576 'Formation of Army Co-operation Wing at Farnborough', Air Ministry, 3 January 1925.

[27] F540, No 22 Group, April 1926 (TNA AIR25/518); Ray Sturtivant, with John Hamlin, *RAF Flying Training and Support Units since* 1912 (Air-Britain, 2007), p286.

[28] F540, No 26 Sqn (TNA AIR27/317).

[29] The aircraft in question were: the Shorts Springbok, to Specification 19/21; the Hawker Duiker, to Specification 7/22; and the Armstrong Whitworth Wolf, to Specification 8/22. Mason, T (in collaboration with T Heffernan), *British Flight Testing: Martlesham Heath 1920-1929* (Putnam, 1993), pp158-59.

[30] *Ibid*, p160.

[31] Mason, Francis K, *The British Bomber since 1914* (London: Putnam, 1994), p171.

[32] Air Ministry Office Memorandum R/20/36, 3 March 1936 (Air Historical Branch collection).

[33] *Flight*, 2 July 1936, p35

[34] Robertson, Major F de V; 'The New Air Force', *Flight*, 24 June 1937, pp615-16.

[35] 'Memorandum of Staff Organisation for RAF at Home', (Appendix B to letter from Air Ministry to AOCinC ADGB, the AOCs Training and Coastal Commands and RAF Halton and RAF Cranwell, 4 May 1936), p7; on Air Ministry file S35818/35 Part I 'Organisation of Home Commands Consequent on Expansion Scheme "C"', opened 18 June, enclosure 39c (TNA AIR2/8875).

[36] 'Officers Seconded to RAF', *Flight*, 29 September 1921, p652.

[37] The officers in question were: Wg Cdr Andrew Wray Geddes, No 2 Sqn (Royal Artillery, re-seconded 19 April 1939); Sqn Ldr Ronald Clive Mackenzie Ferrers, No 26 Sqn (Cameronians, re-seconded 7 September 1939); Sqn Ldr Alan Ford Anderson, No 613 Sqn (Royal Warwickshire Regiment, re-seconded 24 October 1938); and Sqn Ldr Anthony Arthur Malan, No 614 Sqn (Royal Tank Regiment, re-seconded 16 January 1939). Entries in issues of *The London Gazette* for the interwar period indicate that all had completed one secondment with the RAF prior to being re-seconded in 1938/39 with the exception of Andrew Geddes, who had previously served with the RAF *twice* – first, between 2 October 1928 and 2 October 1932 (with No 4 Sqn) and subsequently between 19 October 1935 and 19 October 1938. During the latter secondment, Geddes served as a Flight Commander with the squadron he would subsequently return to command – No 2 Sqn.

[38] Jefford, Wg Cdr C G, *Observers and Navigators: and other non-pilot aircrew in the RFC, RNAS and* RAF (Shrewsbury: Airlife, 2001), pp52 and 106.

[39] Robertson, Major F A de V, VD, 'Old Sarum: The School of Army Co-operation', *Flight*, 29 November 1934, p1278.

[40] F540, School of Army Co-operation (TNA AIR29/678).

[41] *Ibid*.

[42] Robertson, 'Old Sarum', *op cit*, p1277.
[43] War Office Historical Monograph *Army air support and photographic interpretation 1939-1945*, undated (Department of Research and Information Services, Royal Air Force Museum, accession number RAFM 010600), p35. A copy of this monograph is also held by The National Archives under the reference WO277/34. I am indebted to the Keeper of Research and Information Services, Mr Peter Elliott, for alerting me to this source.
[44] Bowyer, Chaz, *RAF Operations: 1918*-38 (London: William Kimber, 1988), p83. The other squadrons comprising the Constantinople Wing were: No 25 Sqn (Snipe); No 56 Sqn (Snipe); No 203 Sqn (Nightjar); No 207 Sqn (DH9A); and No 267 Sqn (Fairey IIID) (*ibid*, p80).
[45] Accounts of No 2 Sqn's sojourn at Shanghai can be found in Onderwater, *op cit*, pp29-31.
[46] Meekcoms, K J, and Morgan, E B, *The British Aircraft Specifications File* (Tonbridge: Air-Britain, 1994), p201.
[47] Penrose, Harald, *British Aviation: The Ominous Skies, 1935-1939* (London: HMSO, 1980), pp10-11.
[48] Unless otherwise indicated, reports and correspondence in this and the following paragraph are contained on Air Ministry file S43641 'Introduction of New Type Westland Aircraft for AC Squadrons', opened 25 January 1938 (TNA AIR2/3234).
[49] A footnote to the entry for RAF Station, Old Sarum in the February 1938 edition of the *Air Force List* confirms that 'The OC this station also holds the appointment of Commandant School of Army Co-operation' (col 187).
[50] This letter was actually signed by No 22 Gp's SASO, Gp Capt John D'Albiac, for the AOC.
[51] F540, No 16 Sqn, entry for June 1938; TNA AIR27/222. The incoming Lysanders replaced not the Hector, but rather the earlier Audax; the entry in the squadron F540 for September 1937 states that 'By this time the Squadron was the only Army Co-operation Squadron at home which had not been re-equipped with Hector aircraft.'
[52] The Director of Organisation to the Director of Staff Duties, Department of the Chief of the Air Staff, Air Ministry, 24 February 1936; Air Ministry file S36519 'Formation of Additional Army Co-operation Squadrons', opened 11 October 1935 (TNA AIR2/1628), minute 13. This would appear to be a reference to DRC report DRC 37 'Programmes of the Defence Services, Third Report, Volume I' dated 21 November 1935, submitted to the Cabinet on 12 February 1936 (CP 26 (36), TNA CAB24/259).
[53] Air Ministry file S37511 'Provision of Squadrons to meet Reconnaissance Requirements of the Field Force', opened 14 February 1936 (TNA AIR2/1706), minute 14.
[54] F540, No 53 Sqn (TNA AIR27/503). According to this document, 'The Squadron duties were termed as more distant tactical reconnaissance and night reconnaissance, with special emphasis laid on the latter.'
[55] F540, No 59 Sqn (TNA AIR27/554).
[56] F540, No 22 Gp (TNA AIR25/518).

[57] Sturtivant and Hamlin, *op cit*, page 290; F540, No 22 Gp (TNA AIR25/518). On 4 February 1937 *Flight* reported that 'The name of the RAF Station, Odiham, will be "RAF Station, Odiham (No 50 Army Co-operation Wing)" ('RAF Station, Odiham', page 120)

[58] F540, No 53 Sqn (TNA AIR27/503).

[59] In his *Munich: The 1938 Appeasement Crisis* (London: Pocket Books, 2009), David Faber notes that 'Throughout the country Air Raid Precautions stations opened to distribute gas masks' on Sunday 25 September 1938, leading to that day being 'nicknamed 'gas mask Sunday' by the press' (p357); and 'When Britain awoke on the morning of Monday 26 September, war seemed imminent' (p356).

[60] Source: *The Air Force List: September 1938* (London: HMSO, 1938), col 151; Jefford, *RAF Squadrons*, *op cit*, pp26, 27, 31, 32, 36, 45 and 47.

[61] F540, No 16 Sqn, September/October 1938 (TNA AIR 27/222).

[62] James, T C J, *The Growth of Fighter Command, 1936-1940* (London: Whitehall History Publishing in conjunction with Frank Cass, 2002), page 43. A table on page 44 of this volume indicates that the AC squadrons tasked with fighter duties at Turnhouse and Old Sarum were Nos 13 and 59 Sqns respectively. The F540 compiled by No 59 Sqn does confirm that 'Instructions for [the] employment of Army Co-operation Squadrons in Home Defence' were received by the squadron on 28 September 1938 and that on the following day 'No 11 (Fighter) Group Battle Orders [were] received', a 'System of: "Battle", "Stand By" and "Stand Off" Flights instituted' and the 'Air Liaison Officer's office converted to [a] Squadron Operations Room' (TNA AIR27/554). However, *no* mention is made in that of No 13 Sqn (TNA AIR27/181) to the deployment of this squadron from its home station at Odiham to Turnhouse, or its employment in the fighter role; the only references to the crisis in this document being an entry on 25 September 1938 noting that 'All officers and airmen recalled from leave – State of Emergency exists', followed by a second stating that 'All restrictions on leave removed' on 17 October.

[63] *Ibid*, p43. In addition to Nos 13 and 59 Sqns, a number of other Army Co-operation squadrons would also appear to have put in train preparations to assume an air defence role should war have broken out at this time. An entry in No 4 Sqn's F540 dated 17 September 1938 recorded that the squadron had been 'given [the] Secondary Role of HOME DEFENCE in the event of the field force not proceeding abroad. War Station USWORTH.' (TNA AIR27/47; capitalization and emphasis as in original). On 26 September, No 16 Sqn at Old Sarum was 'ordered to prepare itself for service as a Fighter Squadron and training commenced immediately. A Battle Flight was organised' (TNA AIR27/222); on the same day, No 26 Sqn at Catterick 'stood by as a fighter squadron, prepared for action at one hours (*sic*) notice until October 5th, when precautions were relaxed' (TNA AIR27/317) and No 53 Sqn at Odiham was 'ordered to prepare for evacuation of Odiham, and move to Digby to assume the duties of a 'Fighter' Unit.' On 5 October the latter squadron's F540 compiler noted that the 'European Crisis very much easier – squadron given permission to unpack and resume normal flying training' (TNA AIR27/503).

[64] F540, No 602 Sqn (TNA AIR27/2073).

[65] F540, No 614 Sqn (TNA AIR27/2073); No 612 Sqn (TNA AIR27/2112); and No 615 Sqn (TNA AIR27/2123).

[66] F540, No 53 Sqn, May-August 1938 (TNA AIR27/503). Two officers from other army co-operation squadrons were attached to No 53 Sqn in order to act as 1st and 2nd pilots for the Valentia; Flt Lt Brian Roberts of No 26 Sqn (28 May-17 August 1938) and Fg Off Edward Campbell-Voullaire of No 4 Sqn (25 May-31 August 1938). The F540 records both the number of days on which the Valentia was flown and the number of troops that it carried on a monthly basis, as follows:

Month	**Number of days used**	**Number of troops carried**
May	11	860
June	**16**	1,380
July	**20**	2,920
August	3	–
Total	**50**	**5,160**

[67] 'Supply Dropping', *Flight*, 27 October 1938, p375.

[68] F540, No 57 Sqn, September-October 1933 (TNA AIR27/537). According to Air Staff Memorandum No 45 (SD62) 'Royal Air Force Contingent accompanying an Army Expeditionary Force Overseas', 1930 (TNA AIR10/1473), squadrons earmarked to form Contingent A of an expeditionary force were to be 'in a position to mobilize at short notice and to be ready to move seven days after the order to mobilize' (para 5, p3).

[69] F540, Nos 613 and 614 Sqns, August-October 1939 (TNA AIR27/2117 and AIR27/2120).

[70] F540, No 225 Sqn, October 1939 (TNA AIR27/1393).

[71] F540, No 416 Flight (TNA AIR29/863).

[72] Letter from the Director of Organisation to the AOCinC Fighter Command, 23 September 1939, on Air Ministry file S1949 'Army Co-operation Group Pool Training Requirements', opened 21 September 1939 (TNA AIR2/3122), enclosure 8A.

[73] Sturtivant and Hamlin, *op cit*, p67.

[74] In his survey of British air operations during the BEF's withdrawal to the Escaut, official historian Major L F Ellis comments that 'the loss of Air Component records of these days makes it impossible to note their actions in detail' (*The War in France and Flanders 1939-1940*, London: HMSO, 1953, p72). The circumstances surrounding the loss of these records are recounted in the War Diary compiled by HQ Air Component covering the period 9-27 May 1940. This records that this headquarters 'evacuated to BOULOGNE by special train' on the night of 17/18 May 1940. Here, 'all files, records etc were placed in a shed behind the GARE MARITIME' and the rest of the headquarters 'kit remained on [the] railway platform.' On the morning of 20 May 1940 the personnel of the headquarters were evacuated from the port in some haste, 'leaving all the kit and the records behind, it being understood that the same would follow on by a later boat.' However, 'As it turned out, the kit, etc, was never brought back to [the] UK. It was subsequently stated

by the harbour staff that they threw it all into the water at a place covered at low tide.' 'Report on the War Employment of the RAF Component' (TNA AIR35/285).

[75] 'Report of a Committee to Investigate War Experiences 1939-40', 16 July, paragraph 76, p20 (TNA AIR20/4325).

[76] *Ibid*, paragraph 14, p5. This view was contested subsequently by the AOC of the Air Component, AVM Charles Blount, who in a letter to the Under-Secretary of State for Air dated 30 July 1940 stated that 'Lysander aircraft did, in fact, after 10th May, undertake the bulk of the close reconnaissance, though the depth to which they penetrated and the length of their sorties were heavily restricted' (copy on TNA AIR20/3545, enclosure 7A).

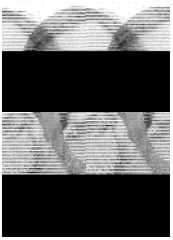
[77] Richards, Denis, Royal Air Force, 1939-1945, Volume 1: *The Fight at Odds* (London: HMSO, revised edition, 1974), p126.

[78] Control of operations over France after the withdrawal of the Air Component was vested in a rear headquarters – BACK VIOLET – established at RAF Hawkinge on 20 May 1940. The SASO at HQ 22 Gp, Gp Capt John Vachell, served on the staff of this headquarters until 1 June 1940. In a report submitted to the Air Ministry on 1 June, Vachell stated that No 18 Sqn were to reassemble at Wyton and No 57 Sqn at Watton (para 4, p2); however, entries in the F540s for the squadrons in question (TNA AIR27/243 and AIR 27/537 respectively) indicate that the reverse was the case. He goes on to note that 'No 50 Wing, comprising Nos 4 and 13 Squadrons, were so depleted that they were not used at all. After the first few days No 70 Wing, comprising Nos 18 and 57 Squadrons, were in a similar condition and the brunt of the Blenheim Reconnaissance fell upon No 52 Wing, and its squadrons, Nos 53 and 59' (para 30, p11). Although No 613 Sqn was made available by AOC 22 Gp for operations over France, 'It was not possible to use Nos 614 and 225 Squadrons, at Odiham, owing to their having been placed at the disposal of the Commander-in-Chief, Home Forces, in the event of invasion' (para 32, p12).

[79] Ellis, *op cit*, p170. Although the F540s maintained by the Lysander squadrons at this time are in many cases incomplete, it would appear that the three aircraft lost were all drawn from No 16 Sqn, operating from Lympne (TNA AIR27/317). In paragraph 21 of his report to the Air Ministry (p8), Vachell noted that the Lysanders despatched in mid-morning were accompanied by 'six Hectors of No 613 Squadron, and nine Swordfish of No 815 Squadron which had been placed at my disposal by the CinC Coastal Command, armed with bombs which it was hoped would keep the defenders' heads down and reduce the amount of anti aircraft (*sic*) opposition encountered' (TNA AIR35/307).

FROM ARMY CO-OPERATION TO FIGHTER RECONNAISSANCE – DEVELOPMENTS 1939-1945

Peter Elliott



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My aim this morning is to describe the way in which the RAF's roles in support of the Army changed between 1940 and 1945. I will look at:

- Organisation – evolution from Army Co-operation Command into Tactical Air Force.
- The main roles:
  - Tactical Reconnaissance (TacR).
  - Artillery Reconnaissance (ArtyR).
- Aircraft used.
- Operations – although I will focus on Northern Europe, we should bear in mind that the tactics used were developed and refined earlier in the war, in campaigns such as the Middle East and Italy.

Organisation

In the second half of 1940, while the three Services were preparing to repel a German invasion and the RAF was fighting the Battle of Britain the Air Staff were considering ways in which to regroup the army co-operation units that had suffered heavy losses in the Battle of France. In October 1940 the Chief of the Air Staff circulated a paper to the Air Council 'setting out recommendations agreed between the Air Staff and the General Staff for the formation of a Royal Air Force Command for army co-operation.'[1] This was approved and Army Co-operation Command was formed on 1 December from No 22 Gp of

No 34 Wg: Strategic Reconnaissance for 2TAF	
No 16 Sqn	Spitfire XI
No 140 Sqn	Mosquito XVI
No 69 Sqn	Wellington XIII
No 35 Wg: 84 Group, 1st Canadian Army	
Nos 2 & 268 Sqns	Mustang IA
No 4 Sqn	Spitfire XI
No 39 Wg: 83 Group, 2nd British Army	
Nos 168, 414 & 430 Sqns	Mustang I
No 400 Sqn	Spitfire XI

2TAF's Reconnaissance ORBAT as at mid-1944.

Fighter Command. Sir Arthur Barratt was appointed AOCinC, with Brigadier J E Woodall as his Senior Air Staff Officer, in accordance with the edict that 'The staffs should contain a strong representation of Army Officers.'

The Command initially comprised two Groups. No 70 Gp was responsible for training, including: the two Schools of Army Co-operation (at Old Sarum and Andover); the Central Landing Establishment, training airborne forces at Ringway; 'the AOP Flight' and Anti-Aircraft and Searchlight Co-operation Flights. No 71 Gp was responsible for operations and controlled 'those squadrons allotted to Army formations in Great Britain.' The operational side of the Command was regrouped in August 1941 as Nos 32, 33, 34, 35 and 36 Wings. Each wing was allocated to an Army Command covering an area of the UK.[2]

In March 1943 the Air Ministry issued an instruction that AC squadrons were to be referred to as fighter reconnaissance or (in the case of those equipped with twin-engined types) bomber reconnaissance units. With the phrase 'Army Co-operation' effectively abolished, the command itself was disbanded on 31 March 1943; by that stage it had no less than seven wings, most of which were disbanded a few months later, leaving just Nos 34, 35 and 39 Wgs all of which eventually became part of the 2nd Tactical Air Force. No 34 Wg was 2 TAF's strategic reconnaissance wing; No 35

Wg worked with the First Canadian Army as part of 84 Group while No 39 Wg was allocated to 83 Group and worked with the British Second Army. Since No 39 Wg included three RCAF squadrons, it had originally been intended that 83 Group would be allocated to the Canadian Army and 84 to the British, but the two groups were re-assigned in February 1944.

In the Middle East units such as Nos 208 Sqn RAF and 40 Sqn SAAF were allotted to XIII and XXX Corps and did much to develop tactics and techniques. They then went on to the Italian campaign as part of the 6½ squadrons responsible for satisfying the TacR and ArtyR demands of 5th and 8th Armies and V Corps.

The number of squadrons in the UK rose from thirteen in 1941 to a peak of thirty in 1942-43. By the end of the war, only five squadrons were operating in North West Europe, partly because the AOP squadrons took over some of the work and partly because information was also being received from fighter and bomber support operations.

Tactical Reconnaissance

The role of tactical reconnaissance has been defined as 'To provide information that may have an immediate effect on the current battle; it may be either visual or photographic, by day or night, depending on the particular tasks to be undertaken. The increased mobility of armies necessitates deep penetration by TacR, and makes impossible a strict division between TacR and Strategic Reconnaissance.' [3]

Clive has already described the role of Army Liaison Officers; (ALO) clearly they were a very important link in the information chain, briefing and subsequently debriefing aircrew and translating both requests for sorties and the information gathered from them into terms that enabled both soldiers and airmen to gain the best advantage.

If we take TacR in 2 TAF as a case study, we find that sorties break down under three headings:[4]

- Visual reconnaissance – this is the largest category in terms of numbers of missions. Photographs would often be taken for evidence and subsequent examination
- Low level tactical photography – these were mainly obliques, taken for intelligence purposes. Vertical photography was possible but there were equipment difficulties.
- ArtyR.[5]

One of a series of pictures of the beaches taken by Air Cdre Andrew Geddes, Air Cdre Ops at HQ 2TAF (but actually a substantive major RA on secondment to the RAF) from a Mustang on D-Day.

In the period leading up to D-Day the AC squadrons were kept busy helping to build up a picture of the German defences and troop deployments and also contributing to the watch on the V-weapon sites that were being constructed in France.

We heard earlier about contact patrols monitoring the progress of troops in No Man's Land during WW I: the Second World War was more fluid and although communications were better, it was still necessary on occasion to locate our own troops and assess how operations were progressing. One example of this is Air Cdre Geddes' flight along the Normandy beaches on D-Day, and we have in our collection, here at Hendon, some of the images he took showing the landings under way. In the Far East jungle made it very difficult to keep track of troop positions and contact patrols became an important

part of the Hurricane squadrons' operations.

Visual reconnaissance at night was undertaken by Wellingtons of No 69 Sqn. The front turret was replaced by a Perspex nose in which the bomb aimer sat to make observations; he could also take photographs to back these up, using flash cartridges mounted in a reloadable discharger. The normal operating height was between 100 and 4,000 feet.

Low level photography could be used for a variety of purposes and therefore came in a number of flavours:

- Oblique Line Overlaps – for the study of river banks, topography, defence positions and anti-tank obstacles.
- Merton photographs – used in the context of ArtyR.
- Oblique and Vertical pinpoints – for the study of bridges, gun positions, strong points, etc.

We often think of high level vertical photography as being carried out by the PRUs and by the specialist squadrons numbered in the 500-series and controlled by Coastal Command, but 2TAF had two squadrons of Spitfire XIs, which produced large scale cover of the battle front and rear areas for intelligence and planning purposes, especially for major operations such as the Rhine crossing. Finally, Mosquitos of No 140 Sqn carried out night photography.

The Society's April 2011 seminar included a paper on the RAF's Mobile Field Photographic Sections[6] and the support that they provided to the recce units but, as a reminder of the scale of their work during the campaign in North West Europe, aircraft of Nos 83 and 84 Gps took over 1·1 million exposures, with an estimated 12·6 million prints being made.[7]

Artillery Reconnaissance

It had been made very clear in France in 1940 that the Lysander could not operate in its Army Co-operation role unless air superiority had been established – an unlikely scenario. The Army had been calling since 1938 for its own aircraft and pilots to observe artillery fire but the Air Staff were opposed to the creation of special air units for artillery observation or reconnaissance, unless it could be clearly shown that there was an urgent requirement for such units which could

not be met by AC squadrons.[8]

Barratt asked his two groups for their views on the way in which aircraft could work better with the guns. A report from HQ 70 Gp[9] on the future role of AC squadrons indicated that the School of Artillery had identified four roles:

- Observation of the forward zone to supplement ground OPs.
- Continuous observation of a hostile battery area.
- Occasional observation further over the enemy lines, to register targets or direct the fire of long range guns.
- Photography on which to base future fire plans and assess the accuracy of fire previously put down.

and had put forward three possible ways to improve work with the guns:

- Train RAF officers at the School of Artillery.
- Second RA officers to AC squadrons for artillery work.
- RA officers to fly as observers in Blenheims or Glen Martin aircraft.

The Polish AC squadron (No 309) had effectively already adopted the latter principle, as its observers were qualified gunner officers. Barratt wrote, 'Here the pilots are relatively unintelligent and are used as chauffeurs. On the other hand the observers, following Polish custom, are fully trained military observers and do all the work.' [10]

The training element – No 71 Gp – pointed out that:[11]

- Naval gunnery observation procedure was faster and suggested its adoption.
- Faster Morse (20 wpm, as used by Naval observers) or the use of R/T would speed up the process.

The 1940 Edition of AP 1176[12] still had a chapter on balloons, but 70 Group remarked, 'If balloons are better, then let the Army have them instead, with RAF assistance in the background.' I have also found a reference[13] to a letter from Army Co-operation Command regarding the Army's desire to have its own Air OPs recommending

that 'the War Office should be approached as to the possibility of developing man-lifting kites as a substitute' – back to the days of Cody!

Barratt drew all these issues together in a paper to the Secretary of State for Air in January 1941,[14] pointing out that conditions had changed from WW I, not least the style of warfare: 'The Field Regiment of 24 guns can now be shot as a single battery and […] a single observation post, given good command, can switch and concentrate the fire of a mass of artillery with almost the ease which 25 years ago could only be attained with a single battery.' He went on to explain that experiments were being carried out at No 1 School of Army Co-operation in one of which,[15] a Lysander pilot (Sqn Ldr J A C Fuller) had used the RA's own method of correction, rather than the clock code, despite having had no training. The report suggested that:

1. Artillery fire orders should replace the old clock code.
2. Radio Telephone should replace Wireless Telegraphy.

Whereas the clock code had been used to report where the rounds were falling, and the gunner officers then had to work out the corrections to pass to the guns, the new system gave the pilot the responsibility for those instructions: range was adjusted with (say) 'Add 200' (yards) or 'Drop 300' whilst the line was corrected with 'Left' or 'Right' and an approximate distance.

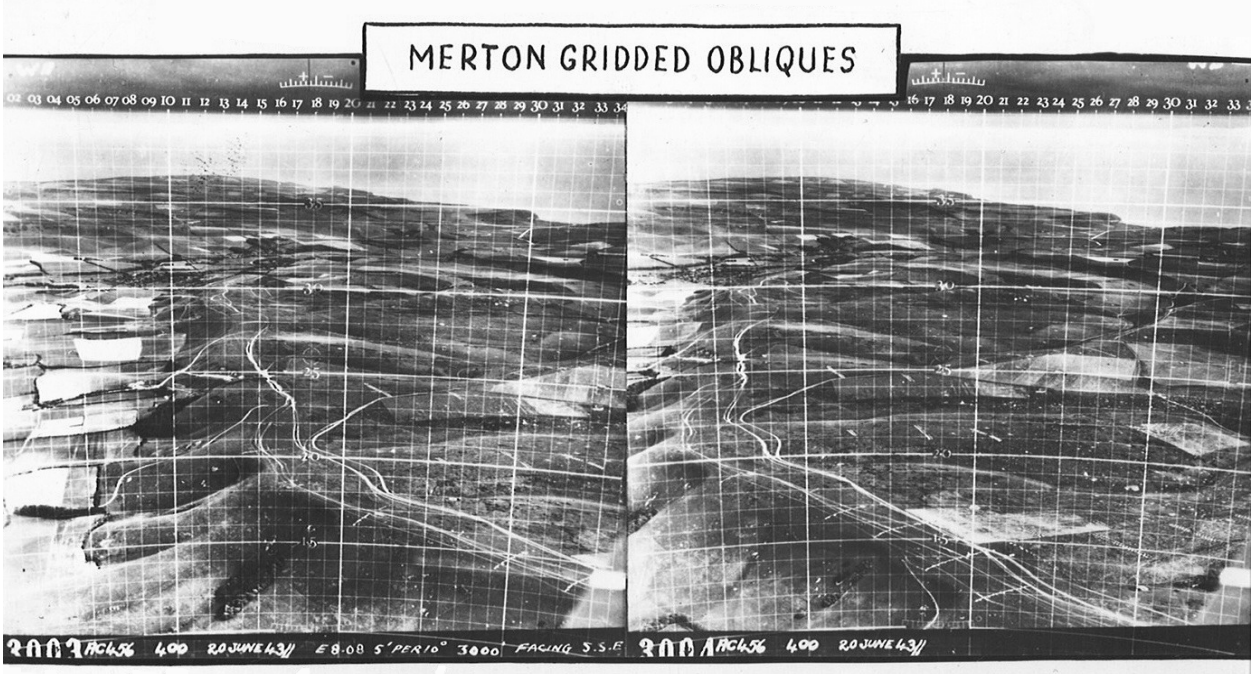
Barratt was unconvinced – he had been an Artillery Officer before joining the RFC in 1914 and had used the clock code; Brigadier Duncan, the senior artillery officer at Eastern Command, held similar views, but others were more receptive. Barratt noted that there was a 'falling off in efficiency due to propagation of rumour as to other and better methods than those shown in AP 1176.'[16]

Nevertheless, progress was being made, and a joint trial held by the School of Artillery and the School of Army Co-operation on 27 March 1941 concluded that the Artillery Method was simpler, quicker and more efficient than the clock code.[17] Barratt disagreed, criticising the design of the trial and was 'not prepared to ask the AC pilot to control the shoot from the air by ordering the guns left or right, or add or drop. I am already certain that this has always been beyond the ability of the normal man in the air and this is increased by my knowledge of the standard of AC pilot we are likely to get.'[18]

Successor to the Lysander, a Tomahawk of No 26 Sqn.

A few months later Barratt saw the light and wrote to the Air Ministry to report on a trial 'with pilots both skilled and unskilled from a normal AC squadron equipped with Tomahawk aircraft.' Following discussions at Larkhill in June he wrote, 'I am satisfied that […] it is both simple and practicable for the normal AC pilot to carry out the procedure proposed by the School of Artillery while flying either the Lysander or the single-seat fighter type.'[19] The War Office and Air Ministry eventually agreed that the new method should be introduced with effect from 15 July 1941[20] and 'Notes On Air Observation By Artillery Methods' were drafted, setting out the process. This was later published by the War Office as 'Co-operation With The RAF'.[21] It was subsequently found that even this system was either impracticable or too complicated, and an 'Agreed Point Method' devised[22] in which a landmark such as a crossroads would be the initial aiming point and fire then directed onto a nearby target.

We heard earlier about the need for large-scale trench maps to enable the gunners and aircrew of WW I to communicate effectively. Finding a target some four miles away on a map while flying at 600 feet could be tricky, and the fluid nature of WW II meant that cartographers were often unable to keep up with developments – so how could the pilots and the gun crews sing from the same hymn sheet? One answer came in the form of Merton photographs: these were developed around 1941 by a Major John Merton RA who was based at the School of Artillery. A Merton photograph was an oblique aerial photograph overprinted with a grid, which gave enough



The creation of Merton obliques was a trifle complex but suffice to say that it involved two photographs of the same terrain taken from slightly different vantage points and superimposing a grid that could be used to provide the co-ordinates of a specific feature.

The Tomahawk's replacement, a Mustang I of No 2 Sqn.

precision for a likely target to be located.[23] In some theatres Merton photography could make up a sizeable proportion of the overall task: although demand for such photographs was relatively low in 2nd TAF, it was noticeably higher in Italy, perhaps because this was a less fluid campaign for which the Germans had prepared defensive lines.[24] In 1942 instructions were given to wings that 'FR squadrons are to undergo such training as will ensure that all pilots are efficient in carrying out ArtyR using gridded oblique photographs.'[25]

Aircraft

Clearly there was a need to replace the Lysander, ideally with something fast and manoeuvrable, with a range of the order of 600 miles to allow for deeper penetration behind the lines. Single-seat fighters would work well, and some units – especially in the Middle and Far East – used Hurricanes successfully, but these were still in short supply. It was therefore decided in 1940 to re-equip the AC squadrons with the Vultee Vengeance and Brewster Bermuda, which were no longer required as dive bombers, but these in turn proved to be unavailable as the factories could not build the aircraft in sufficient numbers, and the Bermuda had a number of problems.[26] The Curtiss Tomahawk, however, was available and in 1941 the re-equipment of fourteen squadrons began. Serviceability proved to be poor, due to

engine problems, and at the start of 1942 the decision was made to re-equip with the Mustang.

The Allison-engined Mustang I proved to be a very capable reconnaissance fighter – fast and a stable platform for photography – and it eventually equipped all the home-based AC squadrons.[27] Unlike the Tomahawk, however, the Mustang was not able to take vertical photographs.

A few Typhoons were converted to the fighter reconnaissance role for use in 2TAF, with the port inner cannon replaced by three cameras (two oblique and one vertical) but the Typhoon had insufficient range and the camera installation was not ideal. A meeting held on 25 October 1944 concluded that there was a strong case for acquiring the Merlin-powered Mustang for AC work, although they actually carried fuel in the areas used in earlier marks for cameras and, in any case, Fighter Command had a prior claim on the Mustang III as long range escorts. As a result the Mustang's successor was not the unsatisfactory Typhoon but the Spitfire XIV which, despite its comparatively poor range, carried an oblique camera and could be converted to carry a vertical one.[28] Although the Hurricane carried on in the Far East, the Middle East squadrons suffered significant casualties and they were eventually re-equipped, first with Tomahawks, and eventually Spitfire IXs.

Operations

An Army training pamphlet issued at the end of 1942 explained that 'Whenever possible ArtyR aircraft carry out [their] tasks by flying behind our own forward localities. On some occasions, however, it may be necessary to fly over enemy positions…'[29] We will look this afternoon at the Army's Air Observation Posts, but it is worth noting that a September 1945 report on tactical reconnaissance in 2TAF, records that the AOP 'has greatly reduced this commitment by the removal, as an RAF responsibility, of all close front line artillery spotting, leaving the Tactical Reconnaissance squadrons free to concentrate on that type of Artillery Reconnaissance which requires a fairly deep penetration into enemy territory.'[30] 2TAF reported at the end of the war that 11,397 sorties had been flown on tactical reconnaissance throughout the campaign, of which approximately 5% were primarily concerned with ArtyR.'[31]

	Naval Gunnery Control	TacR	Total
D	107	9	116
D+1	60	32	92
D+2	51	13	64
D+3	–	–	–
D+4	42	39	81

Number of gunnery direction missions (all flown as pairs, so double these figures for the number of sorties) flown over the beaches. The weather precluded operations on D+3.

Single-seat aircraft such as the Hurricane and Mustang frequently flew in pairs, with the 'weaver' keeping a look-out for enemy aircraft; he could also take over the shoot if his leader had radio problems.

RAF aircraft played an important role in spotting for the naval bombardment on D-Day. The Operation Instruction, issued in January 1944[32] tasked five RAF squadrons[33] and No 3 Naval Fighter Wing. Aircraft would fly in successive waves every 45 minutes, with twelve waves in a cycle which would be repeated up to three times. Each aircraft was allocated two targets, although they could also use their discretion 'to engage vital military targets which the pilot observed in his area'; the pilots were allotted to work with specific ships, and their radios were tuned to a designated frequency for that ship. The aircrew were provided with photographs of their targets marked with a clock face; rather than the pilot giving fire orders, 'in Naval spotting the pilots merely report the fall of shot and the necessary corrections are applied by the naval gunners.'[34]

Laurence Irving was 35 Wing's Intelligence Officer and he states in his memoir, 'Though the saturation of the defences by our bombers had kept the heads of the enemy down, it was the accurate gunnery of our ships, directed at target after target as our pilots reported their destruction, that enabled our troops to overrun these beaches with minimal losses. Having completed this task successfully, for the rest of the day our squadrons quartered inland approaches for signs of any movement of *Panzer* units towards the coast. By nightfall we had flown 74 of the 1,050 sorties ordered by 84 Group and had lost but one of its eight aircraft missing in the course of finding and destroying

a score of tanks and other vehicles.'[35]

Naval bombardment continued on a reduced scale, under the control of Nos 26 and 63 Sqns, mostly against targets of opportunity, while the other squadrons were released for TacR sorties. By D+4 these five squadrons had lost seven aircraft, with two pilots killed.

The successful co-operation on D-Day led to the publication of a Joint Service document in 1945 which included both the Army and Naval instructions for directing fire, enabling ships to be controlled by either aircraft or observers ashore.[36]

In the early days after the invasion, aircraft would often be tasked with visual reconnaissance of main roads for enemy troop movements, but this declined once the Germans started to move by night or on lanes and by-ways, so area searches became more prevalent.[37] Pairs of aircraft would usually fly in line abreast at heights between either 3,000-5,000 or 5,000-6,000 feet, aiming to avoid *Flak* by changing height continuously by at least 1,500 ft and course by 30 degrees.[38]

Tasking for the FR wings was decided at a planning meeting held at the Army HQ shortly after the end of each day's flying. The battle front was divided into a variable number of tasks at the wing's discretion; the Army side would indicate their priorities for the next day and the flying programme would then be planned. If the need for a special mission arose during the next day a demand would be passed to the Wing HQ, who would decide whether it could be handled by an existing task or require a separate mission.[39]

As I mentioned earlier, pilots were briefed and debriefed by the ALO and the report would be passed by telephone and teleprinter to the Army HQ. Urgent reports – such as targets suitable for attack by fighter bombers – would be transmitted by the pilot by R/T to the Group Control Centre, or to their base airfield – Group could then task units as required, and other reports would be passed to the Army HQ for dissemination to ground forces. Towards the end of the campaign aircraft often worked with Contact Cars – usually a half-track or scout car carrying an Army Liaison Officer and an RAF officer who could talk both to the aircraft and Army formations to which they were assigned, and these first appeared in the Italian campaign.[40] Clearly this could improve the flow of information by shortening the links between the aircraft and their customers on the ground.

Conclusions

Although the role of the AC squadrons in the Second World War had a lot in common with that of their predecessors, the tools that they were given to do the job gave them many advantages. Slow, vulnerable aircraft were replaced by more capable fighter reconnaissance types, much more able to look after themselves and with longer range that enabled deeper penetration, as required by the more mobile style of warfare. Photography, with rapid film processing and interpretation had also advanced, and the close liaison between RAF and Army units helped to speed the flow of information.

The direction of artillery fire by both the RAF's AC squadrons and the Army-manned Air OPs had increased the accuracy of gunnery and enabled the Royal Artillery to inflict much more damage on the enemy for a given weight of fire. This was particularly important where ammunition was in short supply..

In the course of five years the RAF had moved from merely *co-operating* with the Army to become almost a fully integrated part of the land battle.

Notes:

1 TNA AIR6/60. Air Council Memorandum 81(40).

2 It is interesting to observe that the Rear HQ of No 71 Gp was originally located on the Wentworth Estate but in March 1941 it moved to the Dormie House Golf Club at Sunningdale – somebody evidently had their own interpretation of the phrase 'command bunker'…

3 RAFM R020589. WO Code 7150 Air Reconnaissance. Part I – General, June 1946.

4 TNA AIR37/54. 2nd Tactical Air Force: Tactical Reconnaissance, 1944-1945: Report.

5 *Ibid*, page 1

6 See Journal 51.

7 TNA WO277/34 (also RAFM 010600). Army Air Support and Photographic Interpretation, 1939-1945, Appx V.

8 TNA AIR39/47. Artillery Reconnaissance Co-operation: Policy, Enc 1A. Air Cdre Goddard (DMC) to Barratt, 8 December 1940.

9 *Ibid*, Enc 6A. 18 December 1940.

10 TNA AIR39/93. Re-arming of Squadrons with Tomahawk Aircraft, Enc 26A.

11 AIR39/47. Artillery Reconnaissance Co-operation: Policy, Enc 11A, 29 December 1940.

12 TNA AIR10/2293. Royal Air Force Manual of Army Co-operation, 3rd edition, 1940.

[13] TNA WO277/34. War Office Historical Monograph: *Army Air Support And Photographic Interpretation, 1939-1945*, p 34.
[14] TNA AIR39/47. Enc 15B, Report on Artillery requirements in Air Co-operation as they affect Royal Air Force commitments.
[15] *Ibid*, Enc 48C, Artillery Co-operation tests, 11 April 1941.
[16] *Ibid*, Enc 53A, Barratt to DMC,, 14 April 1941.
[17] *Ibid*, Enc 55B, Report on trials in the use of Artillery methods of ranging in place of the clock code, 27 March 1941.
[18] *Ibid*, Barratt to GHQ Home Forces, April 1941.
[19] *Ibid*, Enc 85A, Artillery Reconnaissance procedure, 24 June 1941.
[20] TNA AIR39/48, Enc 3A, DMC to HQ ACC, 3 July 1941.
[21] Artillery Training Volume II: Supplement 3.
[22] TNA AIR37/54, page 17.
[23] TNA WO287/175. For full details of Merton photographs see Gridded Oblique Photography (Merton Method), 1941.
[24] TNA AIR37/54, page 10.
[25] TNA AIR39/131, Enc 29A, ArtyR – Use of gridded oblique photographs, 16 September 1942.
[26] TNA AIR20/2172. Bermuda I Statement Of Development Position, September 1942. Problems included brakes that seized when cold and faded when hot, high levels of carbon monoxide on the ground and when climbing, and no oxygen system.
[27] TNA AIR10/5547 (also RAFM X001-0393). AP 3235, AHB monograph *Air Support*, page 203.
[28] AIR37/54, page 2.
[29] RAFM R017315. 26/GS Publications/867, Artillery Training Volume III: Field Gunnery, Pamphlet No 8 Co-operation with the RAF, December 1942;
[30] AIR37/54, page 13
[31] *Ibid*.
[32] TNA AIR37/821. Operational instruction No 1: Spotting For Naval Bombardment.
[33] Nos 2 & 268 Sqns (Gatwick), No 414 Sqn (Odiham), No 3 Naval Fighter Wing (Lee-on-Solent), Nos 26 & 63 Sqns (Lee-on-Solent).
[34] AIR37/54, page 21.
[35] Irving, Laurence; *Great interruption* (Shrewsbury, Airlife, 1983) page 151.
[36] TNA AIR 10/3739. AP 3127, Bombardment Spotting Instructions (Naval), 1945.
[37] AIR37/54, page 3.
[38] *Ibid*, page 7.
[39] RAFM 003973. 84 Group, Air Recce, circa 1945.
[40] AIR37/54, pages 8-9.

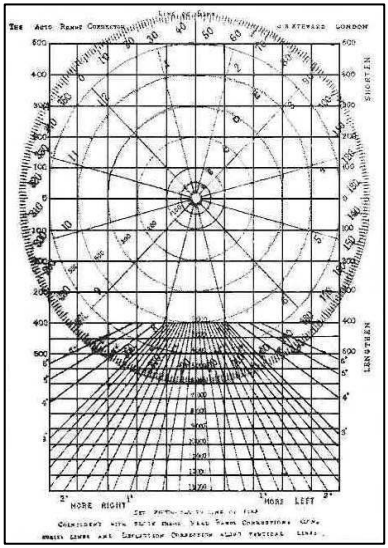
MORNING DISCUSSION

Mike Meech. Jeff – you got a remarkable amount into that 40 minutes. Perhaps I could add a few thoughts on 1916, which was a particularly significant year. In particular, the Royal Artillery made a bid to take over the corps squadrons. There is correspondence on this at Kew but, in essence, the gunners wanted to handle gunnery direction themselves using their own observers. Trenchard resisted, successfully, on the grounds that pilots did most of the actual spotting.

Some experimental night artillery shoots were carried out in 1916, not all that successfully, although they tried again in 1918. There were also some early trials with using a hook to pick-up messages from the ground in 1916. That was a failure too, as the FE2b they were using got tangled up and crashed, killing the crew. Just for the record, I think it is also worth mentioning Leigh-Mallory, who was OC 8 Sqn, of course, and who wrote the book on air-tank support; he was also associated with air-ground support of the Army in the 1920s and '30s.

Jefford. I don't think that there was a question there, but I would not take issue with anything that you said. Leigh-Mallory was indeed a leading player in the game in 1917-18 and between the wars; he was Commandant at Old Sarum 1927-29. Coincidentally, the next Journal will feature a short appreciation of him by Gp Capt Andrew Thompson, although this will focus on his later career as an air officer, rather than his service during WW I.

The bid for the Army to take over corps reconnaissance in 1916 foreshadowed the late 1930s campaign for the RA to provide its own Air OPs. The Gunners always, I think, felt that they could make a better fist of it themselves. The argument boiled down to 'Who runs aeroplanes?' Should it be the customers? – the artillerymen. Or should it be the service providers? – the airmen. Trenchard stuck out for the latter, pointing out that there was far more to corps reconnaissance than artillery direction, notably photography and contact patrol work, not to mention supply dropping and even a little bombing, and that the complex technical infrastructure associated with aviation meant that flying simply had to be air force business, although he was quite content for the RA to provide him with experienced gunners whom he undertook to employ as observers and/or train as pilots to fly with corps squadrons.[1]



The Notcutt Range Corrector

Perhaps I could add a point, prompted by Peter's account of the debate over whether or not to retain the clock code in WW II. I didn't cover this in my presentation, but it is worth pointing out that when the aircrew passed a miss distance to the battery, the gunners needed to use that information to re-lay their guns. There will have been a number of ways to do this, but a good practical example from WW I was the Notcutt Range Corrector. The reported error was plotted on a calibrated disc which was then rotated to the bearing of the target from the gun. Range correction was then read off directly from the superimposed square grid, with deflection extracted from the tapered grid vertically below, with reference to the appropriate horizontal range-to-target line.

Air Cdre Graham Pitchfork. Clive – I know that time was against you, but you restricted your fascinating discussion to the UK. Could you say a few words about the considerable army co-op effort overseas, particularly on the North West Frontier where a number of squadrons were specifically designated 'Army Co-operation'.

Clive Richards. I didn't cover the North West Frontier, because, as you say, of the problem with time. But a lot of the techniques used were essentially the same as those being taught in the UK, although there will have been some adjustment to cater for local conditions – and some of that will have been fed back to the School of Army Co-op. So there was a two-way process involved in pushing the state of the art forward.

Apart from that, one of the problems in considering the activities of the AC squadrons overseas was that their work was a combination of 'army co-op', as it would have been recognised in the UK, and 'air policing', which was the main function of the DH 9A 'bomber'

squadrons. The commanders in the field had a limited range of options available to them, and they would employ squadrons and aircraft as they saw fit, which could well mean using the AC squadrons in the colonial policing role if/when necessary. So the boundaries between the work of the DH 9A and Bristol Fighter squadrons overseas in the 1920s could be somewhat fluid..

Jefford. It may be worth noting that, certainly by the late-1930s, and I suspect earlier, it was common practice for OPCON of air assets to be assigned to a ground commander. When a specifically 'air' action – the punitive bombing of the village of a dissident tribe, for instance – was being mounted, that would have been an exclusively RAF affair. On the other hand, when operating in support of troops, perhaps escorting a column in transit, or engaging a party of bandits, OPCON was assigned to the soldier in command.[2]

Sir Freddie Sowrey. We've heard a lot about directing the guns. Perhaps a word or two about how we were taught to do it would be helpful. I learned to fly in 1941 and in October of that year I went to the School of Army Co-operation and from there to do the fighter reconnaissance course at No 41 OTU. Gunnery training was done in a room, about 20-foot square, containing a terrain model made of hessian fabric, with typical features marked on it – woods, villages, roads and so on – mounted about 6 feet off the ground, so that people could get underneath it. The pilots practised their two-way patter with 'the guns' from a gallery above this layout. Knowing the time of flight of the shell, when the guns called that they had 'fired', you adjusted your procedural 'orbit' up on the gallery so that you would be in a position from which you would be able to observe the fall of shot – not having your back to it! Below the model was a man with a stick about a foot long with four flash lamp bulbs on it. He would stick this up through the fabric and at the appropriate time, switch on the lights. You would observe the 'strike', note the salvo's mean point of impact, estimate the error and pass the necessary correction to the battery – "Right 200. Up 200" or whatever. If you were engaging a difficult target, you might need to call for smoke – which was furnished by the man under the table, who would puff away on a cigarette and oblige by exhaling through a tube with four holes in it! (*Laughter*)

In 1942 I was given the opportunity to fire a corps of Royal Artillery from a Mustang on Salisbury Plain, which produced a satisfying amount of smoke and flashes and raised a lot of dust, and I know that my squadron, No 26 Sqn, subsequently directed naval gunfire on D-Day and later at Walcheren. And so, to my question. How was routine training conducted on the squadrons, because I can't recall anything being done after I had passed through the School of AC and done the OTU course?

Peter Elliott. The trainer you describe is also described in Allen Wheeler's book on flying between the wars[3] and it seems to have changed very little. The OTU syllabus seems to have devoted relatively little time to artillery in terms of flying hours – I think possibly three live shoots, at most? (*This was an underestimate, which Peter subsequently corrected – see Note 4*. **Ed**.)[4] I have seen correspondence from Barrett, or it might have been Maltby, his deputy, to the squadrons saying, in effect, 'I've got you some more ammunition for practice shoots so for goodness sake – use it!' I don't have any specific details but I suspect that some live shoots were available, particularly in the period working up to D-Day but, in terms of synthetic training, I think it unlikely that that would have been a practical proposition in a mobile squadron, which the AC units were supposed to be.

Jefford. It was certainly the case that, prior to D-Day, all of the squadrons that were earmarked to work with the ships were sent up to Dundonald, where the RAF specialised in Combined Operations training, to attend courses run by the Naval Bombardment Unit.[5] By that time the procedures should have been fairly well established, as beach head bombardment had already been carried out at Sicily and Salerno, so Dundonald would have taught the principles and then provided some, probably otherwise scarce, practical experience of gunnery – live shoots.

We need to bear in mind that until mid-1944 confrontation with the enemy was only possible in overseas theatres, so throughout 1941-43 it was all about North Africa and Italy. In the UK there was no live ArtyR, because the Army was not in contact. So practical experience at home would have been available only in association with the Army's training programme or when there was a major exercise.

Whenever the Army did mount an appropriate event, I imagine that the RAF would always have been invited to play, but the bulk of artillery training will have been concerned with practising basic nuts and bolts procedures which would not have required the added complication of aeroplanes. Much of the routine squadron air training programme would presumably have been concerned with practising and perfecting TacR procedures – and taking pictures of inert targets was relatively straightforward as it did not require any second party co-operation.

Sir Freddie's description of a synthetic training facility pretty much duplicates a device that was introduced as early as 1915. The guy who built the first one was actually awarded a post-war cash grant for having done something particularly innovative to assist the war effort. It was even more sophisticated than Freddie's version, as it had light bulbs, rather than guys poking sticks through the fabric – I have a wiring diagram of it which I will include in the Journal.[6]

Elliott. It was known as a Haskard Target, the inventor was a Lt Col Dudley Haskard RA who patented the design in 1943.[7]

Trevor Nash. Thank you for three excellent presentations. I am currently a post-graduate student at the University of Birmingham. In the context of training in artillery observation, I left Sandhurst in 1978 and went to the School of Artillery where we had exactly the same device, except that, instead of a hessian board, we had a peg board, with lots of holes in it, and we used chalk dust to puff the 'smoke' through. So technology clearly hadn't had much impact.

My question is directed to Clive. A convincing thesis, I thought, but the interwar years saw the newly created Royal Air Force needing a *raison d'être* and that, of course, was Trenchard's concept of strategic bombing. Do you think that the focus on bombing in any way detracted from army cooperation?

Richards. I would suggest that, in considering army co-op during that period, one of the main pre-requisites was an army. And for much of the period Britain did not possess a UK-based expeditionary capability of any real significance. You have only to look at the Shanghai Defence Force to see that. The SDF was formed in 1927 with a brigade from the UK, a brigade from Malta and a brigade from India

and they had to be joined together *en route*. Given the small size of the British Army and the British Government's aversion to the idea of deploying a force of any size on the Continent, which, until 1938, was essentially the position, it would have been difficult to construct an argument that would have justified an increase in expenditure on army co-op beyond what was already in the budget. Why expand the RAF's capacity for army co-op if there was nothing for it to co-operate with? Furthermore, if you read some of the Army proposals for the late-1930s they were arguing at one point for a force of 10,000 army co-operation aircraft! That was cloud cuckoo land, and against that background, one can perhaps understand why there might have been a certain amount of resistance within the contemporary Air Staff.

Editorial Notes:

[1] The correspondence relating to General Rawlinson's (GOC 4th Army) post-Somme proposal, that corps reconnaissance squadrons should become part of the artillery organisation, is in TNA AIR1/2268/209/70/190. This exchange closely mirrored an earlier difference of opinion when the RNAS balloon sections had been transferred to the Army in 1915. Since balloons had only one function – gunnery direction – should they become an organic element of the RA or, since they were plainly 'air' assets, would they be more comfortably accommodated by the RFC? Trenchard won that debate too.

[2] TNA AIR2/2065. Chap VII, Section 17 of the 1938 edition of the relevant manual, 'Frontier Warfare – India (Army and Royal Air Force)' states that:

> **'**For a land operation in frontier warfare, army co-operation aircraft will be placed under the command of the force commander in the field, and an air force officer will be appointed to the headquarters of the force to advise the force commander regarding their employment.
>
> When the headquarters of the force does not accompany a column traversing tribal territory, aircraft will usually be allotted to the column concerned and, if required, an air force officer will be appointed to column headquarters for advisory and liaison purposes.
>
> Bomber aircraft will not normally be allotted to a force in the field but will remain under Royal Air Force control for the carrying out of any tasks required of them to assist the operations of the force. Such tasks will be co-ordinated with those of the allotted army co-operation aircraft, by the air force commander acting under the direction of the officer to whom the general control of the operations has been delegated by the Commander-in-Chief […].'

[3] Wheeler, Allen; *Flying Between The Wars* (Foulis; Henley-on-Thames; 1972).

[4] TNA AIR20/1355. Although it will have changed in detail over time, the syllabus for No 41 OTU, as at May 1944, may be summarised as follows:

Ten-week course, with intakes every three weeks.
Content:
Vertical and oblique photography.
Tactical Reconnaissance, singly and in pairs.
Fighter tactics and gunnery.
Military subjects.
222 hours ground instruction.
210 hours flying, minimum of 50 hours on operational type (including 5 flying hours for ArtyR – 2 live shoots per hour).

[5] The pre-D-Day naval bombardment course at Dundonald was of approximately two-week's duration, half in the classroom, half devoted to flying exercises, which included live shoots with naval artillery. Attendance by RAF/RCAF units was as follows (the RN and USN squadrons committed to naval gunnery direction for the invasion period may also have been involved):

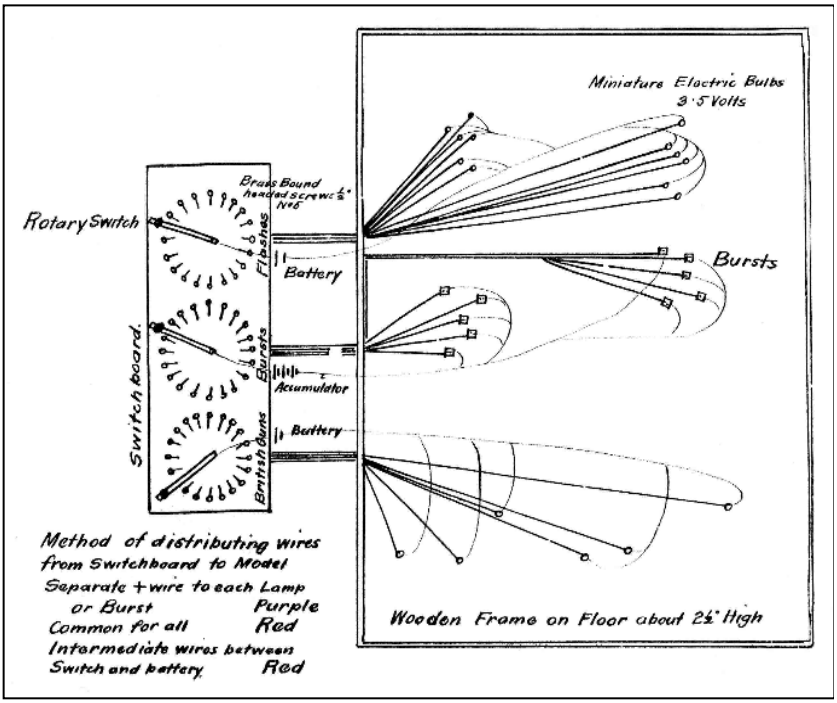
No 414 Sqn	29 Feb-11 Mar 44
No 2 Sqn	11-24 Mar 44
No 268 Sqn	26 Mar-8 Apr 44
No 63 Sqn	9-21 Apr 44
No 26 Sqn	10-21 Apr 44

[6] TNA AIR1/1266/204/9/61. Known within the RFC as Artillery Targets, the officer responsible for W/T training at HQ Northern Group notified all units under command, via his NG/100 of 7 December 1916, that they were to be made 'of wood, about 10 feet square, with scenery painted on it. […] This target should be raised a few feet off the ground to allow for repairs, etc.' But a report on a visit to the Schools of Instruction at Reading and Oxford, covered by HQ RFC letter CRFC 2047G dated 8 February 1917 (TNA AIR1/997/204/5/1241), states that theirs were 'some 30-40 feet square'. Whatever their size, these terrain models had electric light bulbs embedded in the scenery and a means of producing puffs of smoke to simulate the flashes from both British and enemy guns and the burst of British shells; in some cases it was reportedly even possible to represent a gas attack. According to C W Hunt – see *Dancing in the Sky* (Toronto, 2009), p224 – RFC (Canada)'s School of Artillery Co-operation at Leaside had two 40 ft × 20 ft 'sand tables' incorporating 13,000 feet of electric wire and 1,360 light bulbs!

Supplementing the hardware in each case, there was a gridded map, representing the area of simulated terrain. Trainees were required to report the location of targets using the grid system and to estimate the miss distance of a salvo, converting this into Clock Code. Appropriate messages were then transmitted to the 'battery' using a silent Morse key – silent to simulate the conditions in a noisy, open cockpit where the operator would be unable to hear the 'dits' and 'dahs' that he was sending.

The first training aid of this type was built by Cpl Frank Pratt at Brooklands in May 1915. Having been inspected and approved by Generals Henderson and Brancker, Pratt constructed a second at Gosport and a third at Farnborough. He was sent to France in 1916 where he made another twenty or so for the squadrons in action at that time, tailored in each case to match the specific sector of the front over which

they were operating. On returning to the UK, he built models of the Ypres and Armentières Salients for the Schools of Instruction at Oxford (where he personally instructed trainee observers) and Reading, respectively. In 1921, by then Capt, Frank Pratt was awarded £1,250 (about £45,000 in 2012) by the Royal Committee on Awards to Inventors for his 'System of Training Aerial Observers' (see TNA TS28/4).

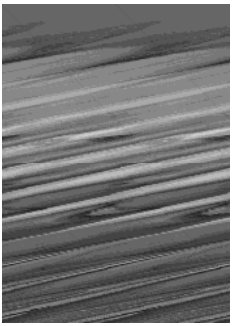


Wiring diagram for an Artillery Target of WW I (the original was in colour).
TNA TS28/4

[7] Somewhat surprisingly, in view of Note 6, Dudley Haskard registered, with the UK Patent Office, Application Number: GB19430013456 19430818, which covered 'Improvements in and relating to landscape and seascape models and the like'. Dated 18 August 1943, it was granted on 16 March 1945 as Publication Number 568083(A). That said, the Annual Army Co-operation Report for 1934 (TNA AIR10/1914) notes that a Haskard trainer, which permitted model tanks and the like to be moved about by operators under the table using magnets, had been installed at Old Sarum.

THE ORIGIN, DEVELOPMENT AND WARTIME SERVICE OF THE AUSTER AIRCRAFT

Hugh Thomas



Hugh Thomas, a founder member of the RAFHS, gained his early flying experience circa 1970 with the ATC and the Manchester UAS. Having qualified as a doctor, he spent 1994-98 as a squadron leader with No 4626 Sqn RAuxAF at Lyneham. While living in Leicester, 1980-87, he had developed an interest in the Auster and his association with the light aircraft was developed via his subsequent membership of the Old Sarum Flying Club and frequent visits to the Museum of Army Flying at Middle Wallop. He continues to fly Cessnas, and motorgliders and has a share in a 1944 Piper Cub.

Early Days

In 1938 Alexander Lance Wykes, a director of a Leicester textile machinery manufacturing company, visited the Taylorcraft Company in Pennsylvania, USA and obtained the rights to build Taylorcraft aeroplanes in England.

Alexander Lance 'AL' Wykes

Wykes, commonly known as 'AL', obtained a Bachelor of Commerce degree at Birmingham in 1916 and joined the Royal Flying Corps, serving as a Sopwith Camel pilot for the last two years of the war. Post-war his aviation interests continued as a member of the County Flying Club. By the late 1930s, with the prospect of another war looming, the County Flying Club was training pilots under the government-sponsored Civil Air Guard Scheme and using

G-AFNW, the first Taylorcraft Plus C.

Taylor Cubs and a Taylorcraft Model A. As the scheme expanded across the United Kingdom 'AL' saw a business opportunity. His new company obtained a Taylorcraft Model B, fifty Lycoming 0-145-A2 engines and also the services of Ray Carlson, an experienced Taylorcraft engineer. Within three months they produced their first aircraft, designated a Taylorcraft Plus C as it featured stronger steel tubing and thicker wing spars in order to obtain British certification. The workforce did not generally have aviation experience and many women were employed who had previously worked in the hosiery trade but they adapted well to light engineering.

The heavier airframe reduced performance and a more powerful engine, the Blackburn Cirrus Minor 1, was fitted to increase the power from 55 hp to 90 hp. This modified aircraft, designated the Taylorcraft Plus D, used all British components.

The outbreak of war in September 1939 meant the suspension of civilian flying but 'AL' and his company saw the potential for the Plus D to be used by the Army as aircraft were being trialled for Flying Observation Post (later Air Observation Post – AOP) work to direct artillery bombardment. The Army trials, which were not generally supported by the RAF in the early days, showed that the Plus D performed better than the Cierva C.30 autogiro and other small aircraft such as the GAL 33 Cagnet and the Arpin A-1 Mk 2.

In February 1940 the first AOP unit, D Flight, under the command of Captain (later Colonel) H C Bazeley, was formed and sent to France in April in the period known as the 'Phoney War'. However, in

The first military production model – the Auster I.

May the German attack was so successful that France fell and D Flight returned hastily to Old Sarum in Wiltshire. During the autumn months the Army continued training AOP pilots. The RAF, keen to maintain control over military aviation, formed Army Co-operation Command in December 1940. In April 1941 General Sir Alan Brooke, Commander in Chief Home Forces and a former 'Gunner' authorised the formation of the first AOP squadron, 651, on 1 August 1941. The history of that squadron, which was based on an expanded D Flight, is told elsewhere in this volume.

The best aircraft for the AOP role was still under review. The Lysander had proved too cumbersome and vulnerable to enemy aircraft. The Vultee-Stinson Vigilant was tested but was too large and complex for operation in the field close to the front line. The smaller Stinson Voyager was more suitable but supply from the USA would have proved difficult. The Plus-D, fitted with 2-way radio, appeared the best and in early 1941 an order for 100 aircraft, later increased to 1,000 aircraft , developed and improved as appropriate, was placed by the Air Ministry. The military aircraft was named the Auster – middle English for a warm dry south westerly wind, in Roman times associated with the Alps. This was in keeping with the more powerful wind named aircraft such as the Hurricane, Typhoon, Tempest and Whirlwind.

Auster Development

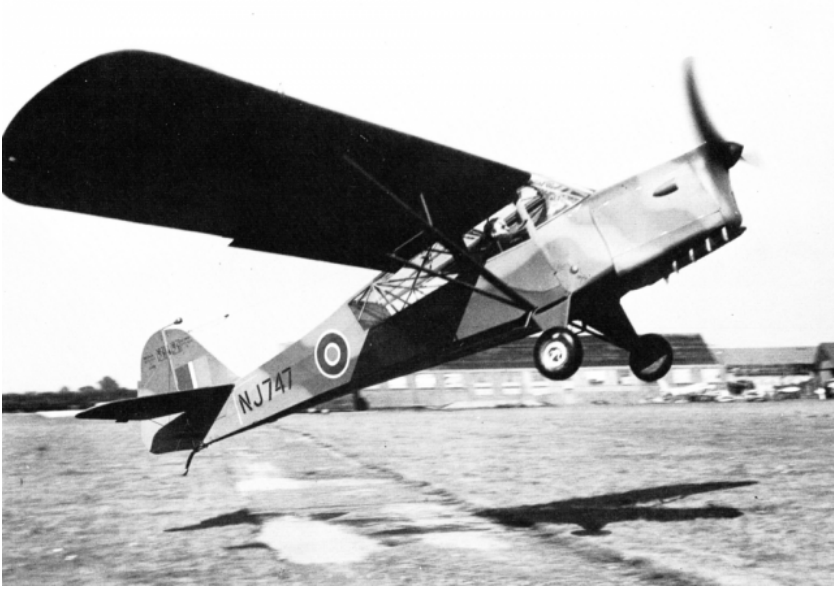
The Auster Mk I, with improvements on the Plus D including a stronger undercarriage and better brakes, showed the value of AOP work when it served with 651 Squadron. But it's deficiencies included

Sqn	Formed		Theatre	Disbanded/ Renumbered
	Date	Place		
651	1 Aug 41	Old Sarum	NW Africa/Italy	1 Nov 55
652	1 May 42	Old Sarum	NW Europe	1 Sep 57
653	20 Jun 42	Old Sarum	NW Europe	15 Sep 45
654	15 Jul 42	Old Sarum	NW Africa/Italy	24 Jun 47
655	30 Nov 42	Old Sarum	NW Africa/Italy	31 Aug 45
656	31 Dec 42	Westley	India/Burma	15 Jan 47
657	31 Jan 43	Ouston	N Africa/Italy/ NW Europe	1 Nov 55
658	30 Apr 43	Old Sarum	NW Europe/India	15 Oct 46
659	30 Apr 43	Firbeck	NW Europe/India	14 Aug 47
660	31 Jul 43	Old Sarum	NW Europe	31 May 46
661	31 Aug 43	Old Sarum	NW Europe	31 Oct 45
662	30 Sep 43	Old Sarum	NW Europe	15 Dec 45
663	14 Aug 44	San Basilio	Italy	29 Oct 46
664	9 Dec 44	Andover	NW Europe	31 May 46
665	22 Jan 45	Andover	NW Europe	10 Jul 45
666	5 Mar 45	Andover	NW Europe	30 Sep 45

Air Observation Post Squadrons of WW II

poor rearward and upward visibility for the pilot, an engine that was underpowered and sometimes temperamental in hot climates, and no flaps to assist take off and landing. An example of this aircraft currently hangs near the main entrance of the RAF Museum, Hendon (less than 30 metres from where this symposium is taking place). It is historically interesting in that it was flown to assess suitability for deck landing. 'AL', who took part in such trials, told his son that it took full power to catch up with the ship that was sailing into a strong wind and an arrestor hook was certainly not required!

The Auster Mk II was designed with the more powerful 130 hp Lycoming O-290 engine and flaps but only two were produced as obtaining engines from the USA was not considered reliable as the U-boat menace threatened all maritime supplies. Testing by the Aeroplane and Armament Experimental Establishment (A&AEE) at Boscombe Down, undertaken on all Auster variants, also identified problems with engine cylinder overheating and also cabin heating in



The Auster III had a more extensively glazed cabin, and could be quite spritely.

Arctic conditions.

With the acceptance of the AOP role the number of squadrons was increased and by the end of the war there were sixteen squadrons serving in all areas of conflict.

In September 1942 the Mk III prototype flew powered by the British 130 hp De Havilland Gipsy Major I. Centre of gravity problems, investigated at A&AEE, were cured by fitting 40lbs of lead ballast in the rear fuselage. The addition of an elevator trim, flaps and larger perspex panels resulted in a much improved aircraft and 469 had been produced by the end of 1943.

Refinement of the Auster was continuous and in May 1943 the Mark IV flew with full production commencing in December. It had a 130 hp Lycoming 0-293-3 engine which was shorter than earlier engines and gave better forward visibility. A modified fuselage shape gave a larger cabin and better rear visibility and a tailwheel replaced the tailskid. A third seat for an observer was placed behind the front two. Production of this mark totalled 255.

The Auster IV was characterised by its distinctive flat-four Lycoming.

Sadly, 'AL' was killed on the 15 May 1944 when the Mark IV that he was displaying at a 'Salute the Soldier' fundraising event in Abbey Park, Leicester crashed. His 9 year-old son was at the show but did not see the accident and was quickly taken away. His 15 year old daughter was at school in Yorkshire and was asked to return home immediately but without a reason being given. It was only when she bought a newspaper on the journey that she found out that her father was dead.

The final Auster variant in wartime service was the Mk V which, with 790 being produced, proved to be the most satisfactory. It had a better elevator trimmer than the Mk IV, was fitted with a full blind-flying instrument panel and had a larger fuel capacity giving an endurance of more than 2 hours. These improvements also permitted it to be flown as a proper communications aircraft, albeit with a limited payload. The Mk V entered service in June 1944.

Throughout its A&AEE evaluations the Auster had been commended as being simple and robust with remarkably short take-off and landing distances, usually around 100 metres in good conditions. Its stalling speed of 28 mph and its manoeuvrability at low level made the Auster a difficult target for fast moving fighter aircraft.

By the end of the war the Leicestershire Taylorcraft Company had taken over a variety of buildings to repair, salvage and build aircraft. These ten works included several former garages, a woodwork shop

and a shoe factory which became the main Auster assembly shop. Repair work was a major commitment and by the end of hostilities the Leicester company had repaired 406 Hurricanes, 339 Tiger Moths, 281 Typhoons and 235 Austers.

Squadron Organisation

The AOP squadrons were RAF units under Army operational control. They usually consisted of three flights of four Austers with four reserve aircraft. The commanding officer was a Royal Artillery major with twenty-one pilot/observer artillery captains. The Adjutant and Equipment Officer were from the RAF and the establishment was sixty-three RAF personnel (fitters, riggers, etc) and 105 Army personnel (supervisory officers, NCOs, drivers, clerks, cooks, batmen etc) In most squadrons there were two sections – servicing and photographic. As the squadrons were air force units, Army personnel were recorded as 'Attached RAF'. The various memoirs indicate that after initial misgivings on both sides the squadrons functioned extremely well as cohesive units.

AOP Training

Artillery officers selected for AOP training initially received three months of basic flying training from RAF instructors at Hatfield, Peterborough or Cambridge. Those who passed this basic course then attended No 43 Operational Training Unit (OTU) at Old Sarum, near Salisbury, where they spent two months training on Austers, taught by AOP pilots who focused on gunnery techniques.

The OTU trained around 600 British and a small number of Polish, Dutch, Belgian and South African AOP pilots. A further seventy-three officers of the Royal Canadian Artillery were also trained. Ten British and one Indian officer were trained in India.

It has been pointed out in the account of No 651 Sqn that one Canadian AOP pilot went on to a career in acting and stardom in the cult series *Star Trek*. An unusual post war career was also followed by Major Tetley Tetley-Jones, commanding officer of No 653 Sqn, who developed the tea-bag which bears his name.

AOP Techniques

A grid system was used for AOP pilots to report the position of enemy targets, the fall of shells and other factors of importance. Such

information could be passed on by radio or if this was not possible by flying manoeuvres, such as climbing or diving, which could be interpreted by the artillery officers on the ground.

The best maps for AOP use were based on Merton oblique grid photographs. Merton had been an artist before the war and had studied perspective in detail. Photographs taken by fast RAF reconnaissance aircraft at two points could be overlaid to produce the grid and this map was passed to the AOP squadrons. AOP pilots were officially not meant to fly over the front line although knowing where the front line was, and sometimes being asked to obtain more detailed information, suggests that this was often not practical.

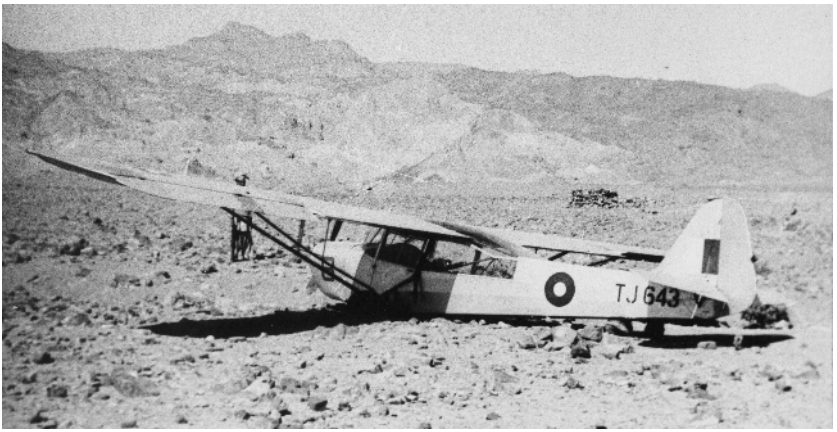
For AOP shoots the usual flying heights were from ground level to 4,500 feet. Infantry photographic runs were usually lower from ground level to 2000 feet. In difficult terrain identifying guns and enemy movements in areas with heavy vegetation often required low level flying for longer periods.

AOP Casualties

Flying low and slow has obvious risks in good flying conditions and more so when the weather is inclement and when the enemy are shooting from the ground and from the air. In wartime obtaining accurate information on accidents, injuries and fatalities is not easy.

In the 1956 book *Unarmed into Battle*, Parham and Belfield identified sixty-one AOP pilot casualties of which thirty-seven were judged operational and twenty-four non-operational. In the later, 1986, edition of their book the non-operational figures were omitted as there were doubts about their reliability. They attributed the main causes of operational losses as our own shells (9),enemy aircraft (6),small arms fire from the ground (4) and anti-aircraft fire (3). Flying accidents (8) and miscellaneous or unknown factors accounted for the remainder (7).

In recent years, Auster enthusiasts have catalogued the fate of individual aircraft as best they can based on official squadron records and aircraft service cards. I have not analysed these records in detail but the war time figures suggest that of the approximately 1,600 Austers in service at least 250 (15%) were damaged beyond repair or reported missing. Perhaps because of the lower speed and altitude, crashes were usually not fatal. Landing and take-off accidents,



The major wartime production model was the Auster V – many of which found their way to SEAC. This one, TJ643, came to grief shortly after the war while flying with No 659 Sqn somewhere on the North West Frontier.

especially hitting hedges, feature strongly in the records. Like all tail wheel aircraft, accidents occurred after a ground loop on landing, or going nose up, and often over, if there was an irregularity in the ground or the brakes were used too aggressively. Small tail wheel aircraft are also more difficult to operate in cross-winds. A large number of cards indicate that Austers flew into the ground or trees while low flying. At least fourteen cards record hitting a balloon cable or high tension wire. Around twenty aircraft were destroyed on the ground by enemy attack and on one occasion four were destroyed in the same parking area when a B-17 Fortress blew up on the ground.

The Auster had to be started by hand swinging the propeller. Quite often this involved the pilot 'chocking' the aircraft, setting low power and swinging the propeller himself. The cards record three aircraft that 'ran away' and another that even got airborne and crashed without a pilot.

It is interesting to observe that Eric 'Winkle' Brown, the distinguished test pilot, assessed the Auster V. He observed that 'it was not in the same class as the Fieseler Storch with regard to take-off and landing performance or general slow flying, and in fact I found the British machine a bit of a handful in really bumpy weather'. If, with his vast experience, he found that Auster flying could be

challenging, it is understandable how much less experienced AOP pilots, and others using the aircraft for communications work, could have problems.

The simple construction of the aircraft meant that even quite extensive maintenance and repair could be done in the field. However, it is interesting to note that 235 Austers were returned to Leicestershire for repair, presumably most of them after training accidents. The relatively low cost of the aircraft and good supply of airframes later in the war may have meant that aircraft were struck off charge more readily. Certainly in the Far East where conditions could be either very wet or very dry, damaging the fabric and wooden components, including the propeller, four months service was often the safe operational limit.

AOP Honours and Awards

Parham and Belfield have documented these in detail. It is remarkable, but perhaps not in view of the dangerous work which they undertook, that almost one in six of the AOP pilots was awarded the Distinguished Flying Cross. Of these 97 four also received a bar to their DFC. Other awards included the Military Cross (5), Member of the British Empire (10), Croix de Guerre (9), Polish Cross of Valour (3) and Distinguished Service Order (2).Several of the ground crew and also some of the non-commissioned 'observers' were also decorated for acts of heroism.

Assessment of AOP Operations

In a despatch of 4 September 4 1946, Field Marshal Montgomery observed 'The Air OP ….. has become a necessary part of gunnery and a good aeroplane is required for the job. Very good RA officers are required for duty in the squadrons. It is not difficult to teach them to fly….'

In the foreword to the 1956 edition of Parham and Belfield's AOP book, Field Marshal Alanbrooke wrote 'From the very earliest days I have personally always felt that a well-established Air OP organisation must have a great future. These feelings were unfortunately not shared by some of those involved in the original discussions. It achieved even more than I had hoped by establishing one more of those essential links of co-operation between two of our fighting services.'

The Auster was extensively used to provide a VIP taxi service. Sporting full D-Day markings, this Mk III was operated by No 38 Gp Comm Flt.

Testimony as to the value of AOP operations was also provided by German records and interrogations. *Feldmarschall* Gerd von Runstedt observed that air observers directing naval guns had made the daylight movement of tanks almost impossible. Numerous gunnery teams reported that if an AOP aircraft was in their area they ceased firing as they did not want to attract accurate heavy return fire. An officer in the German *10th SS Panzer Division* wrote 'But the greatest nuisance of all are the slow flying artillery spotters which work with utter calmness over our positions, just out of reach, and direct artillery fire on our forward positions.' It was also commonly stated that any soldier shooting down an AOP aircraft (an Auster or an American 'Grasshopper') would automatically receive two week's leave.

John Terraine, a significant figure in the history of the RAF Historical Society, also observed that 'by 1945 Auster light-cabin monoplanes had become an indispensable part of the military aviation scene.' However, I have found it interesting that in major histories of photographic reconnaissance the 1941-45 wartime role of Auster squadrons is not mentioned.

Other Wartime Auster Roles

The Auster was also used by a variety of other squadrons and units

for communications work. On the front line it was used to fly senior officers and important visitors (including King George VI – further away and with heavy escort) to see at first hand the way that the various campaigns were progressing. The aircraft were important for delivering mail and messages, emergency supplies both military and medical. In some areas, particularly in Burma, the Auster had a role in aeromedical evacuation although the larger Stinson L-5 was better suited to such work. Less frequent roles included laying telephone cables and, on a few occasions, directing congested military traffic using loudspeakers. A few memoirs record direct aggressive action with an observer, or even the pilot, using a machine gun or grenades.

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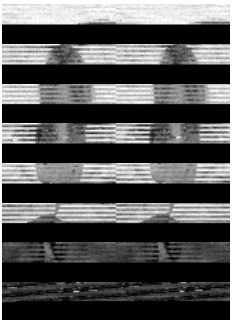
FIRST IN THE FIELD – 651 SQUADRON, 1941-45

Guy Warner



Guy Warner, a teacher by profession, is a long-term member of the Ulster Aviation Society and has written extensively on various aspects of aviation, many of them focusing on regional activities, both military and civil. Of particular significance to the RAF Historical Society, he has published articles and books related to the histories of Nos 72 and 230 Sqns, the Wessex helicopter, RAF Aldergrove and, most recently, No 651 Sqn.

It is, of course, impossible to do full justice to four very busy years of war service in the course of a brief presentation but I hope that sufficient snapshots will be provided herein to give a flavour of No 651 Sqn's achievements and experiences

The first OC 651 Sqn, Sqn Ldr Eric Joyce.

The Early Days

No 651 Sqn was the first Air Observation Post (Air OP) squadron, being formed at Old Sarum on 1 August 1941 under the command of Squadron Leader Eric Joyce.[1] It was part of the RAF but all the pilots, drivers and signallers were from the Royal Artillery, while the RAF supplied the Adjutant, Engineer Officer and technicians. The first OC held a dual commission as a major and was, in fact, a gunner officer seconded to the RAF. Its task in 1941 was to work out methods and means for the Air OP role with an assortment of Taylorcraft Plus Cs and Ds, three Piper Cubs and a Stinson Voyager. The Squadron's pilots had to learn and practise what was believed would be the

HH982, the first of seven civil-registered Taylorcraft C.2s impressed in August 1941, all of which saw service with No 651 Sqn.

key task which would be required of them on the battlefield – observing for, ranging and directing the artillery. Their tubular-steel framed, fabric covered, unarmed and very lightly armoured aircraft would be based close to forward batteries and would keep behind friendly forces, ascending to observe the enemy at an oblique angle from a height of about 1,000 feet and at all times being prepared for a hasty descent. Communications would be made by radio telephony.

It had been decided that it was much easier to teach a gunner officer to fly a light aircraft adequately than it would have been to instruct a Royal Air Force pilot in the detailed and arcane science of gunnery. That is not to say that considerable flying skills were not required. Flying, observing and operating the radio would have been a lot easier if the pilot had been equipped with an extra arm. Moreover, the evasive manoeuvres at ultra low-level which would be needed when enemy fighters were in the offing, were not for the faint hearted. The ability to operate from fairly small fields and hastily prepared landing strips was also of considerable importance. While they were learning these skills they also had to demonstrate the utility of the Air OP concept to Army units all around the United Kingdom, as they retrained, reorganised and regrouped for the task ahead.

The newly-formed squadron took part in Exercise BUMPER which proved that the Air OP concept would work in its tactical role and if handled properly could be of great assistance to the artillery. It has been described with considerable justice as the most important exercise in Air OP history. BUMPER was also one of the largest exercises ever held in Britain. It was designed to give senior commanders practice in handling large formations, to investigate the composition of a future expeditionary force and to test defences against an invasion. It began in torrential rain which did not improve the aerodynamic qualities of the Air OP aircraft, which, being picketed out in the fields, received a very thorough soaking. The dangers of ultra-low level flying were made very apparent to Captain 'Jim' Neathercoat one day when he was flying alongside the A1 in bad weather and poor visibility, at a height of about 50 feet. He was travelling up the right hand side and got a considerable shock when he encountered an Avro Manchester at exactly the same height coming in the opposite direction.

Another hazard would be encountered when picketing the aircraft at an advanced landing ground (ALG) for the night. It was discovered that, if there were cows sharing the field, they liked to lick the dope and so remove the fabric covering from the aircraft's fuselage and wings. There were two methods devised to deal with this problem. Some pilots scrounged barbed wire and disused fencing posts in order to construct makeshift barriers, while others simply had a chat with the farmer and persuaded him to move the livestock temporarily to another field.

The relationship between the pilots and their RAF ground crew was not all that it should have been at this stage, as life in the field was not what the riggers and mechanics believed that they had signed up for. They referred to the pilots as 'brown jobs', thoroughly disapproved of the rather primitive aircraft on which they had to practise their skills and did not like sleeping away from the undoubted comforts of an RAF station. During BUMPER, Capt Andrew Lyell landed at his ALG after a hard day flying twelve dummy shoots to discover that his groundcrew had decided not to wait for him and had driven off, leaving him without petrol or servicing facilities, groundsheet, blankets or greatcoat.

Less than impressed and with only his shaving kit and toothbrush,

Lyell followed their example and flew off towards the nearest RAF aerodrome – Debden. On his way there, he spied a large and attractive country house, so he thought he would land in an adjoining field and enquire if the owner had any beautiful daughters. On landing, he realised that he was in a somewhat dishevelled and muddy state but pressed on regardless and introduced himself to the 'master of the house.' He was somewhat discomfited to discover that he had in fact landed in the grounds of what was known in those days as a lunatic asylum. The new OC, Major Charles Bazeley considered court-martialling the errant airmen but decided in the end that this was all part of the learning process and that the problem would have to be overcome some other way. There was a difference in culture between the Army and the RAF, which Andrew Lyell summed up as follows,

> 'We were all Army pilots with Army ideas. The Army does not turn back just because the weather is too bad nor does it stop fighting just because visibility is poor. If our Flight was committed to take part in an Army exercise, the new idea of an Air OP would be discredited if we failed to turn up and gave the weather as our excuse.'[2]

In November Lyell was sent to the Isle of Wight to work with the gunner regiment stationed there. On the way back he had to land at the Fleet Air Arm station at Worthy Down and ran foul of Commander Air. At that time the Air OP pilots were not wearing any wings, as the RAF was not keen on awarding its wings to 'brown jobs' and Air OP wings had not been approved or indeed designed. (*See pages 154-163.* **Ed**) Commander Air assumed that he was a pilot under training, asked him who had authorised his flight and regarded his assurances that he was entitled to authorise his own flights a little sceptically. They eventually agreed to differ and Commander Air said farewell with the parting words, 'I don't care who the hell authorises your blasted flights.'[3]

In July 1942, No 651 Sqn received the Auster I. It was less than completely suitable, having a very restricted view to the rear and, moreover, no flaps, which resulted in a very flat approach to landing. The squadron was divided into three flights A, B and C with four aircraft in each, plus a Squadron HQ. An additional Combined Operations Flight was equipped with five Vultee-Stinson Vigilants.

The aim was to train a group of pilots for operations from small aircraft carriers and unsuitable ground strips, such as beaches. In the event the Vigilant was rejected as unsuitable for the task and the flight was disbanded.

Then in August came the welcome news that mobilisation was imminent, Jack Parham, the Brigadier, Royal Artillery, 1st Army informed the War Office that he wished some Air OP assets to accompany it on active service, writing:

> 'This Squadron is equipped with Taylorcraft (Auster Mk 1) aeroplanes which are not operational aircraft and are in many ways most unsuited to the job. Normally one would say that the Squadron could not therefore function on service till it got its new aircraft, which may not be till the spring. I consider, however, that it is essential to make an endeavour to provide some observation for our guns in the early stages of the operation, should this be necessary. In brief, the position is this:
>
> (a) We bring out two Flights of such aircraft as we have now got, and work them till they are no longer operationally useful.
>
> (b) Their small number of pilots and personnel can then join up with RA or RAF Units till the Squadron arrives.
>
> (c) The Squadron comes out when it has operational aircraft.'[4]

In the event this proved to a somewhat overly pessimistic assessment of the squadron's chances but it shows what a gamble those to whom the concept of Air OP was important believed that they were taking. They thought that while the risks were great, the prize was well worth it.

North Africa

The squadron was deployed on active service in November 1942, to Algeria and then Tunisia, as part of Operation TORCH. The leading elements arrived off Algiers on 12 November, the eight aircraft crated and carried as deck cargo, accompanied by eleven Royal Artillery officer pilots, thirty-nine RA NCOs and other ranks and twenty-five RAF airmen, a staff car, three wireless trucks, ten three-ton lorries and ten motor cycles. Four days after being off-loaded the aircraft were

An Auster I at Souk-el-Arba, Algeria.

ready for use. The impression that remained in many of the pilots' minds as the officers took their turn at sentry duty during those first days was the entirely novel smell – a mixture of herbs, spices and stale urine. Major Charles Bazeley's own description was,

> 'I led the Flight of the first three aircraft which were ready to Didjelli. It was an uneventful but wonderful flight with the Mediterranean on our left and the Atlas mountains to our right. We were passed by eight Dakotas and 'inspected' by some Spitfires, which worried our single Hurricane escort. We were delayed next day by a gale, but reached Bone on the 19th, where I reported to Brigadier Wedderburn-Maxwell, CRA 78th Division. The last part of the trip was lonely as we had no escort.'[5]

The very first operational sortie was made on 25 November, on behalf of the US 175th Field Artillery Battalion, the pilot twice landing alongside the commander to give a direct verbal briefing. The squadron's main duties were the direction of artillery fire, reconnaissance and light liaison. At first severe restrictions were imposed with regard to operating ceiling, minimum distance behind the forward troops and sortie time but these were 'lightly regarded by the pilots.'[6]

While for the most part the Austers' slow speed, manoeuvrability and evasive tactics were successful, the squadron lost its first aircraft

The first decorations won by No 651 Sqn were an MC, by Capt Gilbert Billingham (left, in an Auster sporting the 'long boat' formation sign of 5th Corps) and right, an MM by AC1 Leslie Bowden.

to enemy action on 28 November, when Capt Alan Newton's Auster was attacked by four Bf 109s. He managed to land and jump out before it crashed and burned. The first Army pilot to be awarded the Military Cross since the First World War was Capt G E Billingham for his actions between 28 November and 2 December, during which time he had been attacked by enemy fighters, flown one sortie in very adverse weather conditions, acted as infantry on the ground and had flown his RAF rigger, LAC Pennell, to safety while under fire from enemy tanks. Another RAF member of the squadron, AC1 Leslie Bowden, received the Military Medal for his actions in retrieving his vehicle and aircraft spares from an abandoned advanced landing ground in enemy territory. Sadly, on 6 December, Capt Peter Wells was shot down and killed by a pair of Bf 109s. Between 24 November and 7 December, No 651 Sqn had flown thirty-seven sorties, of these ten had been artillery co-operation, four contact patrol, five tactical reconnaissance and the rest liaison, communications and reconnaissance for landing grounds.

As the ground forces and Auster crews gained experience of working together, it was found that timely warnings from the ground of the presence of enemy fighters in the vicinity enabled the Air OP pilots to take avoiding action by flying low and slow over wooded areas, so taking full advantage of the terrain and the aircraft's

camouflage, as is shown in one pilot's combat report,

> 'While at 600 feet I received the warning 'Bandits', with the direction from which they were coming. I turned and saw about a dozen Ju 87 dive bombers and several escorting Me 109s at about 1,500-2,000 feet, coming towards me. I dived to ground level and flew evasively over low, dark wooded hills which I had previously chosen as best suiting the aircraft's camouflage. I waited till I saw the bombs fall and after giving time for the raiders to clear off, returned to the landing ground. The Troop throughout gave me clear and repeated warnings.'[7]

As the year drew to a close Brigadier Parham sent a signal to the War Office which he copied to Bazeley: 'Air OP already an unquestioned success despite air inferiority. Stop. Besides artillery observation, has proved invaluable for liaison, intercommunication and contact patrol.'[8]

In January 1943, HQ 5th Corps, having gained confidence in the ability of the Air OP pilots, lifted some of the previously imposed flying restrictions. A good deal of 651 Squadron's flying was in close co-operation with the 78th and 6th Armoured Divisions and the flow of general information they supplied was as much appreciated by the Corps operations and intelligence staffs as those at lower HQs. The number of tactical recce sorties also increased. On 15 January, Lt-Gen Kenneth Anderson, the Commander of 1st Army presented Capt Billingham with his MC and on the same day Maj Bazeley brought the news of Leslie Bowden's MM. The squadron's Operations Record Book (ORB) noted, with pride, that history had been made in that the Army flying badge and the Military Cross were being worn together for the first time.

On 1 February, Capt James Magrath was attacked by five formidable Focke-Wulf 190s when observing artillery fire for a battery in the Robaa Valley. He flew into a small hollow among nearby hills, which he had earmarked earlier as a likely bolt-hole and as he could circle lower and tighter than his pursuers, he was able to make his escape.

Maj Bazeley, having led the squadron successfully into operational service, departed on 2 February. He was later awarded the DSO and also wrote a very detailed analysis of the lessons learned from this

first deployment. He was succeeded by the newly promoted Maj Neathercoat, who here describes the countermeasures that had been devised to minimise the danger from enemy fighters,

> 'We were able to obtain a series of light Ack Ack Bofors guns, set up in a concentrated radius. The Air OP pilot would be in direct touch with the ground and as soon as an enemy fighter was seen, the ground radio reported to the Air OP, using the usual term 'bandits'. The pilot would then fly into the middle of the Bofors guns and fly around until the 109 got fed up and went home.'[9]

The experience of battle had transformed the squadron. The greatest change involved the cohesion of its personnel,

> 'When we first formed the Squadron, and during the early months of training in England, it was very hard to explain to airmen just what we trying to do. They seldom saw the shells fall or heard our orders over the R/T (radio telephone). It was very hard for them to realise what it was all in aid of. Many asked to be posted back to a 'proper Squadron with proper aeroplanes.' By jockeying them along we persuaded them to give it a trial and they came overseas with us. They were too polite to say they knew it would not work but it was easy to see what they thought. After just three weeks in action their attitude was completely different. They had begun to see that their pilots were producing the goods, they also realised they could not do this without their help. But what really 'got' them was the fact that they were the most advanced RAF, that they were in real earnest soldiers and airmen in one. They had to fight as soldiers and maintain their aircraft as airmen, and their pride was terrific. Their opposite numbers on an airfield just did not know what war was; they and only they were the real boys. That the first two immediate awards were an MC for a pilot and an MM for an airman put the final seal on a wonderful team spirit, and their morale was sky high.'[10]

As well as supporting artillery shoots by day, the Air OP pilots had also developed new operational roles including the use of oblique photography (which had been devised by a young RE officer, John

Merton) and the direction of shoots by night. It was discovered that, given adequate moonlight, the bursts of the larger types of shell could be observed with accuracy.

Jim Neathercoat summed up his experiences in North Africa as follows,

> 'We all finished in or near Tunis by the end of May 1943. I think, even at this stage, we felt we had established ourselves. The Air OP was not only of some definite use, but we had undoubtedly been of some considerable value on a number of operations. With regard to our main priority for directing artillery fire, we had not really had a great number of shoots, but we had been extremely effective in general tactical ground reconnaissance, keeping in touch and carrying out sorties of all kinds when asked. Our casualties were not serious, and the serviceability of the aircraft was quite remarkable. We began to see the advantages of having what I called a type of 1914-18 war aeroplane; just fabric, dope and wire, with an undercarriage that relied on elastics, and of course which could be run on ordinary Army WD petrol. All this turned out to be of great advantage while on operations, and the lesson was that the more sophisticated the machinery, the more difficult to maintain and keep in the air.'[11]

Another officer commented,

> 'My next most vivid impression was the value the unit can be to the Royal Air Force. We found ourselves constantly acting as interpreters of the RAF to the Army. One day it would be explaining to a Brigade Major how he could assist the airman by good ground signal discipline so that the airman could render him better support. Another day it would be explaining to an infantry section the difference between a low-flying Spitfire who was endeavouring to make a get-away home with all his ammunition gone, and a *Stuka* intent on bombing the Company locality. The Air OP Pilot was in a sense the most forward RAF observer in the battle, and with his trained airman's eye could assess the effect of our own and the enemy's air activities on the land battle. Time and again we reported to RAF Headquarters,

An Auster III getting airborne from Vasto, late 1943.

> forty or more miles behind, information of enemy air tactics which later proved invaluable. I do not believe yet that the RAF realize fully the value they can get from the Air OP Squadrons, value in no small part due to the air training which they themselves have so whole-heartedly given to officers of another Service.'[12]

Sicily and Italy

No 651 Sqn was transported to Sicily in one of the newly introduced Landing Ship Tanks (LST), arriving on 13 July and being attached to 13th Corps as it advanced through Catania and along the coast to Mount Etna. The value of Air OP assets very quickly became apparent when an ammunition train was blown up by night-harassing fire which had been registered by an Air OP aircraft just before dusk. In August 1943 the squadron began flying in support of offensive operations by 8th Army – by day and also at night – registering targets and directing counter-battery fire, including that of warships of the Royal Navy; the fire of the 15-inch guns of the monitor HMS *Erebus* being successfully directed by Jim Neathercoat at an enemy ship in Catania harbour. The squadron was at this time partially re-equipped with Auster IIIs.

The Americans advanced on the west and the British to the east. They joined forces at Messina on 17 August. Sicily had been captured. At 07.30hrs on 3 September, Capts Carmichael and Magrath of A

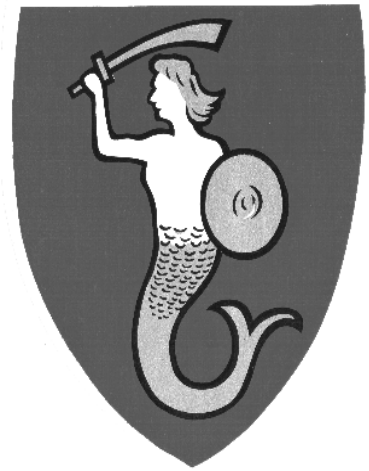
Flight became the first Air OP pilots to cross the Straits of Messina to participate in the invasion of Italy, thus becoming the first Allied air unit to be based on mainland Europe. Within a fortnight two British divisions had advanced as far as Bari on the coast of the Adriatic. However the fighting up through Italy would prove to be intense on the ground, though for the Austers the air threat was diminished, allowing shoots to be directed with the aid of binoculars from as high as 5,000 feet. By late 1943 No 651 Sqn was on the Adriatic Coast where it took part in the battle of the River Sangro, assisting 5th Corps and receiving a mild rebuke from HQ for over-boldness:

> 'We know from intelligence sources that the Germans have a great respect and dislike for the Air OP. They have in fact issued orders that no movement or firing will take place while the aircraft is in the air. It is possible that this success has made 10 Corps Squadron [651] forget the rules. Two days ago I saw aircraft of A Flight flying within easy rifle range of the enemy and I know that B Flight do this continuously. I do not suggest that we should attempt to dampen the ardour of these excellent young men, but we are asking for trouble if we allow them to become too cheeky. Orders therefore should be issued that, except under exceptional circumstances and on direct command of a senior RA Officer, the aircraft should conform to the accepted rules of procedure and thus remain on the active list for their very important primary role.'[13]

The Auster was known to the Germans as the 'Orderly Officer', owing to the regularity with which he visited them.

New types of operational sorties were devised, including early morning 'Met' flights to gather barometric pressure and temperature readings which enabled the artillery to calculate the correction which needed to be applied when ranging guns on a particular target.

No 651 Sqn's War Diary gives a contemporary view of life on the front line. The entry for 3 January 1944, for instance, tells of A Flight's landing strip which had been constructed for them on a siding in Ortona railway station, 'The area has been under harassing fire from this time onwards. Houses on either side of Flight HQ were hit again today.'[14] Near Ortona Capt Riley registered nineteen targets in one day, using Merton gridded oblique photographs as a means of



The Maid of Warsaw emblem of 2nd (Polish) Corps that No 651 Sqn's personnel have been authorised to wear on No 2 Dress since 1977.

picking out his targets, many of which were in olive groves. The expertise of the wireless technicians was much appreciated by the pilots, as from one tiny aircraft it was possible to command the fire of not just a single gun but of a Corps artillery if necessary – up to 400 guns of all sizes.

In May 1944, the squadron, now with the excellent Auster IV being introduced, flew in support of 2nd (Polish) Corps during the capture of Monte Cassino, the ancient Benedictine monastery, built on the top of a mountain, which was a key stronghold of the Gustav Line and dominated the route which the Allies would have to take to capture Rome. It is due to their participation in this famous victory that Nos 651 and 654 Sqns were both awarded the right to wear the *Maid of Warsaw* emblem, which was officially presented on 10 October.

The Gustav Line was abandoned on 23 May and by 4 June Rome had fallen to the advancing Allies. During the assault on the Gothic Line (which ran across Italy from Leghorn to Ancona) in August 1944, the squadron was attached to 5th Corps as it slogged across the many rivers on its line of advance, attacking the last enemy defensive line north of Florence that blocked the way northwards into Austria. The squadron's ORB records that its landing grounds came under frequent shellfire and that pilots were registering as many as nineteen different targets in a day. It can be said that it was during the Italian campaign that Air OP really came into its own and was completely accepted by the armies and air forces involved as an integral part of the order of battle. The Austers were also found to be of great use in the transportation of engineers and other specialists on tactical reconnaissance missions, so enabling unit commanders to view in advance the ground over which their formations were to progress.

Auster III – Italy 1943.

Throughout the remainder of the war the Auster IVs, and subsequently Vs, of 651 Squadron worked with almost every division in Italy as they came in and out of the front line. In April 1945 as the Allies renewed their attack, following a winter pause, it is recorded that the squadron directed 661 shoots, which required 1,135 operational flying hours. During the attack across the River Senio for much of the time all twelve of No 651 Sqn's Austers were in the air simultaneously, with each pilot undertaking two counter-battery shoots. It is a remarkable testimony to the skill and dedication of the RAF fitters and riggers, that the Austers kept going and never let the unit down. Another important activity was tank hunting on the Lombardy Plain in co-operation with RAF 'cab-rank' fighter bombers and their ground-based RAF forward control officers.

A good example of this co-operation is shown by an action on 20 April 1945, when Capt W S Barrow spotted a German tank hiding in a farmyard. Radioing back to base and giving details of the tank's location, a nearby Spitfire squadron was alerted, who despatched one aircraft. Using the Auster to pinpoint his target, the Spitfire pilot then dived down towards the unsuspecting enemy, released his bombs, and scored a direct hit. Capt Barrow then landed his Auster in the next field, and was told all the gory details by the Italian farmer, who had

watched the whole affair from a ditch in a nearby field.

As the Allies broke out towards the River Po, the Germans were in full retreat, and 651 Squadron spent most of its time searching for opportunity targets, which as well as tanks, included on one occasion, a convoy of two hundred vehicles. On 29 April the ORB notes that, 'The Italian Campaign appears to have come to a close insofar as organised resistance goes. The Squadron will standfast present location and await further orders.'[15]

The Divisional Commander, hoping to prevent further lives being lost, asked a pilot from the squadron to risk his neck and fly low over the enemy forces to drop a message. He was shot at from the ground but a deputation was soon sent from the enemy seeking to parley.

Austria and the war ends

With the fighting all but over, at the beginning of May 1945 the squadron moved up to Udine in Northern Italy, and then, after the German surrender was signed, to Klagenfurt in Austria.

The arrival at Klagenfurt was somewhat dramatic for the squadron's vanguard, Capt F J Reynolds:

> 'During a reconnaissance of the Klagenfurt area in the afternoon of May 8, I received orders from Major Neathercoat to land in a field near Villach. Major Neathercoat met me here and gave me further orders to proceed to Klagenfurt aerodrome and if it was serviceable (the Royal Engineers were expected to be there) to land. I arrived over Klagenfurt aerodrome, and saw a green Verey (*sic*) light rise from near the control tower. On taxiing in I was surprised to see the ground staff were using flags to signal me in. I soon saw that they were *Luftwaffe* personnel and, presuming them to be acting under orders of the Royal Engineers, I taxied in and switched off. A Lieutenant came up to me as I climbed out of my aircraft. A few minutes conversation showed me that I was the only Englishman on the airfield, and that I had landed amongst the full station personnel armed with all sorts of weapons, and possessing a varied selection of aircraft from FW190s to Fieseler Storches. I saw that it was up to me to prevent, as best I could, any sabotage to their equipment (as well as any to my aircraft or myself). There followed a rather uncomfortable afternoon and evening bluffing

'. . . a small unit comprising one aircraft, two RAF and two Army personnel, plus one officer.'

> the Station Commandant that I had expected to find things as they were and that my unit was due to arrive at any moment. By dusk my stay was wearing a bit thin when, to my relief, Major Neathercoat appeared in his jeep. He went off to find some infantry to occupy the aerodrome and thirty minutes after dark, they arrived, and I posted them at strategic points with machine-guns covering the hangars and runways.'[16]

All fourteen Austers were then able to fly in a 'V' formation through the mountains of Austria to Klagenfurt as a complete unit. This had not been the case for the previous three and a half years as, in the words of Jim Neathercoat,

> 'Throughout the entire period most of the officers and lads had lived each as part of a small unit comprising one aircraft, two RAF and two Army personnel, plus one officer. This unit had one 3-ton lorry and a jeep. They lived, ate, slept, fought, died, laughed and cried together. A very democratic unit.'

Decorations awarded to 651 Squadron between 1942 and 1945 included one DSO, one MC, sixteen DFCs, one MM, three Croix de Guerre and two Polish Crosses of Valour. It speaks volumes for the spirit of the squadron that the OC recommended the latrine orderly for a Mention in Dispatches as, 'for three and a half years he had literally dug his way from the beach at Algiers all the way to Austria.'[17] Sadly, despite Jim Neathercoat's protestations, Corps HQ decided not to

forward his recommendation on the grounds that there was no precedent for it.

His fellow early Air OP pilot, Andrew Lyell, later wrote of him,

> 'I think the Air OP owed far more to Jim Neathercoat than to any other man, except of course Charles Bazeley. Jim was calm, casual and confident at all times, however great the emergency. He was friendly and helpful to those under him and won their affection. And he never asked anyone under him to do anything that he was not willing to do himself.'[18]

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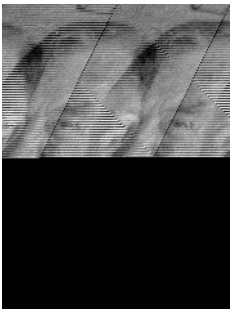
Notes:

1 Joyce was succeeded as OC by Major H C Bazeley RA on 1 October 1941.
2 *Memoirs of an Air Observation Post Officer*, p32.
3 *Ibid*, p38.
4 *Unarmed into Battle*, p27.
5 Unpublished memoir, p26.
6 *The Eye in the Air*, p176.
7 *Unarmed into Battle*, p38.
8 Unpublished memoir, p31.
9 *Wartime Reflections of an Air OP Pilot*, p63.
10 *Unarmed into Battle*, p42.
11 *Wartime Reflections of an Air OP Pilot*, p66.
12 *Unarmed into Battle*, p41.
13 *Ibid*, p50.
14 TNA AIR27/2167.
15 *Ibid*.
16 651 Squadron – A History 1941-65, p44.
17 'Wartime Reflections of an Air OP Pilot', Part II, p16.
18 *Memoirs of an Air Observation Post Officer*, p26.

AIR OP AND THE ARMY AIR CORPS, POST-WW II

Col Michael Hickey



After Sandhurst, Michael Hickey saw action in Korea and, as an Auster pilot, in Malaya. Having converted to helicopters, he flew these during the Suez episode of 1956 and later in East Africa, the Far East and Germany. He commanded, inter alia, independent flights in Korea and Germany, No 656 Sqn in Malaysia, No 655 Sqn in BAOR and JATE at Brize Norton, 1976-78. He has served as an instructor at the Royal Military College of Science and as a Defence Fellow at Kings College London, was, for a time, the Director of the Museum of Army Flying and is the author of several books on military history.

Anyone hoping to hear a tooth and nail account of inter-Service rivalry and mutual throat-cutting is going to be sadly disappointed. The real problems facing this nation and its armed forces post-1945 were geopolitical, cultural and economic. The situation was exacerbated by the lack of a tri-Service defence staff in Whitehall and the alarming decay of our defence and heavy manufacturing industries – notably the design, development and manufacture of all types of aircraft.

Within weeks of the surrender of Japan, most of the RAF's twelve Air OP squadrons were disbanded. One was retained in the UK and by 1950 there was a squadron in each of the Middle East, BAOR and Far East. Air OP support for the large Territorial Army (in which discharged conscripts were required to serve on a part time basis) was eventually recognised in 1949 when five squadrons were re-formed as part of the Royal Auxiliary Air Force, one to each of the Army's Home Commands.

The post-1945 organisation of Air OP squadrons remained as devised by Colonel Bazeley in 1940. The RAF provided aircraft, specialist vehicles such as fuel bowsers, an Adjutant, an Equipment Officer and the technical groundcrew, with the Royal Artillery furnishing all non-technical personnel – drivers, signallers and clerks. Training of Royal Artillery officers for Air OP duties was undertaken

Representative of the five, jointly-manned, post-war RAuxAF Auster units, a dual-controlled T Mk 7 of No 666 Sqn. (MAP)

by the RAF's Light Aircraft School at Andover.[1]

Late in 1945 the Directorate of Operational Requirements in the Air Ministry began to study the requirement for future aircraft. The true extent of the Soviet threat had yet to materialise so this future was somewhat hazy at the time. Within the Directorate was a small cell, in which the Army was represented by a solitary staff officer. From 1946 this post, linked to the Army's Directorate of Land-Air Warfare, was filled by a wartime Air OP pilot, Lt Col Jock Scott, who was expected to feed in, not only the Army's needs for observation and light liaison aircraft, but also its requirements for tactical and strategic troop transport.

Scott's task was hampered from the outset by two factors. First, despite the wide operational experience gained from recent wartime Air OP operations, none of the senior officers in the War Office had been involved in this activity and few of them expressed any interest in this exotic sideline. He also received a stream of conflicting advice and opinion from the Commanding Officers of the current Air OP community – all of whom were very familiar with the practicalities of

[1] The genealogy of the Auster training units is a little complex. In May 1947 the wartime No 43 OTU (at Andover since 1944) became No 227 OCU which moved to Middle Wallop in 1948 where, in May 1950, it was restyled as the Air Observation Post School only to be rebelled again in April 1953 when it became the Light Aircraft School, retaining that designation until it became an Army unit in 1957. **Ed**

warfare but quite unaware of the Machiavellian world in which Scott struggled manfully to put the Army's views across (or indeed invent them when he found that the Army Council knew little, if anything, about aviation – and cared even less).

The second factor was that the Air Ministry would have to foot the bill for any new aircraft introduced into Air OP units, which were 'owned' by the RAF but clearly there solely to serve the Army's interests. At this point the very idea of paying for helicopters in the Air OP role was anathema to the Air Ministry. Nevertheless, Scott, having consulted with the Royal Artillery, and determined to sustain the Air OP concept, submitted, as the War Office's view, a requirement for three types of helicopter: a light two-seater as an Auster replacement, plus a four- to five-seater for general reconnaissance, light liaison and the rapid movement of small parties of troops and light cargo and, finally, a cargo helicopter with a 3-ton payload. Scott's paper was not received with enthusiasm by the Air Ministry and it can be stated reliably that one of the comments made as it circulated around the air marshals was 'Laugh and tear up'. Despite this, in 1946 the Air Ministry agreed to the formation of a helicopter trials unit. Equipped initially with Sikorsky R-4s, and later with the more powerful R-6, it was based at Andover and manned by pilots of No 657 Sqn. This was a significant step forward .

At the time, the Service Chiefs were confronting a formidable array of tasks, listed in the Defence Review of February 1946 as:

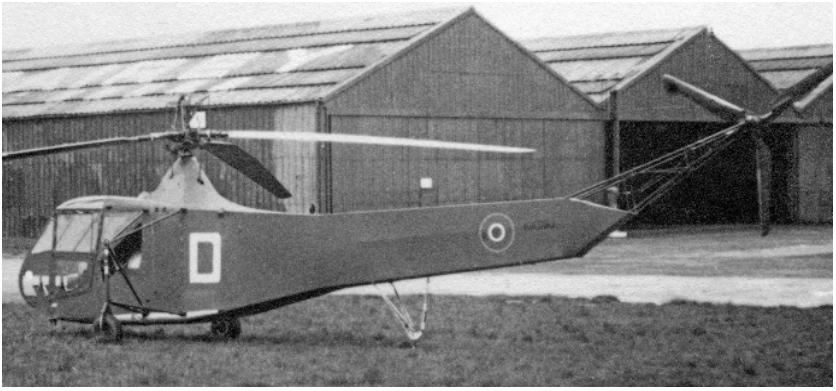
- Ensuring the terms of surrender of Germany and Japan.
- Provision of occupying forces, disarmament, demilitarisation and the creation of strike forces to meet unforeseen emergencies.
- A share of the Austrian Occupation Forces (offering what was regarded as a plum posting for anyone who could get it).
- The maintenance of law and order in North East Italy (only slightly less desirable).
- Assistance to Greece in its recovery – by force if needed (undesirable).
- Maintenance of the British Mandate in Palestine (distinctly undesirable).

- Liberation of Japanese-occupied former British, French and Dutch possessions in SE Asia (good prospects of really enjoyable soldiering).
- Internal Security throughout what remained of the British Empire, including the impending end of the Raj in India, and the demands of former colonies for full independence.
- Safeguarding of imperial communications and bases worldwide.

Although vast stockpiles of military equipment remained, much of it already beginning to deteriorate by the end of 1946, the skilled and experienced manpower needed to operate it was draining away as a consequence of demobilisation. Despite this, the need to maintain security overseas increased, especially east of Suez where, by 1945, British prestige had been irreparably damaged.

By 1948 the independence of India and Pakistan had removed the hinge of British defence policy and it was decided to create a new strategic base in Kenya. 1949 saw the creation of NATO. By now, inept political handling of our defence industries was about to land the Air Staff in a quagmire of indecision. What combat aircraft to order? Against what threat? And where? Browsing through *Jane's All the World's Aircraft* for 1950 reveals a profusion of aviation projects that were foredoomed. One wonders what might have happened had the Supermarine Swift gone into service as the primary interceptor instead of the Hunter; and then there was the costly decision to order the development of no fewer than three nuclear bombers, plus a fall-back in case all the others failed at Boscombe Down. Against that background, it was hardly surprising that the provision of light observation aircraft, to say nothing of observation helicopters, for the Army, was a low priority in the early post-war Air Ministry.

Nevertheless, sense and sensibility eventually prevailed. Air OP pilots at Andover reported favourably on the helicopter's suitability as an observation platform and well-publicised demonstrations were held at Larkhill in the summers of 1946 and 1947. These included casevac trials, at one of which the Matron of Oxford's John Radcliffe Hospital, watching with alarm as a volunteer 'patient' was loaded onto a flimsy stretcher attached to the helicopter's undercarriage, was heard to comment that she had always thought of men as insane but was now



A Sikorsky R-4 Hoverfly, KK990. (RuthAS)

totally convinced of it.

The trials showed that Sikorsky's early helicopters were heavy on maintenance – one pilot reported that his machine appeared to be consuming more engine oil than petrol. It was time to look for more sophisticated helicopters and these were only to be found abroad. Although there were a number of innovative rotary wing projects in this country during the 1950s, notably by Bristols and the Cierva Company, lack of political backing and funds ensured the slow death of our rotary wing design capability, with Westland pursuing a less adventurous policy of building Sikorsky models under licence.

Given the extent of the complex staff work associated with the introduction of the V-bombers in the mid-1950s, it is hardly surprising that little attention was paid to the development of strategic and tactical transport aircraft for the RAF, let alone light observation aircraft. In the United States however, the Korean War revealed the potential of transport, as well as light observation, helicopters. However, in 1950 the RAF re-formed No 1906 Flt with Bristol Sycamores at Middle Wallop. Tasked primarily for liaison duties, usually involving VIPs, the aircraft were flown by Army pilots but maintained by RAF technicians.

Meanwhile, conventional Air OP units, both regular and auxiliary, were equipped with the Auster Mks 4 and 5. The training of selected gunner officers as Air OP pilots continued to be handled by the RAF at Andover until 1948 when the school moved to Middle Wallop.

Auster Mk 6s of Nos 1910 and 1915 Flts at Kermia (north of Nicosia) Cyprus) 1956. (Lt Col J F Tippen)

Basic training was conducted on Tiger Moths before progressing to the Auster Mk 5 and ultimately the newly introduced Mk 6. As the Tigers lacked any form of radio the Wallop traffic pattern was not only highly diverse but depended on lamp signals and intelligent use of the signals area in front of the control tower – which could be quite entertaining at times.

Overseas commitments ensured that the need for Air OP not only continued, but increased. There was, for instance, trouble in Palestine, the outbreak of the communist insurgency in Malaya and problems in North Africa, where Air OP units were stationed in Libya, Eritrea and the Canal Zone. At the same time NATO began to demand higher force levels in Germany. Thus all three Services faced increased global commitments, albeit initially relying largely on wartime stocks of equipment and munitions.

The rebuilding of Bomber Command, and the expansion of Fighter Command, inevitably meant that replacing the ageing Auster fleet attracted a relatively low priority. Despite this, the Malayan Emergency, compounded by the outbreak of war in Korea in 1950, served to increase the demand for Air OP pilots. The Royal Artillery found it difficult to provide the required numbers, a problem that was solved by employing officers and NCOs of the Glider Pilot Regiment, which was about to dispose of its remaining Horsas and Hamilcars.

These men, and volunteers drawn from across the Army, attended the RAF's light aircraft course alongside the gunners who were being trained specifically for AOP duties. The augmentees were introduced to the basics of fire control and then posted to fly Austers, initially as light liaison pilots. The fact that this influx had come from such a variety of regiments and corps meant that they brought with them a wide range of all-arms experience and in the long-term this proved to be of immense benefit.

No 656 Sqn – Malaya

The Army's most pressing commitments in the 1950s were in the Far East, where No 656 Sqn was fully extended in Malaya as part of the Far East Air Force. After playing a key role during the bloody campaign in the former Dutch East Indies following the defeat of Japan, the unit had been withdrawn to Singapore and reduced to a single flight. As the Emergency spread throughout the peninsula the unit was restored to full strength with its HQ based alongside Army headquarters in Kuala Lumpur, and flights stationed in Singapore and those Malay States most affected by terrorist activities.

Operating light aircraft in Malaya posed problems. As late as 1953 few Austers carried VHF radio and communication depended on the, often temperamental, '62 set'.[2] Nevertheless, by using a trailing aerial and skywave, and the remarkable ingenuity of the squadron's signallers, it was possible to operate a tactical squadron net throughout the operational area. The Malaysian climate was hostile to light aircraft parked in the open. The diurnal weather pattern consisted of calm mornings with low cloud; after mid-day, a huge build-up of cumulonimbus brought late afternoon thunderstorms with heavy rain, hail, lightning and severe turbulence which could persist until well after sunset. Huge air currents could catch aircrew unawares and several experienced unwonted descents into primary jungle followed by an obligatory spell of practical survival training. New arrivals underwent careful familiarisation before being committed to operations, including attachment to infantry patrols in deep jungle.

The main task was unending visual surveillance over dense jungle,

[2] The Wireless Set No 62 was a low power, short range HF transceiver built by Pye which worked in the frequency range 1.6 to 10 MHz. **Ed**

The last of the line - an Auster Mk 9 of No 656 Sqn in Malaya.

into which the terrorists had been driven as the so-called 'Briggs Plan' forced them away from the Chinese squatter population. In the jungle the terrorists were compelled to set up camps and dig vegetable gardens. However cunningly these were concealed, 656 Squadron's pilots acquired the ability to recognise the fleeting glimpse of tilled red earth under the jungle canopy, and the even more carefully camouflaged camps with their palm thatch roofs and well trodden parade grounds. Once located, these were carefully plotted and kept under observation. If the infantry were within marching distance, they could be dealt with by a carefully planned assault, co-ordinated, when required, by an Auster pilot who guided the troops during their approach march. This would often last as long as a week with the Auster dropping boxed rations and medical supplies, keeping track of progress and providing a daily radio fix by relaying the grid reference of smoke sent up at midday. The final stages of an operation of this nature could be extremely tense, but the degree of co-operation between pilots and infantry was highly developed and produced gratifying results in terms of 'kills'.

But there was more to Auster operations than co-operation with the infantry. When a bandit camp was located in deep jungle another option was for the RAF to deliver an air strike. In the early days this often involved unassisted area bombing, which was a convenient way of using up wartime stocks of iron bombs, although it achieved

relatively little in terms of anti-terrorist operations. This was understood by FEAF, of course, and by 1952 the original Spitfires, Beaufighters and Brigands had been replaced by Hornets and Lincolns. Until the end of 1953 air strikes were limited to daytime, but trials using Austers as pathfinders to mark targets with flares dropped from light series carriers showed that targets could be attacked with precision by day or by night.

The procedure involved an Auster, at 2,000 feet, illuminating the area with white flares whilst the marker pilot would descend to just above tree top level and place a red flare exactly on the aiming point. Both aircraft then made a hurried exit as the Lincoln formation – sometimes up to seven aircraft – was timed to release its bombs no later than 90 seconds after the red flare lit, their navigation having been assisted by searchlights located at waypoints on the route up from Singapore. Even so, the marker was quite likely to be less than two miles away when the bombs detonated and the Auster would receive something like the kick of a mule as an area of jungle about the size of Wembley stadium became airborne.

The accuracy of these precision attacks, many of which were facilitated by No 656 Sqn's Austers, both by day and by night, gradually bore fruit. Captured terrorist couriers, and documents recovered from recently bombed camps, began to show a marked decline in terrorist morale. This was exploited by brilliantly conducted Special Branch infiltration of the Communist Party and the use of carefully worded air-dropped leaflets. From 1955 onwards the increasing use of naval and RAF helicopters enabled the infantry to carry out rapid follow-up action using aerial intelligence and the Malayan campaign was declared officially over in 1960.

If the ethos of today's Army Air Corps was forged anywhere, it was in the Malayan jungle, for it was the way in which the Emergency had been so successfully handled that woke up the Army Council and led it to appreciate the value of having soldiers flying close aviation support.

The Korean War did not involve RAF combat units (although a number of its pilots served with distinction on attachment to the USAF), but No 1903 (AOP) Flt and No 1913 (Light Liaison) Flt both flew in support of 1st Commonwealth Division. Their outstanding performance, together with that of 656 Squadron in Malaya, was

instrumental in leading to the creation of the Army Air Corps in 1957. This development was not a by-product of inter-Service squabbles; it was, essentially, because the Air Ministry, faced with constant demands for new aircraft and helicopters, very properly decided that it was time for the War Office to pay for its own aviation.

Early Rotary-Winged Developments

In theatres nearer home the concept of battlefield army aviation had been slow to develop. However, the War Office eventually began to show signs of enterprise following the US Army's successful use of helicopters in Korea. The impetus came from one of the Army's foremost logisticians, Maj Gen Ritchie the Director of Supplies and Transport, who suggested to the Army Board that, in the forward combat zone, cargo helicopters should be used instead of trucks to carry ammunition, fuel, engineer stores, troops and so on, thus freeing the Army from dependence on roads that were increasingly vulnerable to air attack. As the result of discussions with the Air Ministry, also now beginning to show an interest in the potential of the helicopter, the Joint Experimental Helicopter Unit (JEHU) was formed at Middle Wallop. A bi-Service organisation, it began life in 1955 with two, of an eventual establishment of six, Sycamores which were joined in 1956 by half-a-dozen Whirlwind HAR 2s (Westland-built Sikorsky S-55s).

Half of the aircrew were provided by the Army, including the CO, Lt-Col Jock Scott – still leading the pro-helicopter campaign from the front. Former fixed wing AOP pilots attended a short manufacturer's helicopter conversion course, while most of the RAF men were already experienced, having flown helicopters in Malaya or with an air-sea rescue unit. As always, technical support was handled by RAF personnel, all other ground jobs being carried out by soldiers. The unit's task was to assess the value of the cargo helicopter in close support of land operations. Until mid-summer 1956 intensive trials were undertaken, exploring a variety of relevant roles.

Then, in October 1956, the Suez crisis erupted. With the 'experimental' temporarily dropped from its title, the JHU, with six Sycamores and six Whirlwinds, embarked on the light fleet carrier HMS *Ocean,* bound for the Mediterranean. On 6 November, in conjunction with ten RN Whirlwinds of No 845 Sqn from HMS

A Whirlwind HAR 2 of the JEHU. (G Lawrence)

Theseus, the combined helicopter force proceeded to put the bulk of 45 Commando ashore at Port Said, bringing out casualties on their return flights. This is not the place in which to analyse the conduct of Operation MUSKETEER. Suffice to say that the heliborne assault – a 'world's first' – showed that helicopters, boldly handled, could have a decisive impact on the battlefield. On return to the UK, JEHU resumed its trials programme which included a particularly successful exercise in 1957 in Germany when twelve helicopters maintained an armoured brigade in the field under mobile war conditions for over a week – a task that would have demanded over 120 3-ton lorries.

Although the Rhine Army exercises convinced many that support helicopters should be developed and integrated into the field army, political wavering and the inability of many senior generals to perceive the future shape of the Army, meant that it was not to be. The JEHU, an outstanding example of Joint Service collaboration, was disbanded in 1959. Its helicopters were handed over to the RAF to form No 225 Sqn, the nucleus of what would become the support helicopter element of 38 Group.

At this time, the main thrust of Army development was a major re-equipment programme, not least because virtually all of BAOR's wheeled vehicles were of WW II vintage, and many even older.

Furthermore, the field artillery regiments within the infantry divisions were equipped with the 25-pounder towed gun, offering no nuclear protection for their crews, and there was no British nuclear artillery until some American 8-inch cannon were acquired in the early 1960s. The urgent need for self propelled artillery and armoured personnel carriers for the infantry, together with a political commitment to a 50,000-troop level in Germany, dictated that the main thrust of re-equipment would lie on the Rhine for the immediate future. The single Air OP squadron and one light liaison flight in Germany, both equipped with Austers, had to be augmented and a squadron was duly allotted to each infantry and armoured division, with a Wing Headquarters at Detmold.

The expansion of Air OP facilities inevitably added to the demands being placed on the RAF's equipment budget and this was further exacerbated by the introduction of the Skeeter from 1956. It was becoming increasingly apparent that, if the Army was serious about securing a more capable means of conducting battlefield reconnaissance and light liaison, it would have to fund it from its own budget. After several years of deliberation the Army Air Corps (AAC) came into being on 1 September 1957, taking the place of the Glider Pilot Regiment which disbanded on the same date.

The Army Air Corps

While the AAC may have been born in September 1957, it had been conceived on 21 February when the recently appointed Minister of Defence, Duncan Sandys, had directed that the War Office was to assume responsibility for the manning and operation of unarmed light aircraft not exceeding an all-up weight of 4,000 lbs. It now seems, from a distance of over half a century, that this arbitrary figure had not been adopted, as is often supposed, in response to pressure from the Air Ministry. The Air Staff was pre-occupied with matters of far greater weight at the time. The 4,000-pound limit was a consequence of the failure of senior members of the Army Council to appreciate the differences between all-up weight, payload and empty weight. This decision was to bedevil army aviation for several decades, an early example of its unfortunate consequences being the transfer of title to JEHU's assets to the RAF, rather than the Army.

The creation of the Army Air Corps posed manning problems, not

least because the RAF's technical support, which had served the Army's aviators so well since 1940, had to be withdrawn and replaced by technicians found from within the Army. Volunteers from all arms were invited to apply, making it necessary to devise a system that would provide them with a satisfactory career structure within the early AAC. The initial intention was that there would be a relatively small cadre of professional permanent aviators who would form the instructional element, the majority of flying appointments being filled, as had been the case in the Glider Pilot Regiment, with seconded officers. It soon became clear, however, that many of those applying for transfer to the new corps were ambitious and keen to make it their permanent regimental home.

So far as organisation was concerned, the Army assumed command of Middle Wallop, the RAF's Light Aircraft School becoming the Army Air Corps Centre. A Light Aircraft Squadron was stationed in the UK, available for deployment world wide as part of the Strategic Reserve whilst elsewhere: BAOR was to be served by a Light Aircraft Squadron plus an independent Light Liaison Flight; there was to be similar provision for the Middle/Near East with Malaya having a Light Aircraft Squadron and Hong Kong an Independent Flight.

The Defence White Paper of 1957 meant that these were turbulent times for all departments of the defence establishment, not least the Army which was required to lose 170,000 men over the next four and half years, with conscription ending in 1960. Nevertheless, additional demands were to be placed on the Army when it was decided to establish a strategic base in East Africa, the Independent Flight stationed in Libya being transferred to Kenya where, as 8 Flight AAC, it achieved remarkable feats.

Another crisis soon developed due to malevolent Egyptian influence at work in the recently created Federation of South Arabia. Whitehall, decided to set up yet another military base and strategic stockpile in Aden and, at immense cost, the latest military folly was planned and began to build as the, still new, Kenya base began to empty in the face of moves for independence in Tanzania, Uganda and finally Kenya. The Army Air Corps element in the Aden garrison expanded to become a wing and by the end of 1962 its squadrons were heavily committed to up-country operations in the Radfan mountains – surely one of the most extreme theatres in which the Army had yet

An Aden-based AAC Beaver bomber – note the 28 lb bombs under wings. (Lt Col Richard Grevatte)

operated its aircraft.

Meanwhile, a major re-equipment programme was under way. Experience with the last of the Auster line – the Mk 9, in service from the mid-1950s and a totally new design compared to previous Austers – was unable to cope with the hot and high operating environment encountered in East Africa and Aden. Fortunately, the unsatisfactory fixed-wing situation had been under review for some time and the problem was solved by buying, eventually more than forty, De Havilland Canada Beavers, a true 'bush' aircraft. These were used very effectively in East Africa, Aden and the Far East, as well as in Germany where, by now, it had been decided to establish aviation units with selected armoured, infantry, artillery and engineer units with the Royal Corps of Transport assuming responsibility for liaison flying with Beavers.

The rotary-winged position was equally unsatisfactory to begin with, the limited performance of the diminutive two-seat Skeeter, rendering it quite unsuitable for operational service anywhere outside north west Europe. Nevertheless it provided the AAC with experience of operating light helicopters in the field and permitted the rest of the Army to see helicopters close-up as they conducted tactical reconnaissance exercises. As with the fixed-wing situation, however, operations in Aden demanded something new and a potentially suitable turbine-powered helicopter, the Saunders-Roe P.351, had first flown in 1958. Subsequently taken over by Westland, and powered by

The Westland Scout.

the 1,000hp Blackburn (later Bristol-Siddeley, later still Rolls-Royce) Nimbus turboshaft, it eventually entered service in 1963 as the Scout which proved to be a practical and robust battlefield helicopter, serving satisfactorily in BAOR, Aden and the Far East. It was subsequently complemented by the Sioux, the Bell 47 built by Westland from 1964 onwards under licence from the European franchise-holder, Agusta.

In the meantime, with operations in the Radfan escalating, a new crisis erupted in the recently established state of Malaysia. It started in December 1962 with a revolt in Brunei, followed by Indonesian incursions into East and West Malaysia which developed into what became known as 'Confrontation'. This campaign, which went on until 1966, was conducted over a vast area of largely mountainous and jungle-covered terrain. The airfield at Tawau in the east of Kalimantan was some 1,300 miles from the British base in Singapore which, as Air Marshal Foxley-Norris pointed out, 'was analogous to operating a tactical airfield in Greece with its support and technical backing in Sussex'. Under these circumstances, air mobility was critical – and the helicopter essential. In-theatre airlift was provided by RAF Sycamores, Whirlwinds and Belvederes and the RN with the Wessex while the AAC operated Scouts and Sioux as well as Beavers and Auster 9s, the latter undertaking light communications duties, leaflet

dropping and even anti-piracy patrols. Inter-Service co-operation at the sharp end was outstanding – perhaps because the action was far distant from superior headquarters in Singapore?

Experience in counter-insurgency operations, worldwide, had indicated the need for helicopters flying in a hostile environment to be provided with defensive armament, usually a pintle-mounted machine gun fired through the open cabin door. The US Army had been taking this a step further with trials of offensive weapons, fixed forward firing guns and rockets eventually leading to wire-guided missiles capable of engaging tanks at ranges of several thousand metres. French experience in Algeria in the mid-1950s had also been encouraging. In the UK, a paper raised by the Joint Service trials establishment at Old Sarum in 1960 suggested that the Scout helicopter, which was just entering production, might be a suitable platform for anti-tank guided missiles. Ten years later, at Detmold in Germany, the Army's first anti-tank missile unit, No 655 Sqn, became operational, equipped with the Nord SS-11. This initial capability was later extended by the introduction of the Lynx helicopter, progressively improved sighting facilities and missile systems, like TOW and Hellfire, with an effective range of as much as 8 kms.

To take advantage of aerodynamic advances, which conferred much greater powers of manoeuvre, the American had begun to discard the practice of fitting weapons to, what amounted to, utility helicopters in favour of dedicated attack machines or 'gunships' embodying sophisticated, night-capable target acquisition and fire control systems. The first generation of Cobra gunships proved invaluable in Vietnam and that experience led to a new generations of attack helicopters, like the Apache. The British version, assembled by Westland, re-engined by Rolls-Royce and fitted with a number of British avionics, including secure communications equipment and the defensive aids suite, also has (uniquely for Apaches) folding rotor blades, permitting it to operate from ships. All of which makes the British Army's Apache one of the most capable attack helicopter in the world.

Throughout the 1980s and '90s new commitments continued to arise, confirming the truth in the proverbial 'nothing is as certain as the unexpected'. Sure enough, in 1982 an amphibious expeditionary force had to be assembled at short notice to re-take the Falklands. Not

The AAC's fearsome Apache AH 1.

long afterwards it was Iraq and the Balkans, the latter running true to historic form; then it was Sierra Leone and Iraq again, all of these campaigns underlining the need for tactical air mobility. And now it's the quicksand of Afghanistan where the British Army has yet to win an away match, despite the hideous lessons of 1844 (loss of the 44th Foot), 1880 (loss of the 66th Foot) and continual outbreaks of rebellion from 1919 until 1939, only subdued at great cost and disruption. One wonders if any lessons are learned in Whitehall and Westminster.

AFTERNOON DISCUSSION

Jefford. Michael**,** you didn't have much to day about ArtyR. Having brought it to a high level of sophistication by 1945, did it simply go out of fashion? Did we still invest in the concept of air-directed artillery?

Col Michael Hickey. Yes. The guns were still there, but control was handled by Air OP. In Korea, for instance, the chaps in 1903 Flight conducted regimental, divisional and even corps shoots, the latter involving the American formations on either side of the Commonwealth guns. But there was no ArtyR, because we had no fighter aircraft in Korea. The Navy was flying carrier-based fighters in the ground attack role but they weren't trained for, or particularly interested in, ArtyR – nor was there any need for them to do it because the Air OPs were quite capable of fulfilling the role. In fact traditional WW II-style ArtyR was pretty much a dead duck, because of the increasingly high performance of fighter aircraft. Indeed I only ever saw it demonstrated once myself, at a gunnery demo day at Larkhill in March 1953. A solitary Meteor zoomed low over the awestruck audience, transmitted some terse instructions and a (previously registered) target out on the ranges was duly stonked – but this was not really a practical proposition by then.

Jefford. And was it a practical proposition to control gunfire from something like a Skeeter – was it actually done – popping up from behind the trees and directing fire?

Hickey. Oh yes. Bazeley's pre-1939 doctrine of popping up from behind natural ground cover to observe and correct the fall of shot continued to be practised after WW II, initially with Austers and, from personal experience, I can assure you that it was equally successful with light helicopters. I commanded a Skeeter unit in 4 Guards Brigade and our Gunners were commanded by an ex-Air OP pilot. When he discovered that I hadn't got a single Gunner pilot in my unit we were all given a crash course to buff up on what we had been taught at Middle Wallop – on the old canvas 'puff range' that you heard about this morning from Sir Freddie. I left Middle Wallop perfectly capable of directing a regimental shoot, certainly a simple exercise like a battery shoot, but by the time I finished my tour in

Germany, under the guidance of Col Peter Howard-Harwood – the old AOP pilot – I and my other pilots were going up, in Skeeters, on Hohne ranges, or at Grafenwoehr in the American Sector where there was a huge artillery range, and conducting regimental shoots and much else, including medium artillery – and even doing it at night! It was great fun – positively Wagnerian! I should add that this sort of thing is still done today, the advent of gyro-stabilised sighting systems having hugely enhanced the capabilities of a helicopter operating in this role.

Vic Flintham. A few comments, based on my uncle's log book. He was Aubrey Young, who features in Graham Pitchfork's second book in his *Men Behind The Medals* series.[1] Aubrey flew with 657 Squadron in Italy, writing off three Austers due to accidents while he was there. That highlights an interesting point – HQ Flight held in-use reserve aircraft and its staff flew operational sorties in addition to those conducted by A, B and C Flights. On at least one occasion the squadron added bombing to its repertoire when Popski invited them to drop some mortar bombs on a difficult machine gun site. It wasn't a particularly successful operation – and Popski got a severe telling off for poaching on air force preserves.[2]

A topic that is, I think, under-researched – and time would probably have prevented its being explored today – is the development of forward air control. This was, I believe, employed quite extensively in Italy using a system of 'Rover' call-ins associated with cab rank patrols. I am not aware that this has been written up anywhere. Perhaps it is something that I should do myself![3]

Finally, from conversation with Aubrey he asserts that one of his colleagues on A Flt actually conducted an Army shoot in Italy – although I have not seen that recorded anywhere – although I suppose that that might have been feasible in a relatively narrow peninsula.[4]

Richard Bateson. Referring, in part, to the morning session, I wondered whether any of the speakers had made any use of the records of the War Office Operations Branch, MO7, which was more or less the Army body dealing with air operations at that time. It was noted that the RAF's Official History makes very little reference to AOP; this may be because the Army Co-Op Command records for

1940-43, the AIR 39 Series held by TNA at Kew, are confined to a mere 147 files.

In that general context, perhaps I could draw attention to a book by Lt Col Charles Carrington which was published in the 1980s, with a Foreword by John Terraine.[5] Carrington left the Cambridge University Press in September 1939 to join MO7 who sent him on a course at Old Sarum to become one of the first Air Intelligence Liaison Officers (AILO). Sent to France in June 1940, he escaped from St Malo on the last ship to leave. Having reached Jersey, he used a local telephone box to call MO7 and arrange the last air strike on a target in France. In his book, he mentions many of the names that have come up today, notably Charles Bazeley; he discusses Exercise BUMPER (*see page 104*) and he talks about some interesting activity in Northern Ireland just after the fall of France, when a lot of the early work on liaison between aircraft and forward controllers was done. He also identifies Slessor as having been very influential between the wars in the field of army co-operation.

Hickey. Carrington was an outstanding person. I was lucky enough to get to know him about 30 years ago when I was up at Kings doing my Defence Scholarship. He'd got a tremendous record on the Western Front in WW I as an infantryman and he wrote a marvellous book about it.[6] As you say, he continued to write about his later experiences and he was a great inter-Service collaborator. I think he should be compulsory reading at Latimer, or wherever the Joint Staff College is these days – Shrivenham, of course, isn't it?!

Hugh Thomas. I'm afraid that I wasn't aware of MO7 – perhaps unsurprisingly, as I'm not an academic historian. But I would add that with the 'grasshopper' aeroplanes – the Cubs and Austers – there were a number of one-off episodes, like dropping petrol cans to get fires going. I've heard tales of them taking grenades up too, although they were a bit concerned that there was a significant risk that they might blow themselves up. There was an interesting episode in Burma where the guy in the back was able to use a gun to fire on Japanese troops. The most extreme case was probably an American who strapped rockets and bazookas to his Cub and used them to engage tanks. Probably more of a morale raiser than a practical proposition but, during WW I, when a great deal of air combat took place directly over

Lt-Col Charles Bazeley DSO

the lines where they could be seen by the troops in the trenches, it was a great boost for morale when one of our aircraft scored a victory. I believe that the presence of an Auster doing its stuff over the lines in WW II had a similarly positive effect, especially as it tended to be associated with neutralising incoming fire.

Steven Mason. Could anyone tell us something about Bazeley's career post-651 Sqn?

Guy Warner. Yes. He went on to write an analysis of the lessons that had been learned during the first deployment to France, including setting out the scales of equipment that an AOP squadron would need. He was then involved in training at Old Sarum for a while, before returning to the artillery. He commanded a battery during the Normandy landings and many years later, in an article describing his own experiences at that time, Lt Col Ian Neilson wrote in the warmest terms about the performance of Bazeley's anti-aircraft guns.[7] In recognition of his expertise with his guns, he was decorated by the Americans with their Distinguished Service Cross, which was quite rare. After the war he was less successful. Having rubbed too many higher-ups the wrong way, through his very strong advocacy of AOP, his military career stalled at lieutenant colonel so he left the Army. Sadly, however, everything he turned his hand to after that failed – both in business and in his personal life – and in 1955, at the age of 48, he took his own life.

He had written a memoir in 1948, however, which provides a personal account of the birth of the Air OP movement and of his own experiences within it. I have edited this, added a foreword and provided some footnotes to enlarge on some of the individuals whose names crop up. This has all been done with the full co-operation of the

Bazeley family, his four children, and, with sponsorship from them, industry and AAC sources, we shall shortly be publishing 1,000 copies. Some of these will be given, free of charge, to Woolwich and to Middle Wallop – and to Hendon if they want some – to be sold-on at 100% profit. So, although Bazeley has been rather sadly forgotten, his story will finally be told.

AVM Niven. And on that note, I think we can close the proceedings. I'm not even going to attempt to summarise the six presentations that we have been given today. Suffice to say that our chosen topic has, as intended, served to commemorate the 100th anniversary of the formation of the Royal Flying Corps and, speaking for myself, I certainly learnt a lot about the various units involved and about the evolution of doctrine, especially prior to WW II. It only remains for me to thank all of our speakers for the work that they put in to preparing their papers and for the exemplary way in which they were delivered.

Editorial Notes:

[1] Pitchfork, Graham; *Men Behind The Medals – A New Selection* (Sutton; Stroud; 2003).

[2] 'Popski', actually Vladimir Peniakoff, commanded an LRDG/SAS-style special forces unit, 'Popski's Private Army', in North Africa and Italy from late-1942 to the end of the war.

[3] Forward air control was considered briefly while the seminar was being planned but ruled out on the grounds that it was associated with the direction of fighter-bombers, not artillery fire, and CAS was specifically not on the agenda. That said, it is, of course an ideal topic for another occasion.

[4] An 'Army shoot' was a recognised option and thus was certainly feasible. Extending the Zone Call procedure for engaging unplanned targets that had been established during WW I, in 1942 the RA introduced a refined system which provided for concentrations of guns to be directed on an escalating scale. This permitted any observer to request (or, in the specific case of an AOP, to order) a Mike (regiment), Uncle (division), Victor (corps), William (army) or Yoke (AGRA) target.

[5] Carrington, Charles; *Soldier at Bomber Command* (Leo Cooper; London; 1987).

[6] Edmonds, Charles (a pseudonym for Carrington); *A Subaltern's War* (Peter Davies; London; 1929).

[7] Neilson, Lt Col Ian; 'The Role of the Air Observation Post in Combined Operations in Normandy, 1944' in *Aeromilitaria* (Spring 2007) which notes that Bazeley's unit shot down eleven German aircraft during the first three weeks in Normandy and broadcast warnings to the Air OPs over the Army radio net whenever enemy aircraft were in the vicinity.

SOLDIER PILOTS IN THE RAF 1920-41

by Wg Cdr Jeff Jefford

In the aftermath of WW I, elements within both the War Office and the Admiralty began to put forward the view that the creation of the RAF had been merely a wartime expedient. Since the war was over, it followed that there was no longer a case for a separate third Service and the Army and RN sought to recover their RFC and RNAS investments in what was now, arguably, a redundant enterprise. As CAS, it fell to Hugh Trenchard to defend the status quo and, with the active support of Winston Churchill, he was able to present a convincing case for the preservation of the RAF based on its demonstrable cost-effectiveness in colonial policing.

Nevertheless, some senior soldiers and sailors continued to harbour concerns that airmen would never really understand their requirements. Those concerns increased as the airmen began to advocate exploiting the potential inherent in air power and using it independently in a strategic context. As a result, opposition to the existence of the RAF rumbled on throughout the interwar years. The Air Ministry succeeded in defending its wicket until 1937, when it was eventually directed to relinquish control of seagoing aviation. Nevertheless, in the interim it had acknowledged the reservations of the other Services and to mitigate these it had been agreed that soldiers and sailors should be seconded to the RAF to fly as pilots.

In the specific case of the Army, this innovation was introduced as early as 1920 when it was announced that 'a limited number of Army Officers will in future be seconded to the Royal Air Force for a period of four years.'[1] The terms of this secondment involved the granting of a temporary commission within the RAF, a £25 outfit allowance being sanctioned with which officers were to provide themselves with, the recently introduced, blue/grey service dress uniform. At formal functions, however, they were to wear the mess dress of their parent corps or regiment, which would, in the majority of cases, be the Royal Artillery.[2] The regulations were periodically amended and restated, an early refinement in 1924 making Army officers on secondment eligible for selection for a permanent commission in the air force, ie permitting soldiers to jump ship and become professional airmen.[3]

The aim of the scheme was, of course, to ensure that the RAF did

not lose sight of its RFC heritage and it was intended that the pilots drawn from the Army would fly exclusively with the Army Co-operation (AC) squadrons, thus maintaining an appropriate level of expertise within that community. Incidentally, although it had not actually been stated in the regulations that had been published thus far (an oversight that was eventually corrected in 1933), it had been understood from the outset that once they had completed their four-year secondments and resumed their places in the Army, officers participating in the scheme would, for a further four years, constitute an earmarked reserve of pilots upon which the RAF could call in an emergency.

All did not go exactly to plan, however. Despite the Army's willingness to participate in the programme, it was not prepared to pay for it and that proved to be a problem in the context of recruiting. Needless to say, all applicants would have to be passed 'fit for full flying duties by a special aviation medical board'. At the time these facilities were available only in London and Cairo but a parsimonious War Office would not underwrite the cost of travel. That was of relatively little consequence for officers stationed at home, of course, but in September 1922 eight of the potential candidates were stationed as far afield as Malta, Turkey, Iraq, India, China and Bermuda. These officers were expected to underwrite the cost of their own passages. In the case of the two from India, who needed to go to Egypt for testing, they were also expected to cover the cost of their reliefs from England. Arguing, perhaps a little short-sightedly, that the scheme was 'in the interests of the Air Ministry and not the War Office', it was suggested that these costs should, therefore, fall to the Air Vote.[4] The Air Ministry was obliged to go cap in hand to the Treasury and in May 1923 it succeeded in gaining authority for the RAF to pick up the tab.

It was clear from the Army's attitude, however, that there was a certain lack of enthusiasm for the project and in January 1925, four years into the programme, Gen Cecil Romer wrote to the Air Ministry to point out that 'instead of having 200 or 300 (*pilots*) as we had hoped, we have 62; in fact this scheme has failed.' Romer believed that the lack of response was the length of the undertaking. Since it appeared that Army officers considered four years to be too long to be away from the military mainstream, Romer asked that consideration be given to a shorter period, perhaps as little as one year.[5] This led to a

prolonged debate during which, and perhaps for the first time, an attempt was made to analyse and quantify the requirement.

The numbers game was dictated by the establishment of an eighteen-aircraft AC squadron which, at the time, ran to twenty-two officers of whom, it was assumed, eight (the CO, three Flight Commanders, the Adjutant, and the Signals, Stores and Accounts Officers) would have to be RAF personnel, leaving fourteen Flying Officers, some of whom were to be drawn from the Army. The questions that had to be answered were, how many and for how long? Although the balance began to shift towards 50%, most of the early calculations envisaged that the Army would provide 70% of the Flying Officers, possibly based on the precedent set by the RN which had undertaken to furnish 70% of the pilots required by the FAA.

Since it took about ten months to train a pilot,[6] Romer's suggested one-year attachment was clearly a non-starter as it would require a major expansion of the flying training system while yielding, for the air force, little, if any, productive service. Similarly, most of the second year of a two-year scheme would be taken up by on-the-job training. Furthermore, a two-year scheme would involve a 100% annual turnover of Army personnel on the squadrons which would be unacceptably destabilising. The dilution of experience would be less with a three-year commitment, but the throughput would still require a significant increase in the capacity, and cost, of the flying training system. The upshot was that the Air Ministry saw no practical alternative to the existing four-year secondment.

When the scheme had originally been introduced it had been intended that Army pilots would fly only with the four home-based AC squadrons, but consideration was now being given to their flying with the four in India as well.[7] If 70% of the fourteen Flying Officers on each of eight squadrons were to be provided by the Army there would be about eighty soldiers flying with the RAF once a steady state had been reached. Of these one third would need to be replaced each year, so, allowing for 10% wastage in training, the annual intake would be of the order of thirty per year, a figure that could, just, be handled by the existing training facilities. With some twenty-seven pilots completing their engagements each year, this would eventually create a floating four-year reserve of 108 pilots upon whom the RAF would have a residual claim.[8]

In some quarters, at least, it was suspected that the RAF might encounter some problems prizing loose more than a hundred Gunners to deal with an emergency when, it is reasonable to assume, the Army would have been reacting to the same crisis. It was also pointed out that if the RAF Reserve really was regarded as being sacrosanct, it meant that in peacetime the Army would actually be employing (and paying), for four years, officers for whom it would have no use in war. In view of the Army's refusal even to assist with the costs associated with volunteering to fly with the RAF, some thought this a rather unlikely scenario. It was also to be expected that a number of the officers earmarked to return to the RAF would be serving in overseas posts which raised further doubts over their real availability. Despite the reservations raised by the staffs, however, the man in charge, AVM Vesey (DOSD) was confident enough to reassure CAS that 'there is no doubt that the Army will hand over to the RAF every officer that is available in the country on mobilisation'.[9]

In the event, despite all the number-crunching, including cutting back the projected commitment from 70% to 50%, it was clear that the Army and (albeit to a lesser extent) the RN were both going to find it difficult to meet their numerical obligations. That is hardly surprising, of course, after all, most people who wanted to fly would surely have joined the RAF in the first place. To put it another way, how many RAF pilots were likely to volunteer for a four-year stint in submarines or tanks?

The upshot was that the scale of the scheme was considerably reduced, and confined to the, now five, home-based squadrons, the establishments of which had been reduced from eighteen to twelve aircraft in 1929. When the revised terms and conditions were published in 1933, it was clear that the attempt to man the RAF with substantial numbers of soldiers had been abandoned. The stated aim was now merely 'to produce for army co-operation squadrons a reserve of pilots who are also trained as Army officers'. The Army Council Instruction (ACI) went on to spell out that this involved an individual's accepting a, now clearly stated, obligation to be recalled to fly with an AC squadron in the event of mobilisation throughout the four years following his return to the Army on completion of his, still four-year, secondment. Throughout that four-year reserve period a pilot was committed to attending an annual fourteen-day 'refresher'

with an AC squadron. The intake had been reduced to just eight per year, so that the numbers on secondment 'at any given time will not exceed 32.' Another very obvious sign of the change in emphasis was that, although officers on secondment were still awarded a temporary commission in the RAF in the rank of flying officer, they were no longer required to wear RAF uniform; they were now to 'wear the uniform of their corps or regiment, with RAF "wings" on service dress'.[10]

Some other refinements had been introduced in 1933. For instance, the option of a permanent commission had been withdrawn. On a more positive note, it had been agreed that, two years after returning to the Army, a few (no more than two per year) ex-secondees could undertake a further two-year full-time attachment on completion of which, the four-year reserve obligation would be regarded as having been discharged. In another manifestation of more relaxed inter-Service relations, in 1931, over and above the secondment scheme, the Air Ministry had invited the War Office to provide the RAF with additional Army officers, including majors, to serve in non-flying AC-associated staff and administrative posts, an invitation that it had been pleased to accept.

The next significant developments were prompted by the Expansion Schemes that began to be implemented from 1935 onwards. The RAF was capable of filling its middle and upper ranks by drawing on the substantial numbers of experienced officers who had begun their careers in the 1920s or earlier. The problem was that promoting these men meant stripping the squadrons of the seasoned flight lieutenants who, in their capacity as Flight Commanders, had been responsible for the direct supervision of more junior officers, especially first tourists – and the expansion meant that the squadrons were increasingly being manned by such tyros.

Once again the RAF turned to the Army and, once again, the War Office was pleased to oblige. In view of the thousands of additional pilots that the RAF needed, the Army could be expected to make only a small contribution in numerical terms, but it could help by releasing the men who had already completed a four-year secondment. This, plus their previous seniority within the Army, made them both eligible and suitable to become Flight Commanders and thus help to fill the RAF's critical 'flight lieutenant gap'. Negotiations took some time but

agreement was reached during 1937 and by the end of that year the provisions of the revised scheme may be summarised, as follows:[11]

a. Army officers could now volunteer for an initial secondment, in the rank of flying officer, after only three years' service; it had previously been four.

b. After three years with the RAF an Army officer (ie one still on his first secondment) would be eligible for promotion to substantive flight lieutenant and given one year's antedate of seniority. If specifically appointed to command a flight, he could be made an acting flight lieutenant, with pay, six months earlier.

c. The interval between secondments had been reduced to one year, and the second attachment would now be for three years.

d. Exceptionally, an officer on his second secondment could be promoted to squadron leader, in which case his tour would be extended from three years to four.

e. The possibility of a permanent commission in the RAF had been reinstated.

In numerical terms, the Army had now undertaken to provide 50% of the pilots on each of the AC squadrons. In February 1937, No 208 Sqn in Egypt was embraced within the scheme and by the summer of that year there were seven home-based squadrons. Since each unit's establishment now called for fifteen active pilots, that meant that the posts notionally to be filled by the Army were:

Sqn Ldr	Flt Lt	Fg Off/ Plt Off	Total
4	12	44	60

If the numbers of officers applying for secondment or re-secondment were to exceed the numbers required by the AC squadrons the War Office was content that the RAF could employ them in other flying posts. It had also been agreed that twenty officers would begin *ab initio* flying training in 1937 with the intake pattern in subsequent years to be sixteen for an initial four-year secondment, four on a second three-year stint and one or two for a third three-year tour as a squadron leader. Over and above this undertaking, which was specifically concerned with the AC squadrons, the Air Ministry had asked the War Office if it could find a further 200 officers to fly in

other roles. At the time, December 1937, it was thought unlikely that it would actually be able to find more than thirty.

Although they were implemented, these revised provisions were not publicised by an appropriate ACI or AMO, an omission that provoked a number of queries from offices embedded within the ministerial bureaucracy that had not been party to the discussions. Most of these were soon resolved but, perhaps as a result of inadequate initial consultation, problems began to emerge in the context of career management. This can be illustrated by the position with respect to the Army's actual contribution to the manning position on the seven home-based AC squadrons (there were no soldiers flying with No 208 Sqn at the time) which was, in January 1938:

Sqn Ldr	Flt Lt	Fg Off/ Plt Off	Total
2[12]	15	20	37

What is significant here is the disproportionate over-representation of Army officers in that crucial flight lieutenant bracket. Because of his previous service, the most junior Army pilot on a squadron would have at least three years more service than his junior RAF colleague. This, and the antedate of seniority granted to soldiers on promotion to flight lieutenant, had created a situation in which RAF officers felt that they were being 'leap frogged' by the interlopers. The fact that soldier pilots had not been wearing RAF uniform since 1933 served only to highlight the fact that they were 'different' and that they were being afforded preferential treatment.

By late 1937 the degree of friction between Army and RAF officers within the AC squadrons had given rise to questions in the House.[13] It had also led James Despencer-Robertson, MP for Salisbury and particularly well informed on air force matters, to write privately to the USofS for Air, Lt Col Muirhead, to draw his attention to these issues. Rooted in the problems associated with relative seniority and rank, there were some grounds for this discontent, and AOC 22 Gp, AVM Bertine Sutton, confirmed that the secondment scheme was unpopular and giving rise to resentment, on both sides.[14]

The problem was that the Air Ministry was having to carry out a very delicate balancing act. If it had required Army officers, with three-years' service and already ranked as lieutenants, to transfer to

C Flight, No 16 Sqn circa 1938. Note that the officers sitting on either side of the Flight Commander, Flt Lt P L Donkin, are wearing Army uniform with RAF flying badges.

the RAF as mere pilot officers, the supply would simply have dried up. Once he had transferred, as a flying officer, an Army officer was promoted to flight lieutenant after three years' service, compared to only two for an RAF flying officer, the antedate of seniority given to the soldier being intended to compensate for this and to level the playing field at flight lieutenant rank. The Air Ministry was also obliged to invoke a little pragmatism in order to meet an undertaking it had given to the War Office. In order to make good its obligation to fill some posts at squadron leader rank, it had promoted Capt Iain MacGregor to command No 53 Sqn. MacGregor was not a bad choice, he had twenty years' total military service, nine of them with the RAF, but, because of the vagaries of the secondment scheme, he was 216th on the flight lieutenant gradation list and no amount of rationalising by officialdom was going to persuade the 215 who had been leap frogged that this was fair.

This situation provoked another prolonged round of exchanges of correspondence between the Air Ministry and the War Office as both

staffs worked towards an acceptable compromise. By the end of 1938 a draft scheme had been devised that attempted to alleviate the previous problems over seniority. This envisaged that Army officers might now be seconded to the RAF as flying officers after two to four years' service (arguably two years would equate to a Cranwell cadetship) and that Army officers and RAF officers on permanent commissions would both become flight lieutenants after 3½ years of productive, ie squadron-based, air force service – it would actually have been 4½ years for the majority of RAF officers, ie those on short service commissions. There were still some carrots which, it was hoped, would serve to sustain the flow of volunteers from the Army, not least that 50% of the wing commander posts at HQ 22 Gp were to be reserved for officers on secondment.[15]

This was not the final answer, however, and in the spring of 1939 the Air Ministry produced a revised scheme that would have seen Army officers being seconded after only one year, but ranked as pilot officers rather than flying officers. The wearing of RAF service dress was to be reinstated with mess dress optional. This proposal was submitted to the War Office for its consideration with the covering letter stressing that the Air Ministry attached 'considerable importance to the wearing of such (*ie RAF*) uniform, without which seconded officers must remain aliens in their Royal Air Force units and cannot indicate promotions in Royal Air Force rank, save by obtaining the grant of corresponding local rank in the Army.'[16]

By early 1939 substantial progress had been made, at least insofar as manning was concerned. The table below reflects the position on the eight AC squadrons (there were now seven Army officers serving with No 208 Sqn) in mid-February.[17] Figures in brackets are Army. Note that the RAF/Army imbalance at flight lieutenant has been corrected; indeed the pendulum has swung the other way, although that will have been, in part, because of an overall shortfall in numbers, at that rank.

Sqn Ldr	Flt Lt	Fg Off	Plt Off	Total
6 + (2)	13 + (5)	40 + (34)	35	94 + (41)

Negotiations over the fine detail rumbled on through 1939 but, before an ACI could be finalised to update the provisions that had last been formally stated back in pre-expansion 1933, they were overtaken

by the outbreak of war. It was February 1940 before the wartime arrangements were announced. [18] The reserve aspect had now been dropped, of course, as had the term 'secondment'. The primary aim now was 'to produce for army co-operation squadrons a number of pilots who are trained as Army officers', the quota still being expressed as 50% manning of AC squadrons at home (to which France had now been added) and in Egypt. This was no longer to be an exclusive arrangement, however, and provision was made for, for instance, pilots 'in need of a rest from operational flying' to be employed in other flying appointments.

Nor was there any limit on numbers and, while priority was still to be afforded to the AC squadrons, it was envisaged that any surplus would fly bombers. Army officers would be granted temporary RAF commissions as pilot officers and would be promoted to flying officer and flight lieutenant after 12 months service in each rank, ie at the same rate as wartime air force officers. Crucially, it had been agreed that Army officers were, once again, to 'wear the service dress uniform of the RAF'. [19]

Since the period of service was to be 'for the duration', the terms of these arrangements were not far short of a transfer to the RAF and before the year was out a scheme was introduced that did exactly that. In December 1940 an ACI was published that, with certain exceptions, invited Army officers, and other ranks, to apply for training as pilots, observers, wireless operators and/or air gunners.[20] Officers would be attached to the RAF while under training, retaining their substantive Army rank, but on qualification they would relinquish their Army commissions and be appointed to a 'for the duration' commission in the RAFVR in the rank of pilot officer. Officers who failed to complete their training would be returned to the Army in their original rank. Other ranks were transferred (ie not attached) to the RAF in their existing rank within Trade Group V and promoted to temporary sergeant on qualification. Those who failed would be re-transferred back to the Army.

This scheme specifically did not affect 'in any respect' the pre-existing arrangements for the provision of Army officers to fly as pilots in AC squadrons. That said, in practice, it was relatively short-lived because it had been decided to create a force of glider-borne troops and, since 'transfers to the RAF […] have been suspended for

The Lysander and its ultimate replacement, the Allison-engined Mustang. A number of 'legacy' Army officers from the pre-war era flew both of these types but the requirement for Army pilots to fly with the AC squadrons declined from 1941 onwards.

some time and it is not known if or when they will be re-opened', in December 1941, the War Office began to offer those volunteers who had already applied, and been earmarked, for a transfer to the RAF the opportunity to train as glider pilots.[21] Since the initial plan envisaged that the Army would require 75 officers and 550 other ranks, this severely limited its ability to release any more men to fly with the RAF. In practice, the RAF was not short of recruits by 1942 and the output from the EATS was more than sufficient to sustain the front line. Ironically, the priority was reversed in 1944-45 when, in order to mount the crossing of the Rhine (Operation VARSITY) the RAF was obliged to provide the Army with some 1,500 surplus pilots in order to make up the losses sustained by the Glider Pilot Regiment at Arnhem.

Meanwhile, changes in the way in which air/land warfare was to be conducted after the fall of France, meant that the RAF no longer needed substantial numbers of Army officers to fly the high performance fighter reconnaissance aircraft with which the squadrons began to be re-equipped. As a result, the traditional requirement for Army officers to fly with the AC squadrons faded away along with the Lysander. For a while Army officers who simply wished to fly were able to take advantage of the December 1940 regulations and switch to the RAF, although, as noted above, this option had, in effect, been withdrawn before the end of 1941.

That was not the end, of course. Since February 1940 a small group of Army officers at Larkhill had been exploring the possibility of using light aircraft to co-operate with the guns. The results were promising and in the summer of 1941 the original experimental unit, D Flt, was expanded to become No 1424 Flt, the operational training unit for pilots who were to fly in the newly constituted role of Air Observation Post (AOP).[22] At much the same time an Air Wing was established within the School of Artillery to preach the new gospel[23] and No 651 Sqn was formed at Old Sarum to put the AOP concept into practice.[24] By mid-1941, therefore, just as the Army officer's door into flying via a secondment or transfer to the RAF was closing, another opened for those who wanted to fly, specifically to support the guns, by volunteering to fly Austers. Since the new AOP units were jointly-manned, the administrative and social complications of secondments, and of inter-Service transfers and rivalries, and the potentially contentious issues associated with relative seniority, changes of uniform and so on simply did not arise. Army officers could now stay in the Army and fly in their own right as soldier pilots.

Notes:

The Army Council Instructions (ACI) and Air Ministry Orders (AMO) cited below are in the TNA WO293 and AIR72 Series respectively.

1 ACI 772 of 20 November 1920.

2 ACI 525 of 21 August 1921.

3 ACI 81 of 7 February 1924.

4 TNA AIR5/322 Pt I. War Office letter 370183/22.S.7 dated 13 October 1922.

5 *Ibid.* Unreferenced War Office letter, dated 13 February 1925, from the Director of Staff Duties, Gen C F Romer, to his opposite number, AVM Sir Ivo Vesey, at the Air Ministry. Interestingly, Vesey was actually a soldier (a colonel who had held the temporary rank of major-general since 1918) who had been loaned to the Air Ministry where, as a temporary air vice-marshal, he filled the appointment of Director of Organisation and Staff Duties from 1923 to 1928.

6 The sequence involved pilot training at No 1 FTS at Leuchars, which also trained RN officers volunteering to fly with the FAA, followed by a course at the School of Army Co-operation at Old Sarum.

7 Although there was considered to be some merit in embracing the four AC squadrons in India within the scheme, the RAF in India was underwritten by Delhi, not London, and that could make funding a contentious issue. An overseas tour for an RAF officer was a notional five years whereas, a four-year secondment would yield only half of that, once the year's training had been discounted and time lost waiting for the trooping season. It was thought that Delhi would demur at accepting the costs

of the passages for such a relatively short period and, in the event, the squadrons in India never were provided with secondees.

[8] TNA AIR5/322 Pt I. Unreferenced Air Ministry letter from AVM Vesey, responding to Romer's proposals at Note 5.

[9] *Ibid*. Minutes 3 and 5, dated 7 and 11 May 1925 respectively, on Air Ministry File 555295/24.

[10] ACI 222 of 6 September 1933 which was reproduced on 19 October as AMO A.274/1933.

[11] TNA AIR2/2246. Memorandum summarising the revised scheme of secondment of Army officers to the Royal Air Force dated 6 December 1937.

[12] The Army officers serving as squadron leaders in January 1938 were OC 4 Sqn, Sqn Ldr I O'B MacGregor, and OC 53 Sqn, Sqn Ldr A P C Hannay MC.

[13] TNA ZHC2/837 Hansard for 4 and 11 November 1937.

[14] Formed on 12 Apr 1926 within ADGB (later, from 1936, Fighter Command) No 22 (Army Co-operation) Group was the controlling authority for the pre-war home-based AC squadrons. It was redesignated as HQ Army Co-operation Command on 1 December 1940 having, a week before, hived off elements to create its own subordinate formations, Nos 70 and 71 Gps.

[15] TNA AIR2/2246. Minutes of a 'Conference on 1st December 1938 Regarding Secondment of Army Officers'.

[16] *Ibid*. Air Ministry letter 457922/35/S7a of April 1939 covering 'A proposed scheme for secondment of Army officers for duty within the RAF'.

[17] Figures derived from the Air Force List for March 1939 (which was correct to 15 February), the last list to provide details of officers serving with each unit.

[18] ACI 152 of 22 February 1940 which was reproduced on 4 April as AMO A.187/1940.

[19] Among the more notable wartime soldier pilots was Andrew Geddes. He did three pre-war secondments, was OC 2 Sqn 1939-41 and spent most of the rest of the war on AC and/or Tac Recce-associated staff duties. Another was Christopher 'Kit' North-Lewis; commissioned into the Army shortly before the war, he flew AC Blenheims with No 13 Sqn, and Tomahawks and Mustangs with No 26 Sqn before achieving particular prominence commanding the Typhoon-equipped No 181 Sqn and No 124 Wg. Both relinquished their Army commissions in 1946 and formally transferred to the RAF; both eventually retired as air commodores.

[20] ACI 1520 of 9 December 1940 which was reproduced on the following 27 March as AMO A.206/1941.

[21] TNA WO32/9873. War Office letter 20/Misc/2065 AG17A dated 3 December 1941.

[22] No 1424 (AOP) Flt was formed at Larkhill on 20 September 1941. Having grown considerably, it was redesignated as No 43 OTU on 1 October 1942. Later wartime moves took it to Old Sarum, Oatlands Hill and Andover where, in 1947, it became No 227 OCU.

[23] James, N D G; *Gunners at Larkhill: A History of the Royal School of Artillery* (Gresham Books, Henley-on-Thames, 1983) p129-130

[24] TNA AIR10/392. SD155 entry 669/41.

FLYING BADGES FOR ARMY PILOTS 1921-58

by Wg Cdr Jeff Jefford

When the RAF was created on 1 April 1918, anyone currently serving with the RFC or RNAS was automatically transferred to the new Service. Anyone who elected not to remain in the RAF had the option of returning to his parent organisation during the next three (later extended to six) months. Furthermore, some erstwhile aviators had already returned to their original folds before the RAF had been established. This raised the question of whether any of these people should still be permitted to wear their flying badges. The Air Ministry initially indicated that it would consider applications from ex-RFC pilots on their individual merits. It was subsequently decided that this would be inappropriate, however, and in May 1918 it was ruled that in future flying badges were to be worn exclusively by RAF personnel.[1] The War Office and the Admiralty raised no objections and in October the former published its own regulation to the effect that 'Pilot's and Observer's Wings are now badges peculiar to the Royal Air Force and are worn by Army officers only when serving with the Royal Air Force. They are not worn by officers after return to the Army.'[2]

The first regulations governing the secondment of Army officers for flying duties with the post-war RAF were published in 1921.[3] These noted that such officers would be granted temporary commissions in the RAF and, as such, that they were to wear RAF uniform. It was not specifically stated, but it followed that, like any other RAF officers, once they had passed the associated tests, they would automatically have worn a flying badge.[4]

When the dress regulations for Army officers seconded to the RAF were amended in 1933 the War Office was obliged to withdraw its earlier prohibition on the wearing of the flying badge. The new rules stated that in future, while they would still be granted a temporary commission in the RAF in the rank of flying officer, Army officers on secondment were to wear the uniform of their corps or regiment, not that of the RAF, but with 'with RAF "wings" on service dress'. Furthermore, the regulations went on to say that, on completion of their four-year secondment, officers were to continue to wear their flying badges throughout the four-year period during which they were liable to recall to the RAF in the event of mobilisation.[5]

The sovereign is the ultimate authority for badges so he can, presumably, wear whatever he wants. Since, the then, Prince Albert qualified for his 'wings' in 1919, however, he was fully entitled (under the terms of ACI 839 of 13 December 1939) to wear them on his field marshal's uniform as HM King George VI, as seen here in May 1944.

In 1936 the RAF sought authority for the wearing of 'wings' by its seconded Army officers, until then confined to service dress, to be extended to embrace mess dress and full dress uniform.[6] The Air Ministry had no objection but the War Office demurred, its response stating that 'Army officers seconded to the Royal Air Force will continue to wear the regulation flying badge on their regimental service jacket only.'[7] There was clearly a change of heart not long afterwards, however, as the War Office wrote to the Air Ministry in November 1937 seeking its agreement to Army officers wearing their flying badges on mess dress and full dress. They appear to have received no response to this proposal, so they asked again in January 1938.[8] It took the Air Council eight months to make up its mind, which was odd, as they had been quite happy to accede to this suggestion in 1936, but when the Air Ministry did finally reply it was to say that suitably qualified Army officers would be 'entitled to wear the Royal Air Force flying badge on all descriptions of regimental uniform.'[9]

By 1938 the inter-Service arrangements provided for an initial four-year secondment followed, after a one-year interval, by a re-secondment for a further three years. Observing that air force pilots who transferred to a non-flying branch were permitted to retain their flying badges, the War Office suggested that this closely resembled the circumstances of a long-term Army pilot. On that basis permission was sought for Army pilots to wear their flying badges on a permanent basis.[10] Again, the Air Ministry concurred, this time without delay.[11]

Shortly after the outbreak of war, the War Office pointed out that

Many senior members of the wartime RAF Regiment were seconded officers who retained their Army ranks. In direct contravention of the rules, this colonel is wearing an observers badge that he had presumably acquired during WW I. (via B L Davies)

ex-RAF officers re-joining the Service, whether as volunteers or as a result of a reserve obligation, were able to wear their flying badges and it requested that this authority be extended to pilot-qualified officers who were rejoining the Army under similar conditions.[12] The Air Ministry agreed and even extended its concession to permit Army officers other than those involved in the interwar secondment scheme, ie those who had qualified during WW I as a pilot with the RFC, RNAS or the RAF, to wear the current pattern RAF flying badge.[13]

In February 1940 the War Office sought authority (previously confined to officers) for other ranks who had at some time qualified for a flying badge to wear 'wings' on their Army uniforms.[14] Once again the Air Ministry obliged.[15] The air force appeared to be in a particularly accommodating mood of late, so the Army decided to seek one more concession. Noting that ex-RFC observers were permitted to wear an 'O' badge on their RAF uniform, the Army requested, not unreasonably, that the same rule should apply to soldiers.[16] That proved to be a request too far, however. The Air Council drew the line at the observers badge.[17] When the next ACI governing the wearing of RAF badges appeared in June 1940, it extended authority for other ranks to wear the pilots badge, but went on to state that 'The observer badge will NOT be worn by officers or other ranks on any uniform.'[18] The strength of the Air Ministry's feeling on this issue being made crystal clear by that capitalised 'NOT'.

Despite several later approaches by the War Office, the Air Ministry was adamant and it stubbornly refused to countenance the

wearing of the observers badge on Army uniform. That did not prevent people from doing it, of course, and on several occasions the Air Ministry was moved to complain that Army personnel had been seen wearing inappropriate RAF badges and urging that the practice be stamped out. As a result, the prohibition was re-stated on at least three further occasions, the last being as late as 1950, by which time relatively few observers of WWI-vintage would still have been wearing uniform.[19]

Another flying badge that became a contentious issue was the 'AG'. In February 1941 an officer of Anti-Aircraft Command had accompanied an RAF crew on a bombing mission. His observations had been so useful (to Fighter and Bomber Commands, as well as to the Army) that further similar flights were arranged. In October a batch of twenty Army officers was formally trained by the RAF as air gunners and in January 1942 they became the staff of the newly established AA Observation Section. Proudly wearing RAF 'AG' badges on their Army uniforms, they were authorised to fly operationally with Bomber Command to observe German *Flak*.[20] The section was disbanded in May 1942, by which time it had lost seven of its members in action in the course of flying a total of 168 sorties. Although the section no longer existed, a few Army officers continued to fly with the RAF as air gunners until the end of the war.[21]

In June 1943 the GOCinC Anti-Aircraft Command, Gen Sir Frederick Pile, pointed out that RAF air gunners were allowed to continue to wear their 'AG' badges after they had ceased flying and he asked the War Office to permit his officers to do the same.[22] His request was strongly supported by HQ Fighter Command, whose AOCinC urged the Air Ministry to press the War Office to allow its soldiers to wear their RAF badges.[23] Unbeknown to Air Mshl Leigh-Mallory, however, it was not the War Office that was dragging its feet; the problem lay much closer to home – at the Air Ministry. By 1943 the position of the Air Ministry's mandarins with respect to the observers badge had become so deeply entrenched that they had denied themselves any room to manoeuvre. As a result, they were quite incapable of acknowledging the justice of the Army's submission and the Air Council stubbornly refused to extend its flying badge concession to embrace ex-air gunners.[24]

Meanwhile, back in 1940, a small group of Army officers had

begun to experiment with the use of light aircraft as Air Observation Posts (AOP). Some of these men had previously served on pre-war secondments and as such they had been fully trained to RAF standards and wore an RAF flying badge. Others, who became involved later, however, flew as Army officers in their own right, ie they were not seconded to the RAF. By the summer of 1941 there were still only eight of them[25] but, because they had not completed the full RAF flying training sequence, they lacked a badge.[26] The CO of the unit, the Larkhill-based D Flt, pointed out that, notwithstanding their lack of formal training, his pilots actually flew solo as self-authorising aircraft captains. As such they had to make the same decisions relating to serviceability, weather and the like as any other pilot. Their role meant that could also expect to fly under fire and the fact that they routinely operated from unprepared sites meant that, as often as not, a sortie ended in, what amounted to, a precautionary landing. While the aeroplanes may have been unsophisticated, AOP flying could be very demanding and the pilots involved needed a high degree of skill. It was recognised that, in view of the limited training that was provided, this did not warrant the award of the RAF's flying badge but it was requested that consideration be given to the introduction a new badge of an appropriate design.[27]

AOC 70 Gp, Air Cdre J B Cole-Hamilton, was sympathetic and supported both the award of a badge and the introduction of flying pay. He pointed out, however, that the design of the badge would 'require the sanction of the Royal Regiment of Artillery and ultimately His Majesty the King.'[28]

While D Flt was currently embedded within No 70 Gp, its precise constitution was somewhat ill-defined and its CO's bid for a badge had served to draw attention to this rather unsatisfactory situation. In July Maj Gen Otto Lund began to get a grip on the situation by writing to Maj Gen Archibald Nye to point out that there were many loose ends that needed to be tied off.[29] Apart from the lack of a flying badge, it was not even clear whether D Flt was 'a gunner affair or an RAF one' and there were other issues to do with rank and pay and even the authority under which these Army pilots were flying. This served to set the ball rolling, the most obvious development being the creation of No 651 Sqn with effect from 1 August 1941.[30]

Several alternative badges were prepared and the Air Ministry was

The Army flying badge of 1942.

advised that it was proposed that the one that had been selected would be worn on the left breast. The Air Ministry had no objection to the design but considered that the left breast had already been claimed by the RAF and recommended that the Army badge should be worn on the sleeve. The Army objected to that, pointing out that, while there were some exceptions, it was conventional international aviation practice for pilots, both military and civil, to wear their 'wings' on the breast, and usually the left breast. Since the proposed Army badge was quite different from the RAF's, there was little likelihood that anyone would be confused if they were both worn in the same place. This was an issue that needed to be settled because, apart from the handful of AOP pilots, plans were being laid to train (initially) more than 600 men to fly gliders and it was intended that they would wear the same badge.

In January 1942 the Air Ministry withdrew its objections but suggested that, when the new badge was approved, it should replace the RAF badges that were worn by some Army officers.[31] In February the final design was submitted to the Palace and approved by HM King George VI.[32] In April the War Office rejected the Air Ministry's earlier proposal. It was pointed out that the Army badge represented 'qualifications which are not comparable with those demanded of RAF pilots'. It was argued that it would be unfair to those Army pilots who had gained their RAF 'wings', and had flown alongside RAF pilots in RAF units, to deprive them of a badge that they had earned and that to do so might have an adverse impact on the 'friendly co-operation that now exists between the two Services.'[33] The Air Ministry conceded the point and withdrew its suggestion.

When the regulations introducing the Army badge were published in April they laid down that it was to be worn by AOP and glider pilots and, once awarded, the badge was to be worn permanently.[34] There was no reference to its replacing the RAF badges of officers who were qualified to wear them. So did that mean that an Army

The second glider pilots badge of 1944.

officer who had been trained to full RAF standards, like a pre-war AC pilot on secondment, but who was now employed on AOP duties could wear *both* sets of 'wings'? The air force had foreclosed on this option by ruling that, regardless of how many badges RAF personnel were qualified to wear, an individual was to wear *only* the badge of the category in which he was currently being employed. The Army had failed to spell this out and at least one officer is known to have exploited the loophole in the Army's regulations and worn both the RAF *and* the Army flying badges (*see the photograph on page 139*).

For completeness, it should be noted that in 1944 a further badge, the second glider pilots badge, was introduced for men who flew as co-pilots in heavy assault gliders. They were trained to a less demanding standard, about 30 hours, compared to the 150 flown by first pilots, and their badge was a much simpler design, a twin-winged 'G'.[35]

These arrangements sufficed until 1946 when the Commandant of the School of Artillery wrote to the War Office to point out that the AOP organisation 'exists solely for the Regiment and is officered, as far as the Army is concerned, entirely by Royal Artillery Officers.' He suggested, therefore, that its pilots should have a distinctive flying badge of their own, ideally one featuring the RA's grenade emblem.[36] This proposal attracted the necessary support and, once a suitable design had been agreed, it was submitted to the Palace for approval, which was duly forthcoming.[37]

The new air observation post badge, in which the royal crest was replaced by the artillery grenade and a scroll containing the motto '*Ubique*'[38], was introduced in 1948.[39] The original Army flying badge remained current, but was now awarded exclusively to glider pilots. That said, AOP pilots who had qualified for the earlier badge could still wear it 'provided they are not serving in Air Observation Post units.' The ACI went on to state that '*The practice of wearing the two badges together will not be permitted*', the italics clearly indicating

The AOP pilots badge of 1948.

that the Army was really serious about this.

To remove some minor misunderstandings the regulations governing the award and wearing of the AOP badge, the Army flying badge and the second glider pilots badge were restated in 1950, but these did not introduce any significant changes.[40] What did introduce a change was the creation of the Army Air Corps (AAC) on 1 September 1957, an innovation which absorbed the quasi-RAF AOP squadrons and the rump of the Glider Pilot Regiment which was disbanded.[41]

The long history and tribal nature of the British Army's regimental system means that great significance is attached to seemingly minor details of uniform and accoutrements. In order to consider the need for changes and to offer advice and/or make recommendations to the Executive Committee of the Army Council, the War Office maintained a Dress Committee which held frequent meetings.[42] Needless to say, the creation of a new corps raised many issues, one of the first decisions to be taken was that 'the Army flying badge should be worn by all qualified pilots of the Army Air Corps and that the present Air OP pilots badge in use should be discontinued.'[43] The colour of the beret was less easily resolved. It was initially proposed that it should be maroon, to perpetuate the 'airborne' legacy associated with the glider pilots, but the Parachute Regiment objected and the eventual upshot was that the AAC's beret would be light blue.[44]

Notes:

The Army Council Instructions (ACI) and Air Ministry Orders and Weekly Orders (AMO and AMWO) cited below are in the TNA WO293 and AIR72 Series respectively.

1 AMWO 168 of 2 May 1918.

2 ACI 1110 of 7 October 1918.

3 ACI 525 of 21 August 1921.

4 The post-war qualification standards and tests associated with wearing of a flying badge were first laid down in AMWO 655 of 22 July 1922. In due course, and with

appropriate amendment in detail, these were eventually republished as Appendix III in Vol II of the first (1924) edition of King's Regulations and Air Council Instructions.

[5] ACI 222 of 6 September 1933.

[6] TNA AIR2/6336. HQ Inland Area letter 1A/1980/P.1 dated 6 January 1936.

[7] *Ibid*. War Office letter 54/Offrs/3277 (MGC 7b) dated 5 March 1936.

[8] *Ibid*. War Office letter 100/RAF/187 (MT 4) dated 25 January 1938.

[9] *Ibid*. Air Ministry letter 488232/36/S7a dated 25 August 1938.

[10] *Ibid*. War Office letter 100/RAF/187 (MT 4a) dated 7 September 1938.

[11] *Ibid*. Air Ministry letter 488232/36/S7a dated 24 September 1938.

[12] *Ibid*. War Office letter 100/RAF/187 (MT 1) dated 22 October 1939.

[13] *Ibid*. Air Ministry letter 488232/36/S7a dated 20 November 1939. This concession was publicised by ACI 839 of 13 December 1939.

[14] *Ibid*. War Office letter 43/RAF/543 (MT 1) dated 3 February 1940.

[15] *Ibid*. Air Ministry letter 488232/36/S7a dated 26 March 1940.

[16] *Ibid*. War Office letter 43/RAF/543 (MT 1) dated 12 April 1940.

[17] *Ibid*. Air Ministry letter 488232/36/S7a dated 2 May 1940.

[18] ACI 660 of 19 June 1940.

[19] For instance, ACI 1268 of 19 July 1941, ACI 1263 of 10 September 1944 and ACI 499 of 5 July 1950.

[20] The 'AG' badge was worn by Army officers under the terms of AMO A.89/1942 of 29 January which sanctioned the recognition of *de facto* aircrew on a relatively informal basis and the wearing of the appropriate badge. This was not specifically reflected by the War Office until the publication of ACI 1263 of 20 September 1944.

[21] A specific instance of this is cited by Mike Henry in his book, *Air Gunner* (London 1964). He was a Capt J W Casserley (Henry calls him Cassidy) of the Royal Berkshire Regt who flew as a gunner in Bostons of No 137 Wg, to which he was attached as an ALO between 31 March 1944 and 8 March 1945.

[22] TNA AIR2/6336. Letter AAC/30147/A, of 4 June 1943, from Gen Pile to the War Office.

[23] *Ibid*. HQ Fighter Command letter FC/S.27927/Ops3(b) dated 22 June 1943 from Air Mshl T Leigh-Mallory to the Under-Secretary of State at the Air Ministry, Sir Hugh Seely.

[24] *Ibid*. Air Ministry letter A.15766/39/S.7.(a).1 of August 1943.

[25] The eight officers concerned, with flying time as at June 1941, were:

Capt Cobley	221 hrs	Capt Morgan	151 hrs
Capt Fisher	88 hrs	Capt Neathercoat	209 hrs
Capt Ingram	152 hrs	Capt Tetley-Jones	141 hrs
Capt Lane	154 hrs	Capt Willett	15 hrs

[26] At the time, flying training for, what would become, AOP pilots comprised the standard course at an Elementary Flying Training School, followed by a course at the School of Army Co-operation at Old Sarum.

[27] TNA WO32/9871. Letter DF/S/503/Org of 10 June 1941 from OC D Flt, Sqn Ldr E D Joyce, to HQ 70 Gp.

[28] *Ibid.* HQ 70 Gp letter 70G/S.807/2/Air dated 17 June 1941.
[29] *Ibid*. GHQ Home Forces letter HF/6308/1/RA(FA) dated 25 July 1941 from Maj Gen Lund (Major General Royal Artillery for the Home Forces) to Maj Gen Nye (Direct. or of Staff Duties at the War Office).
[30] TNA AIR10/392. SD155 entry 669/41.
[31] TNA WO32/9873. Air Ministry letter S.77210/S7a dated 14 January 1942.
[32] Although their procedures were rather less formal than those adopted by the Air Ministry, in that they did not result in a 'King's/Queen's Order', it was also Admiralty and War Office practice to submit new badges to the Palace for approval. In the case of the badge for Army air observation post and glider pilots the King's approval was conveyed by Buckingham Palace memo 54/Gen/9432, dated 16 February 1942, to the Secretary of State for War, David Margesson (WO32/9873). An example from the RN is provided by an official stamp, dated 9 July 1942, on the minute sheet of Naval Law file NL 21093/41 which records the King's approval of a badge to be worn by commissioned FAA air observers (ADM1/11844).
[33] TNA WO32/2973. War Office letter 54/General/9432(AG 4(d)) dated 20 April 1942.
[34] ACI 768 of 11 April 1942.
[35] ACI 1128 dated 19 August 1944.
[36] TNA WO32/12073. Letter, dated 2 September 1946, to USofS for War, Lord Nathan, from Commandant School of Artillery, Brig G W E Heath; to be pedantic the letter was actually signed on his behalf by the Chief Instructor of the school's Air Wing, Col W G Stirling.
[37] *Ibid*. The customary application to the Palace was submitted by the Secretary of State for War, Emanuel Shinwell, on 2 January 1948. The sovereign's approval was granted the following day via a Sandringham-headed note from the King's Private Secretary, Sir Alan Lascelles.
[38] Battle honours are conventionally emblazoned on colours but, since, artillery units in the British Army do not have colours, their exploits are indicated by honour titles. In 1832, however, King William IV directed that the Royal Artillery as a whole (and the Royal Engineers) were to use the word *Ubique* (Everywhere) to embrace all previous and subsequent battle honours. In effect, therefore, the motto is the RA's battle honour.
[39] ACI 808 of 8 September 1948.
[40] ACI 676 of 16 September 1950.
[41] The initial arrangements governing the AAC were promulgated by ACI 358 of 4 September 1957.
[42] Originally constituted in in 1947, following the establishment of the tri-Service Ministry of Defence, the War Office Dress Committee (WODC), became the Army Dress Committee in December 1965. It was still functioning well into the 1970s, and may still be today.
[43] TNA WO32/18840. Decision D818 of the WODC, recorded in the minutes of its 101st Meeting, held on 16 July 1957
[44] *Ibid*. Decision D840 of the WODC, recorded in the minutes of its 108th Meeting, held on 14 March 1958.

FEEDBACK

The caption to the photograph on page 105 of Journal 53, showing a Vampire being refuelled with AVTAG, was written by the Editor – not the author of the paper. My intention had been to highlight the fact that the introduction of jets introduced a significant supply issue in that BFIs and bowsers would now have to deal with paraffin as well as petrol. In dealing with the technicalities of hydrocarbon fuels, however, I exceeded my level of competence. This prompted Air Cdre Mike Allisstone to point out that the aeroplane was actually being filled with wide-cut gasoline and not kerosene (as I had it). He is quite right, of course, and, having also consulted AVM Graham Skinner, the following is offered for the enlightenment of anyone else whose expertise in this field is somewhat lacking.

There were three types of fuel in general service use in the early jet era:

> Aviation Gasoline – AVGAS (100/130 octane petrol for piston engines) (colour code – green)
>
> Aviation Kerosene – AVTUR (Jet fuel) (colour code – white on black)
>
> Wide Cut Gasoline – AVTAG (*aka* JP4) (Jet fuel) (colour code – green on black)

'Wide cut' means taking a broader slice (band) in the distillation temperature range within the fractionating column of crude oil; petrol comes out at the top followed by kerosene with diesel nearer the bottom.

It eventually became standard RAF practice to use 'narrow-cut' kerosene (AVTUR) for jets with petrol (AVGAS) for piston engines. Whilst not favoured for various valid safety reasons anyway, AVTAG also had, unfortunately, an embedded technical name popularly association with petrol (ie gasoline) creating the potential for confusion over which fuel should be used. Even without having to deal with the nuances of the name and colour code for AVTAG, however, there have been occasional instances of mis-fuelling between the two standard fuel types in RAF service.

The most tragic example was at Valley on 5 July 1973 when a visiting Basset from Wyton was topped up with AVTUR instead of

AVGAS. The aircraft crashed on take off, killing the navigator and injuring the pilot and his passenger. Since the bowsers were conspicuously and correctly marked in accordance with regulations that had been thoroughly overhauled by MOD in 1972, there was deemed to be no systemic weakness and the cause was put down to human error. Fortunately such instances were rare and it is understood that, going as far back as 1971, there have been only two other cases of the incorrect fuel being used; these concerned a Jet Provost in 1978 and a Pembroke in 1984. Both of these were also attributed to human error but both were spotted before either aircraft got airborne. Even these incidents might have been avoided if Air Cdre Allisstone had succeeded in introducing a system of keyed refuelling orifices that he advocated when he was heading up the RAF fuels organisation in the mid-'70s, but he was unable to secure the necessary funding.
Ed

The original RAF labelling system has evolved and been superseded by a NATO standardised scheme which is currently reflected, for the British Services, in JSP 317 – Joint Service Safety Regulations For The Storage And Handling Of Fuels & Lubricants. *This is a modern Dennis fuel tanker marked on its flanks with the current style of black and white label for aviation grade kerosene. For the real enthusiast, or cognoscenti,* NATO Code F-34 *conforms to either the* US MIL-DTL-83133E (JP-8) *or the* UK DEF STAN 91-87(AVTUR/FSII) *specification. (*Marcel Sloover)

BOOK REVIEWS

Note that the prices given below are those quoted by the publishers. In most cases a better deal can be obtained by buying on-line.

Two Roads to War – The French and British Air Arms from Versailles to Dunkirk by Robin Higham. Naval Institute Press, 2012. £33.95

Professor Robin Higham describes his study, *Two Roads to War,* as one focusing principally on the 'badly neglected tale' of the French Air Arm. The resulting book is an impressively researched work with a huge list of references and sources. It is densely written, demanding, and not a book for the faint hearted! Alongside his study of what he rather grandly describes as 'the geographic, political, economic and technological base on which the [French] aeronautical edifice was erected', he has run a parallel review of activity on the other side of the Channel, as a 'control', to show what could have been achieved in France, given a different approach, politically and militarily.

This is not an easy book to read, nor is it one on which many are qualified to pass judgement, given that it sets out successfully to break new ground and begins to fill what has been recognised as something of a vacuum where the critical historiography of the French interwar air effort is concerned. His use of Britain and the Royal Air Force as a control makes this book of immediate interest to members of the Society and he may even raise the odd eyebrow, not least by his assertion that: '[British] Airmen have not been great readers'!

The very ignorance of the interwar period in France that makes this book potentially so valuable, forces the reviewer back onto his rather better knowledge of what went on in Britain in the same timescale. The British 'control' becomes all the more valuable, essential even, for that reason. Sadly, Professor Higham's account of events on this side of the Channel contains a number of minor errors of fact and understanding which, taken together, place something of a question mark over the work and its judgements.

Another aspect of the book which may be of concern for the reader lies in its recourse to what Professor John Ferris has memorably described as 'military and cultural ethnocentrism' – attitudes hampering judgement of any group which behaves unlike one's own.

Ideas of 'national characteristics' can lead to over-generalisations and 'predictions about group behaviour which are wrong about many of their members some of the time, and some of them most of the time'. *Two Roads to War* makes much use of such analysis and makes for almost tabloid reading in some of its verdicts on the London Establishment of the 1920s and '30s!

Other reviewers of Professor Higham's comparative study have described it as an impressive achievement, filled with fascinating details and offering larger and provocative conclusions about the performance of Britain and France, politically, militarily and industrially. A French historian has described it as possibly harsh and unfair. I can only repeat that I found the book difficult in places but well worth the effort involved, in exploring an area of European history about which much ignorance remains, not least my own. *Sauve qui peut!*

AVM Sandy Hunter

X-Planes of Europe by Tony Buttler and Jean-Louis Delezenne. Hikoki, 2012. £34.95.

Secret Research Aircraft from the Golden Age 1946-1974 is the sub title of Tony Buttler's most recent book on historic aircraft projects. For this volume he has joined forces with Frenchman Jean-Louis Delezenne to produce a hugely detailed account of Europe's experimental aircraft at a time when the growth in aerospace technology, both airframe and powerplant, was rapid. It is another excellent reference book listing those aircraft which, in the authors' opinion, fall into the category of 'X-planes'. The authors are at pains to explain their dilemma of judging what to include and which types to ignore. They have assessed that if an aircraft was built for pure research, such as the British DH 108 and the several French Leduc ramjets, they justified inclusion. However prototypes which were considered to be steps towards production aircraft, such as the Hawker P1052 and Supermarine Type 510 are excluded, because they are seen as development aircraft for the later Hunter and Swift. Strangely, the French entry for the 1956 NATO lightweight fighter competition, the Sud-Est Baroudeur, which was rejected in favour of the Fiat G91, is included, despite three prototypes being built and flown for NATO evaluation. While it is easy to criticise the selection process, the

authors had a difficult task and there are sufficient examples of the good, the bad and the ugly to whet the spotters' appetite whether or not they fall into a specific category. This comprehensive record does not follow the customary Buttler formula – an account of types, drawings and photographs contained within an overall narrative – instead it is compartmentalised chronologically into short descriptive chapters devoted to each type, including weight, dimensions, approximate performance, engine type and thrust. The 302 pages are illustrated profusely with many previously unseen images and the useful annexes cover the several aircraft types, including those airframes which have survived in museums.

Throughout the period aircraft designers studied the theory of aerodynamics and probed the possible by exploring revolutionary concepts. An example of unconventional flight controls, for instance, being the Short SB4 Sherpa with its isoclinic wing. Some projects evolved into others, a classic example being the high speed research Fairey FD2 which morphed into the BAC221, its new wing shape providing a step towards that of the graceful Concorde. Conversely the mixed powerplant interceptor fighters such as the Saunders-Roe SR53 and the Sud-Ouest Trident disappeared into obscurity. Much of the information in this extensive list of forty aircraft types, the majority of them British or French, is the result of painstaking research by the authors who have delved into national archives to study their subjects thoroughly and much previously classified material is published for the first time. Several types are relatively unknown, such as Switzerland's N20 Aiguillon and its baby brother the FAF Arbalète but the majority are familiar shapes which aviation historians and enthusiasts alike will welcome for the extensive descriptive narrative and excellent photographs.

Unfortunately, historians will be quick to criticise some of the mistakes which have slipped through the authors' careful preparation where, for example, the early German jet engines, the BMW 003 and Jumo 004, are described as having centrifugal compressors and there is an inaccurate comparison between the Dassault Balzac lift engine concept with that of the Pegasus vectored thrust engine in the Hawker P1127 which is described as having four 'louvered lift fans'. Also there are a few relatively small errors where aircraft type numbers and serials have been misidentified and ventral fins have been described as

dorsal. These are minor quibbles however and should not reduce the attraction of this splendid volume which is recommended for a place on the Total Aviation Person's bookshelf.

Gp Capt Jock Heron

The Many Not The Few. The Stolen History Of The Battle Of Britain by Richard North. Continuum, 2012. Price £20.00

The philosopher Michael Oakeshott saw the past as the contents of a kind of vast storehouse in which items are continuously being deposited. Historians, amateur and professional, looking for things to support their hypotheses, rummage about selecting items they want and taking them out on loan. Some items are so useful they seem out on permanent loan. Nelson's blind eye at Copenhagen or Caesar's crossing of the Rubicon for example. Such items have iconic status. The Battle of Britain has become an icon for the bravery of a few young men locked in a desperate struggle to save us from slavery, fighting in machines produced by the genius of British aeronautical engineers and guided by a Radar (RDF in those days) based system, a wonderful British adaptation of a technology. Their opponents in the *Luftwaffe* were equipped with examples of excellent German engineering and some of them had been blooded in combat in Spain. They were no pushover. The Battle of Britain has all the ingredients of a good icon. So what is wrong with it and how it gets used? Sit back; the author is going to tell us.

E H Carr, a contemporary of Oakeshott, who has an eight-volume history of Soviet Russia to his credit and a stint as Leader Writer for *The Times* between 1941 and '45, advised readers of history to be aware of the buzzing of the bees in the historian's bonnet. If you can't hear any then either you are tone deaf or the historian is a dull dog, he wrote. Our author is certainly not a dull dog. The buzzing to expect here is signalled in the book's subtitle, *The Stolen History of the Battle of Britain*. What has been stolen and who has done the stealing?

From this book, Fighter Command's Battle of Britain emerges as a flawed icon containing sizeable elements of myth and propaganda concerning The Few, an elite group who aided and abetted by historians over the last 70 years, Richard Overy is singled out for special mention here, have stolen a history which rightfully belongs to The Many, a more deserving and much larger group. That is the

author's case and he sets about proving it with a text based on selections from a wide variety of sources. He has little choice but to devalue the contributions of the thieves and to glorify the achievements of their victims. He sets about both of these tasks with relish and enthusiasm. A note of caution here. The use of the word elite in connection with The Few can no longer be used to imply a social hierarchy given what we now know about the breadth of their social composition.

In a war between industrial states, both sides want to defeat the enemy's forces in the field and destroy the infrastructure which supports those forces. There are two aspects to the latter; the destruction of the morale of the civilian population (Shock and Awe, followed by Surrender and Regime Change) and the destruction of physical elements of the infrastructure such as the factories. With particular reference to civilian morale, the role of propaganda for home consumption is very important and, if it served no other purpose, reports of the achievements of The Few were important factors in maintaining the morale of The Many.

Why did the Germans decide to launch aerial attacks on Britain in 1940? To clear the skies in preparation for a seaborne invasion or to go for Shock and Awe which would cow The Many and destroy the factories? The first aim is still disputed but in his 1947 book, *Who Won the Battle of Britain*, which is not cited here, H R (Dizzy) Allen, a Fighter Command Ace of No 66 Sqn in the Battle, thought the evidence for a serious German intention was convincing but he was sure that the major deterrent was actually the Royal Navy. (Although Allen's book is not cited, the author has given it a favourable review in a blog on EUReferendum.com in March 2012.)

Structurally this book takes the form found in Francis Mason's 1990 day-by-day account of the Battle,[1] a format which provides an opportunity for the author to point up his thesis by emphasising what he interprets as the propagandist and myth-making elements which have led us to the delusion that honours should go to The Few at the expense of The Many. For example, he says that Fighter Command was not in any kind of desperate state around 7 September which needed that switch to London which placed The Many directly in the

[1] Mason, Francis; *Battle Over Britain* (Aston, Bourne End, 2nd Edn 1990).

Front Line. But why did the *Luftwaffe* switch its attacks from airfields to London on 7 September unless it believed that by then it had cleared a safe daylight corridor through 11 Group? North argues that the outcome of the struggle for air supremacy resulted in a score draw but although Fighter Command did prevent the *Luftwaffe* from gaining total air supremacy it could not prevent it from going on to pound British cities in a night offensive. We are given to understand that Dowding was a failed commander who painted what was a partisan picture of his Few's achievements in his official Despatch of 1941. He may have been able to hold Fighter Command together during the Battle but could not protect The Many from the *Luftwaffe's* night offensive.

That is grossly unfair to Dowding who, as the author well knows, lacked tools to do the job – but what about his efforts to develop such a tool during the daylight Battle? His Blenheims played an important role in the development of Air Interception RDF techniques(AI RDF) which were Fighter Command's only hope of dealing with a night offensive. Some 100 of his men served as operators in that development. It was not until the arrival of the Beaufighter and AI Mk IV in the later stages of the Battle that there was even some promise of an effective system on the horizon. Dowding's 'failure' can be put into perspective by noting that Kammhuber with his radar and *Schräge Musik* equipped Bf 110 and Ju 88 nightfighters was unable to halt Bomber Command's destruction of German cities.

The spokesmen invoked for The Few are generally of a right-wing persuasion, whilst those cited on behalf of The Many, J B Priestley very prominent among them, have left-leaning sympathies. But does anyone really doubt that The Many played a vital and honourable role in the overall defeat of Germany? They stood up to the horrors of bombing without the break in morale aimed for and if that is to be counted as their victory then by the same token the German Many – who took such a dreadful pounding, including firestorms, meted out by the combined efforts of the RAF and USAAF without breaking – deserves its share of admiration. It has to be acknowledged that 1940 was an on-going learning period in how to deal with mass aerial attacks, both in the air and on the ground. The Battle of Britain was the first set-piece battle between the air forces of two major States. Dowding and Kesselring had no precedents to guide them. Civil

defence arrangement in 1938-39 proved to be inadequate for *Blitzes* so of course there were inadequacies in shelter provision and Andersons were not impregnable; of course civil defence arrangements had to be urgently re-defined on the hoof in the face of real-time testing. The Many, as the author shows, faced the consequences and did not break.

It also comes as no surprise to find that anticipation of what might follow the end of hostilities should have stimulated vital debate about the sort of society which could emerge, with a greater emphasis on equalities than existed prior to 1939. This book is deliberately provocative because it is the author's intention to provoke us into looking again at a narrative which he thinks has deceived us for too long. It is a piece of iconoclasm and iconoclasm is useful only if the icon concerned is an ignoble one, which is not the case here. The book is worth reading because it will make you examine your own opinions about a ground-breaking example of 20th century warfare and the author has done a sound job in assembling his material and presenting it. Read it and draw your own conclusions. My own view is that, without indulging in iconoclasm, all that was necessary to say about the Battle of Britain – however it is defined – was to show how the Germans lost it to the combined efforts of The Few and The Many. It would be a truism to say that neither could have done it alone.

Dr Tony Mansell

A Very British Sound Barrier by Brian Rivas. Red Kite, 2012. £40.00.

The de Havilland DH108 is rightly credited with having been Britain's most adventurous and exhaustively-tested experimental design of the early Jet Age. TG/283, the first of three prototypes, was rolled out at Hatfield in April 1946 in conditions of great secrecy. It was expressly designed to test the aerodynamics of a swept-wing, tailless aircraft up to transonic speeds: unknown territory to designers and pilots alike. The 'Swallow', as it became nicknamed, was never intended to be Britain's first supersonic aircraft although, two and a half years later, it was to achieve that distinction. When the company's first jet aircraft, the DH 100 Vampire, had flown in 1943 the idea took root at Hatfield of developing it into an airliner with four Goblin engines. In 1945 de Havilland's chief designer, Ronald Bishop, went to Germany to see for himself the swept-wing, tailless Messerschmitt

Me 163 Komet. Back in England he sketched new plans for the projected DH 106 airliner, which by 1946 had itself acquired swept wings and no tail. This design promised huge potential savings in weight and drag at a time of comparatively weak and thirsty jet engines. The little 'Swallow' – basically a Vampire fuselage with a pair of swept wings tacked on – would test it.

Aerodynamicists at RAE Farnborough had already conducted wind-tunnel tests and warned of the likely drawbacks of this planform: Dutch rolling, longitudinal instability, a sudden wing drop heralding an irrecoverable spin. It is the mark of those adventurous times – of Sir Geoffrey's determination for his company to be at the forefront of research and of the outstanding courage of his chief test pilot and eldest son – that the flight testing of TG/283 went ahead regardless. Geoffrey de Havilland Jr.'s approach was gradual and meticulous. However, it soon became clear that whatever promise the design might offer for delaying compressibility, its very twitchy handling characteristics ruled out its use for an airliner, and on the company's drawing boards the DH 106 promptly acquired a conventional fin and tailplane and the Comet prototype was born.

Brian Rivas tells the story of the eventual three DH 108s and their tragic ends with a nicely-judged balance between readability, technical detail and historical background. Thus there is a chapter on the exactly contemporary, but ill-fated, Miles M.52, arguably our best contender for breaking the sound barrier before the Americans and which would have used a quite different, straight-winged design. This is germane to the DH 108 story and also underlined the conservatism of British designers of high speed aircraft in failing for so long to adopt the M.52's innovative all-moving tailplane that was to prove so indispensable at supersonic speeds.

Rivas provides the heroes of his story with proper biographical backgrounds. Geoffrey de Havilland Jr. emerges as a genuine character: a charismatic and high-living party-goer when out of the cockpit. He was also a first-rate test pilot although by later standards still fairly eccentric – once nearly letting 'Dick' Whittingham, a 22 year-old inspector who couldn't fly, attempt a take-off in a Mosquito. Yet amid the day-to-day minutiae of different tests on the 108 (fitting full-span leading-edge slots, varying ballast and CG, fitting wing-tip anti-spin chutes, covering the upper wing surfaces with wool tufts), he

showed himself an entirely serious, patient and cautious test pilot.

This made his death in late September 1946 over the Thames Estuary in TG/283's successor, TG306, both tragic and baffling. Rivas's account is all the more valuable because while researching the book he had access to men like John Wimpenny, who was head of high speed research at de Havillands from 1948. From contacts with men who were at Hatfield over sixty years ago come stories such as the mysterious message from two psychic ladies at the time of the accident: one they themselves did not understand and who for that reason went to Hatfield to tell it to Wimpenny. They took it to be Geoffrey Jr's final thought at the moment his Swallow broke up: 'Transdunal trough: don't press it back.' According to Rivas, Wimpenny still claims this 'described with great accuracy what happened to Geoffrey.' Given that 'transdunal' is an invented word, it is impossible to agree; while 'don't press it back' has that unmistakable quality of gibberish from The Other Side. The sentence has no meaning, least of all in an aviation context. Nevertheless, it remains an ineradicable part of the 108 story.

After Geoffrey Jr's death, John Derry bravely took over the 108 test programme, duly breaking the 100km course speed record and finally the sound barrier in VW120. Rivas is an authority on Derry, having already written his biography, and writes with exceptional understanding of the man's skill and grace. Derry's two near-death experiences in this 'killer' aircraft (Eric Brown's verdict) make for tense reading and leave one freshly amazed and humbled by what such men did for so little money, climbing day after day into aircraft that might behave quite docilely up to transonic speed but could in an instant be thrown into fatal instability by encountering a patch of mild turbulence. Two successive pilots who flew the 108, Stuart Muller-Rowland and Eric Genders, were killed by this aircraft. In the end, all three Swallows and their pilots perished.

This book must surely be the definitive history of the DH 108. It is a masterly account, full of technical detail, complete with appendices of documents from the de Havilland archives, copiously illustrated and enriched by interviews with surviving members of the team. Most of all, though, it is quite evidently a labour of love and full of the author's sense of gratitude and respect for the men who lived so dangerously, from the results of whose work we still benefit each time

we fly. A quite exceptional book.
James Hamilton-Paterson

A History of the Mediterranean Air War 1940-1945, Volume One by Christopher Shores and Giovanni Massimello with Russell Guest. Grub Street; 2012 £40.00

It is some forty years since Chris Shores, a member of the Society, wrote his highly-regarded work *Fighters over the Desert* and this was soon followed by his equally impressive *Fighters over Tunisia.* In the years that followed, he produced a series of books on operations in the Middle East and Far East, which added to his reputation as a meticulous researcher and author and one of the leading international aviation historians

He has now embarked on a new venture to produce a seven-volume series of histories on the Mediterranean Air War. Following years of research, he has gathered a great deal of new information and now plans to expand the coverage of his earlier works to include other types of aircraft and operations and to extend the period that his previous books described by including later operations over Sicily, Italy, the Balkans and Southern Europe. The ultimate result will be a seminal series providing full coverage of aerial operations throughout the whole of the Mediterranean area.

This first volume covers the period from the outbreak of war in North Africa in June 1940 to January 1942 and is largely based on *Fighters over the Desert.* However, it is significantly expanded with individual chapters describing the wider scenario to set the scene for each period of operations before relating the detailed activities and events day-by-day. Fighter operations remain a major feature but the activities of the bomber, reconnaissance, maritime and transport units attracts more attention than in Shores' previous books. Some of these crucial activities attract their own chapters. The authors also incorporate into the daily activities, the memories and opinions of individual aircrews. This wider approach creates a full and comprehensive explanation and description of all that occurred during the Mediterranean air war for the period covered.

To add to the quality and value of the historical narrative there are many superb, rare and evocative photographs and a wide use of very clear maps. Printed on good quality paper, their reproduction is

excellent, as is the comprehensive index.

It is almost impossible to offer any criticism of this volume. It would be good to think that the volumes that follow might include a little more detail of the bomber and support operations. That said, any self-respecting air historian, and those with any interest in this major theatre of air operations, must have this volume. It is difficult to believe that anything produced in the future will match the quality, historical detail and commentary of this book.

Some might baulk at purchasing this weighty, 560-page hardback, which is priced at £40. However, I was brought up to judge a product, not by its cost, but its value for money. Based on that criterion, this superb volume is cheap.

This book is very strongly recommended and many will look forward to the publication of the other six volumes, all of which I expect to become the definitive accounts and the first point of reference for the Mediterranean Air War.

Air Cdre Graham Pitchfork

Losing Small Wars – British Military Failure in Iraq and Afghanistan by Frank Ledwidge. Yale University Press, 2012. £10.99.

In the first decade of this century, the UK has been committed to two fairly major and long lasting conflicts, which between them have a duration beyond that of the two World Wars combined. Whilst the rationale for one, or both, is frequently questioned and the shortages of equipment, 'boots on the ground', etc are matters of public record, most people are led to believe that the outcome is not in doubt and that the British and their allies will prevail. This 308-page softback (a casebound edition is also available) with its comprehensive bibliography and useful index presents a very different picture. Having served in Bosnia, Kosovo and Iraq as an intelligence officer and in Afghanistan as a civilian justice advisor, one time Lt Cdr Frank Ledwidge, is not unfamiliar with his subject matter. That said, had he still been in uniform, the book's title alone would probably have earned him a one-sided interview with his CO and a suggestion that he should, perhaps, consider doing something else with his life.

Losing Small Wars – British Military Failure in Iraq and Afghanistan is a sufficiently shocking title in any event, to a

population unaccustomed to dealing with defeat. Ledwidge examines every aspect of the political and military imperatives of the conflicts in Iraq and Afghanistan. Whilst he illustrates his arguments with details of such issues as the shortages of equipment, he goes much deeper and considers, for instance, all aspects of training and organisation, the mindset which exists within the armed forces and the trouble caused by, for example, the 'can do' attitude or 'cracking on' as he puts it. He is particularly critical of the six-month tour philosophy and the problems it engenders amongst senior officers, each of whom has to be able to show a positive outcome, lest their tenure in-theatre be deemed a failure or to have been insufficiently successful. He compares generalship today with that of yesteryear and finds it wanting. Ledwidge makes liberal use of quotations from others, mainly unnamed, and the frequent use of 'as a former officer said to me' or some such, can be irritating. Nonetheless, the message, that success in the conflicts has, at best, been exaggerated and at worst, is untrue, is worthy of serious consideration and Ledwidge makes a powerful case in support of his views.

With a seemingly endless round of reductions in defence capability and much else going on in the intended restructuring of our armed forces, this book makes uncomfortable reading, particularly I suggest, for the top brass. In my view the book is worthy of a prominent place on the bookshelves of the Defence Academy at Shrivenham and it should be required reading for those who will become the next generation of senior officers or defence service employees. Familiarity with its contents might also prove useful to those who constitute our political elite. There is much food for thought in this book and I recommend it.

Wg Cdr Colin Cummings

Wings by Patrick Bishop. Atlantic Books; 2012. £25.00.

This is Patrick Bishop's fourth essay on an aspect of RAF history. His previous titles, *Fighter Boys* (2003), *Bomber Boys* (2007) and *The Battle of Britain* (2009), have been reasonably sharply focused but his latest opus is rather more ambitious. As suggested by its subtitle, *One Hundred Years of British Aerial Warfare*, it is an attempt to get a quart of history into a 400-page pint pot and that had to involve a lot of spillage. For instance, while Coastal Command's participation in the

Battle of the Atlantic is dealt with, there is nothing on the Strike Wings and, although some space is devoted to the Mediterranean Theatre, the RAF's 'Forgotten War' in the Far East lives up to its name. The latter omission extends to the FAA's activities in the Indian and Pacific Oceans, and the FAA is definitely embraced within that subtitle – indeed much of the 20-odd pages devoted to the Falklands campaign concentrates on Sea Harrier operations. There is coverage afforded to some other post-war conflicts, particularly Iraq and Afghanistan, but others, like Korea, Kenya, Suez, Malaya, the Radfan, the 'Confrontation' with Indonesia and so on get little more than a paragraph, sometimes less. That, of course, is an inevitable result of the constraints of the available space.

While the book is well-written and the narrative flows well enough, I harbour much the same reservations as those that I expressed in my review of *Bomber Boys* (see Journal 40). I said then that while 'the numerous Notes at the end of the book tend to create the impression that it is an academic history, some turn out to be rather wanting if you actually try to use them' and that 'there are many instances of "op cit", but there is no bibliography (a significant omission in a work that draws heavily on secondary sources) so you may find yourself trawling back through several pages of previous Notes in the hope of coming across the "op" that has been "cited"'. Both of these observations apply equally to *Wings*.

As intimated above, some of the, few, references to primary sources simply do not work. Take 'PRO AIR 2', for instance. Leaving aside the fact that the PRO was rebranded as TNA in 2003, the AIR 2 Series contains 19,216 pieces so we really do need a rather more specific steer. Then again, the correspondence relating to a mid-1943 spat between Churchill and the Admiralty is cited as being drawn from ADM 43. ADM 43 actually contains 76 files raised between 1793 and 1833. Similarly, Harris' well known pronouncement of November 1943 that 'We can wreck Berlin from end to end . . .' is said to be in AIR14/357. It just isn't. AIR14/357 is a file containing papers raised between October and December 1941 dealing with matters relating to PoWs.

That sort of thing does not inspire confidence, of course, nor do annoying typos like JPAD (for SPAD), 1942 (for 1924), Glosser Meteor, Kitthawk and a statement to the effect that there were 170

helicopters deployed in Operation CORPORATE. There are others, all of which suggests inadequate – or a lack of – independent proof reading. While these are all slips of the pen, there are other errors which are less easily explained. It could be said that, when writing history, the devil is in the detail, and this book has more than its fair share of gremlins, all of which would/should have been picked up if the manuscript had been proof read by someone with some real familiarity with the subject matter. This would have avoided howlers like the RFC's 'maternity jacket' being slate-blue (it was khaki); Ira Jones flying with No 56 Sqn during WW I (it was 74, of course); Mannock was OC 85 (not 84) Sqn; the specification that produced the Stirling was B. (not P.) 12/36 of July 1936 (not 1935) and the Argentinean Pucara had/has turboprop (not piston) engines. If there had been a competent proof reader Armstrong Whitley Siskin would surely not have passed muster and he would also have picked up the fact that the first attempt at a bomber raid in September 1939 involved Hampdens of No 83 (not 89) Sqn. Interestingly, as with the inadequacy of that AIR 2 reference, the confusion between Nos 83 and 89 Sqns, also cropped up in *Bomber Boys* – which suggests a degree of recycling.

So, a verdict? Although *Wings* bites off rather more than it can comfortably chew, it is a reasonably successful attempt to live up to its subtitle and it is, undeniably, an easy read. As such I would certainly recommend it for the layman, but there is nothing new here and because it is, inevitably, a little shallow, it is unlikely to appeal to members of this Society. They would, I think, also tend to be distracted by the double-takes provoked by the incidence of unfortunate, and unnecessary, errors.

CGJ

The Pathfinder Companion – War Diaries and Experiences of the RAF Pathfinder Force – 1942-1945 by Sean Feast. Grub Street; 2012. £20.00

For a number of reasons, 2012 will be remembered by many people as a rather special year; it might be the two Olympic Games, the near success of Andy Murray at Wimbledon, Her Majesty's Diamond Jubilee celebrations or simply the dreadful weather – first drought then flood! For those interested in RAF history, the dedication

of the Bomber Command Memorial and the Seventieth Anniversary of the formation of the Pathfinder Force, will also dovetail into those other memories or, for some perhaps, even transcend them.

In view of this most recent anniversary, it is fitting that it should be marked by another account of the creation, development and contribution made by the Pathfinders to the bomber offensive. The author is becoming a prolific writer on aspects of the RAF's wartime history and he seems to have a particular affection for the Pathfinders.

This 215-page hardback is not a cerebral dissertation on the Pathfinder Force but it is an easily readable description of the development and activities of No 8 Group throughout its relatively brief – a little over three years – existence. The largely chronological narrative is supplemented by the recollections of veterans and amplified by vignettes dealing with related topics such as escape and evasion, and the dangers associated with bombing up an aircraft. These additions are presented in shaded text boxes inset within the narrative, a practice that I found at first confusing and later irritating. The book is well illustrated with monochrome photographs throughout. Whilst many of these pictures may be familiar, others are new and will probably have been drawn from the albums of those who contributed personal accounts. There is a comprehensive index and a record of sources and acknowledgements. There is a select bibliography which suggests that this account is not based on research into official records.

As a 'companion' the book lives up to its title and, as such, it draws many things together, rather than attempting to expose startling new facts: but then, with scores of books about the bomber offensive, and perhaps dozens about Pathfinders, already having been published, that 'tipping point' has long passed.

That said, I do recommend *The Pathfinder Companion* and it will certainly find a place on my bookshelf.

Wg Cdr Colin Cummings

Victor Boys by Tony Blackman. Grub Street; 2012, £20.00

I have to say that I found this book to be a bit of curate's egg. There are lots of old Victor mates in here with fascinating stories to tell, and they tell them well. But I was disappointed in Tony Blackman's personal contribution. His 'Vulcan Test Pilot' book was

tremendous, full of detailed reminiscences and explanations of how the Vulcan evolved and why pilots, like me, operated the mighty flatiron as we did. I know that Tony wasn't responsible for testing the Victor to the same extent, of course, but I think that he missed a trick in not exploring the Victor's operational evolution and development, perhaps through exploiting some of the A&AEE's reports. For example, it was a standard interview question for any Victor pilot aspiring to join the ETPS to explain why the Victor 1 could effectively land itself whereas the Victor 2 could not. Tony provides an account of HP's Chief Test Pilot, Hedley Hazelden, demonstrating an early Victor 1's ability to do this but he doesn't really explain why, nor why the Victor 2 couldn't do it.

That said, the book's subtitle is *True Stories from Forty Memorable Years of the Last V Bomber* and it does do what it says on the tin. It is a 198-page hardback containing recollections solicited from former Victor aircrew, pieced together with the help of Garry O'Keefe, editor of the Victor Association Newsletter. While these tales are certainly interesting, I was left with a feeling of superficiality – that there was so much more that could have been said.

While some of the book's content seems to have been culled from other published works, there is certainly new stuff here. I particularly enjoyed, for instance, reading my old captain, Peter 'Nobby' Clark's, account of a Victor B2(SR) diverting into Argentina en route to Lima prior to 'sniffing' French nuclear tests over the Pacific. This is a little known aspect of the Victor's career and I would have liked to have been told a lot more about the annual sorties flown by No 534 Sqn out of Peru and the Aleutians. Similarly, there was much that could have been said about the options that were explored in connection with the Victor's participation in the *Daily Mail* Transatlantic Air Race in 1969 – including the possibility of dropping Stu Stevenson into the Hudson River by parachute. But the less than a page devoted to the race has as much to say about the Harrier and the Phantom as it has about the Victor.

The best and most fascinating reminiscences are those relating to the Medium Bomber Force. The Victor B1/1A and B2 recollections are really punchy and life on the Joint Services Trials Unit that proved the Blue Steel missile exemplifies 'the best of British'. There are plenty of good photos in the book and there is a detailed overview of

the air-to-air refuelling effort that went into supporting the Black Buck Vulcan raids on the Falklands in 1982, but on the 30th anniversary of those remarkable sorties, this is at risk of becoming an oft told tale.

While they are not very comfortably embraced by the book's subtitle, *Victor Boys* ends with an appendix dealing with all accidents that resulted in the destruction of a Victor. These include the loss of XL191 over Ontario, a classic case study for anyone interested in crew resource management and how not to run a sortie, but this is not explored in any depth. The loss of XM716 over Warboys in front of the TV cameras in 1966 was caused by the brand new Victor being flown far too fast while pulling far too much 'G' because, in the words of my first Flight Commander, 'the captain had left his brain behind on Meteors'. As for the loss of XM714 over Barnack in 1963, *Victor Boys* says that 'one account did state that the pilot shut down the wrong engine'. True, but the 'one account' was the Board of Inquiry. The Air Speed Indicator was found to be capable of misinterpretation by a pilot under pressure. It would have been interesting to have a view on how that came to be missed by the test pilot mafia.

This book will undoubtedly appeal to the ex-Victor lobby and with forty years of service behind them, there are enough of these folk to ensure that it should sell fairly well. My personal view, however, is that the book is a missed opportunity. With such a notable test pilot at the helm, I had hoped for something more original, more analytical. As it is, his contribution is more that of an editor, than an author. I was disappointed, but, that said, the tales are well told.

Wg Cdr Andrew Brookes

One Flight Too Many by Jimmy Taylor. Greystones Publishing; 2012. £27.50.

The reviewer should, in the words of that overworked political cliché, perhaps declare an interest at the outset: the author of *One Flight Too Many* is the doyen of the Squadron Association of which I am currently President. I know Jimmy Taylor well, and like and respect him. I will attempt to be objective.

The first thing that must be said about this autobiography of a World War Two Spitfire reconnaissance pilot is that it is self-published, measuring 12 × 9 inches, weighing some 6 pounds, and written over 750 pages. Although it has been spared the synoptic red

pencil of a commissioning editor, it is still a compelling read.

First, it is very clear and well-written. The author is an intelligent and objective man who had a privileged education. He went to Cheam Preparatory School where his clergyman father was both owner and headmaster. He then went on to Eton, for which he had little affection, but nevertheless eventually became Head of House and was elected to 'Pop', the select Eton Society. After the war, he went to Trinity College, Cambridge to study history.

The second reason is that Jimmy Taylor is that rare phenomenon: a truly modest recce pilot. Of course, I write this tongue in cheek. But there is a pervading sense that the wartime PR community (and its advocates) may have nurtured a myth about their infallibility. Jimmy Taylor is ruthlessly honest about his mistakes and the book does not suffer from hyperbole. He writes with candour and modesty about the demands of operating a Spitfire. In passing, I did not know until I read the book – and I have known Jimmy Taylor for some 22 years – that he had been to Eton.

The final reason is that the author, who notched up sixteen operational PR sorties before bailing out over occupied Holland in November 1944 and was eventually captured, had a quite extraordinary and cathartic experience in 1990. It was only then that he learnt that the Germans had wrongly assumed that the Dutch community in the village of t'Hessler had assisted him to escape and summarily executed 4 Dutchmen from the village. I suspect the realisation that this had happened is probably the reason why this book was eventually written. Jimmy Taylor was, and still is, profoundly shocked by this outrage. The book covers this episode poignantly and is dedicated in part to those Dutchmen's memory.

The reader cannot help but be struck by the thoroughness of the flying training that Jimmy Taylor underwent. It dispels any notion that all young pilots in World War Two were pitched into battle with precious little conversion training as they may have been in 1940. He started elementary flying training on the Tiger Moth in November 1941, and completed his first operational sortie some 33 months later in August 1944. In between, he underwent training – along with 10,000 other British pilots – in the USA on the Arnold Scheme. Thereafter, he became a flying instructor for 9 months; during the 21 months he spent in America, he accumulated 1000 flying hours. It was

this hard-won experience which proved to be his passport to a highly coveted Spitfire posting.

The section of the book covering his conversion to the aircraft and subsequent operational experiences are so fully covered that the reader might be excused for thinking he had undergone the experience himself. One marvels at the detailed notes, photographs and diaries that Jimmy Taylor (illicitly) kept which have enabled him to write so vividly of the aircraft that became the love of his life. His subsequent evasion and final capture and incarceration in *Stalag Luft I* are also detailed and self-deprecating.

The second half of the book deals with Jimmy Taylor's life after the War ended. He left the Service in 1946. He subsequently had an interesting and eventful career as a teacher and travelled extensively before eventually retiring. But this part of his life is summarily dealt with in one chapter, because the focus is kept on flying in general and his subsequent discovery of the atrocity alluded to earlier. There is a great deal here about the friendship and respect he feels for the Dutch relatives of those executed for allegedly assisting him – a complete fabrication on the part of the German Army in order to carry out instant reprisals on a community suspected of harbouring members of the underground. For the more detached reader, who may want to skim over parts of this section, Jimmy Taylor still holds the interest of aviation-minded readers. He recounts the detailed research he undertook to establish the cause of the engine failure that led to his bailing out. He also chronicles some aspects of the Allied advance through Holland and Germany in which 16 Squadron, on which he served, played a contributory role in providing much-needed aerial surveillance as well as dropping messages to General Browning, the Commander of the 1st Airborne Division during Operation MARKET GARDEN.

I commend this book to every aviator and aviation historian. The flyleaf states that it may become a classic. HRH The Duke of Edinburgh – who was a fellow pupil at Cheam with Jimmy Taylor and wrote the Foreword – states delphically and presciently that the book is not a history but more a book from which history is written. All I will say is that I now have a profound understanding of the life and fears of a patriotic young aviation enthusiast who joined the RAF in 1941. But after 750 pages, perhaps the final words reveal why this

book came to be written at all: in describing his life as a circle from a distant past to a topical present, Jimmy Taylor poignantly concludes that the innocent men who were so needlessly executed will never allow the full circle of his life to be completed. For all that, he writes about his life, flying training and operational experiences with a compelling honesty, humour and rare insight. If you have strong arms, then pick it up and read it for this is a heavy book written by an author with a light touch.

Air Chf Mshl Sir David Cousins

The Sowreys by Air Commodore Graham Pitchfork. Grub Street; 2012. £20.00

The subtitle to this book, *A unique and remarkable record of one family's sixty-five years of distinguished RAF service*, tells the reader exactly what the book is about. But *The Sowreys* goes beyond a narrative of an exceptional family and its members' contribution to the Service. This book opens a myriad of windows into less well known events in the RAF's history and, arguably more importantly, gives us a very rare social history of the new Service. It catalogues the life and times of two generations of the Sowrey family from the earliest days of the First World War through to almost the present time. As one would expect from Air Cdre Pitchfork, the book is very well written and immaculately researched. The author has made use of an extensive bibliography in addition to the Sowrey papers and a wide range of files from The National Archives. The flysheet to the book makes it clear that the author worked closely with Air Mshl Sir Freddie Sowrey and those resulting elements of the book are outstanding.

The first generation of the Sowreys joined the Royal Flying Corps at various stages of the War and flew operationally in France as well as in the air defence of the United Kingdom. In this role, Fred Sowrey was awarded the DSO for shooting down a Zeppelin on the night of 23 September 1916. The obvious proximity of the raids to London, along with political and press interest, made these victories particularly newsworthy and Fred achieved celebrity status. All three brothers flew in France with Bill joining 8 Squadron, Fred 19 Squadron and John 100 Squadron. The latter became a very accomplished night bomber pilot and Fred added the MC to his list of

credits for his air-to-air skills. Both Bill and Fred subsequently flew against the Gotha menace with various degrees of success and frustration caused by the inferiority of the defenders' aircraft. Here, as well as at other points in the narrative, Air Cdre Pitchfork places the exploits of the family in the wider context of the War and the development of the air services with the Gotha attacks on London in particular leading to the Smuts report and the formation of the RAF.

The interwar years give a real flavour of the challenges facing the RAF in terms of its survival, technical challenges and the realities of operating in remote locations. These years flow seamlessly into the Second World War where the three cousins – Jimmie, Johnnie and Freddie were very much in the fray. Jimmie flew with 6 Squadron in North Africa and was shot down and killed when his flight was bounced by four Bf 109s on 24 June 1941. The surviving cousins continued to fly extensively though the war years despite medical problems and, for Freddie, being on the receiving end of a *Luftwaffe* 'tip and run' raid on the Red Cross adorned Palace Hotel in Torquay.

The period after 1945 sees Freddie in particular rise through the rank structure of the RAF, but with both cousins involved in trials work. As Freddie became more senior, his portfolio of duties expanded to include his role in so-called 'Colonels revolt' in 1964 when the RAF Club came perilously close to financial disaster. With less than 10% of the potential members actually staying in the Club, drastic action had to be taken and a small team including Freddie did just that resulting in a professionalisation of the whole enterprise and him eventually ending up as Chairman.

From the front line in wartime to some seriously demanding staff appointments prevented Freddie getting too bored. These included membership of the Joint Planning Staff in 1968 which was a time of huge change in the Services. As SASO Training Command, Freddie was deeply involved in the change at RAFC Cranwell from the Flight Cadet system to the new, and rather despised at the time, Graduate Entry Scheme. Subsequently, as Director General Training Freddie worked closely with the CAS of the time and Air Chf Mshl Sir John Barraclough to establish the post of Director of Defence Studies for the RAF with the then Gp Capt Tony Mason at the helm.

Overall, this book has much to commend it. It is a fascinating narrative of the lives and times of an extremely able, talented and

industrious family. Inevitably, there are a few grumbles of which the most serious is the total absence of footnoting or referencing which would be a significant issue for any academic historian; this is especially so with the amount of really valuable material that Air Cdre Pitchfork has discovered. I would also have welcomed brief CVs of the main characters in the form of an Appendix. That all said, the book is well illustrated and tells the story extremely well at a number of levels from tales of derring-do to the social and political context of the time.

Dr Peter Gray

The Aviation Historian.

There has not been a quarterly publication dedicated to aviation history since the demise of Key Publishing's *Air Enthusiast* in 2007. Michael Oakey and Nick Stroud, the erstwhile Editor and Assistant Editor of *Aeroplane*, are making a bid to fill that gap with *The Aviation Historian*. The first edition appeared in October 2012. The format is a 130-page, perfect bound booklet, sized somewhere between A4 and A5 (170mm × 245mm). Production values are high with the many illustrations crisply reproduced and colour used where appropriate. Other than the 'enthusiast', there is no specific target audience so the sixteen articles in the first edition are drawn from across the whole gamut of aviation history, military and civil, at home and abroad. For the RAF aficionado the highlights are an account of the Baghdad Air Mail in the 1920s and of Exercise TRUMPET in 1962. The latter was a trial flown over Scotland in co-operation with USAF U-2s to establish the sortie profile required to permit a Lightning to engage targets at altitudes in excess of 60,000ft – which explains some supersonic bangs that were heard in the Borders area in October of that year.

Individual copies cost £12.50 with an annual subscription at £44, both available only via the website at http://theaviationhistorian.com where you can learn much more. I wish this enterprise success.

CGJ

ROYAL AIR FORCE HISTORICAL SOCIETY

The Royal Air Force has been in existence for more than ninety years; the study of its history is deepening, and continues to be the subject of published works of consequence. Fresh attention is being given to the strategic assumptions under which military air power was first created and which largely determined policy and operations in both World Wars, the interwar period, and in the era of Cold War tension. Material dealing with post-war history is now becoming available under the 30-year rule. These studies are important to academic historians and to the present and future members of the RAF.

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

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

Membership of the Society costs £18 per annum and further details may be obtained from the Membership Secretary, Dr Jack Dunham, Silverhill House, Coombe, Wotton-under-Edge, Gloucestershire. 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:

1996	Sqn Ldr P C Emmett PhD MSc BSc CEng MIEE
1997	Wg Cdr M P Brzezicki MPhil MIL
1998	Wg Cdr P J Daybell MBE MA BA
1999	Sqn Ldr S P Harpum MSc BSc MILT
2000	Sqn Ldr A W Riches MA
2001	Sqn Ldr C H Goss MA
2002	Sqn Ldr S I Richards BSc
2003	Wg Cdr T M Webster MB BS MRCGP MRAeS
2004	Sqn Ldr S Gardner MA MPhil
2005	Wg Cdr S D Ellard MSc BSc CEng MRAeS MBCS
2007	Wg Cdr H Smyth DFC
2008	Wg Cdr B J Hunt MSc MBIFM MinstAM
2009	Gp Capt A J Byford MA MA
2010	Lt Col A M Roe YORKS
2011	Wg Cdr S J Chappell BSc

THE AIR LEAGUE GOLD MEDAL

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

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

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