ROYAL AIR FORCE

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TRAINING IN PEACE FOR WAR – THE OFFENSIVE
WELCOMING ADDRESS BY SOCIETY CHAIRMAN

Air Vice-Marshal Nigel Baldwin

It is a pleasure to welcome all of you today to what should be a fascinating seminar. Air Vice-Marshal Mike Robinson has been working on the subject for well over a year so my first thanks must go to him, on behalf of all of us, for his efforts. I am grateful, too, to Sir 'Sandy' Wilson who has agreed to bring his experience to bear, not least in the early days of the Gulf War and then as a Commander of RAF Germany at a critical time. He will be guiding us through the day and summing up for us later this afternoon.

My usual thanks, of course, to Dr Michael Fopp, the Director of the Museum and his staff. Without their help, we would be hard pushed to put on events such as this. Incidentally, you will be pleased to know that we are going to get back to having the occasional Society meeting at Bracknell – now renamed the Joint Services Command and Staff College. Our next major symposium – on the history of RAF Germany – will take place at Bracknell on 9 December.

But back to today and to how well we train in peace for war. Sir 'Sandy' – over to you.

INTRODUCTION BY SEMINAR CHAIRMAN

Air Chief Marshal Sir Andrew Wilson KCB AFC

Sir 'Sandy' Wilson has enjoyed a career spanning 36 years in the Royal Air Force in which he served in the Falklands and the Gulf as well as twice serving as Commander-in-Chief and member of the Air Force Board.

Educated at Tonbridge and the RAF College at Cranwell, Sir Sandy has flown virtually all the aircraft in the RAF inventory although the main part of his operational service was spent in the fighter reconnaissance role. He commanded a Jaguar squadron in Germany and RAF Lossiemouth in Scotland. He was also the first Air Commander in the Falklands after the war in 1982 and, as Commander British Forces in the Gulf as part of Operation DESERT SHIELD in 1990, he was responsible for the build up of UK Forces before handing over to General de la Billiére. He also served in a wide variety of staff appointments both at home and overseas and, following the end of the Cold War, was the last Commander-in-Chief of RAF Germany and the last Commander of NATO's Second Allied Tactical Air Force. His last appointment was as Air Member for Personnel and CinC of the new Personnel and Training Command. He was the Air ADC to Her Majesty The Queen from 1993-1995.

Sir Sandy was awarded the AFC in 1976, appointed CB in 1989 and KCB in 1991. He has many interests, including water colour painting, genealogy and antique restoration, and is a Freeman of the City of London and a Warden of the Worshipful Company of Skinners. He is married with three adult children and lives in the Cotswolds.

Chairman, Distinguished Guests, Ladies and Gentlemen. First may I, as your Chairman for the day, add my own very warm welcome.

Our subject for today's seminar is 'Training in peace for war – the Offensive' or to be more specific 'A critical survey of the peacetime missions, training and equipping of the Royal Air Force for the offensive through the years, and their relevance to the actual war task'.

In putting today's programme together, Air Vice-Marshal Michael Robinson has had, I think, a genuine difficulty in deciding where to put the

focus since this is such a broad task. After due consideration he has chosen a broad canvas ranging briefly from the pre-war period but concentrating mainly on post-war training. Since his aim is to draw out some of the more general lessons I am sure he has been right to cover a wide selection of roles. Nevertheless, in taking this approach a number of important aircraft types have been left out and he has asked me to mention in particular the Canberra which played a large part in our post-war history.

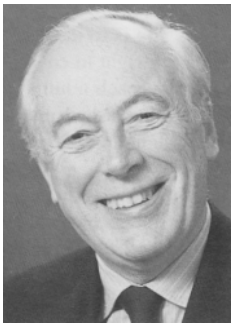
Now to the programme. The first presentation will be given by Air Vice-Marshal Robinson who will discuss pre-war training; he will be followed by Squadron Leader Rupert Parkhouse who will focus on his experience preparing the Fairey Battle for service in France in the 1940s. We then 'fast forward' to the 1960s to listen to two presentations about Vulcan training, the first from the Society's Chairman, Air Vice-Marshal Nigel Baldwin, who will discuss V-Force training, and the second from the Society's Secretary, Wing Commander 'Jeff' Jefford, who will concentrate on the Vulcan's role in the Falklands Campaign. These will be followed by the morning panel discussion.

The afternoon programme will focus exclusively on the post-war period and deal with the training of the Fast Jet Force. Group Captain Nigel Walpole will start the afternoon programme by examining the important role played by Battle Management and he will be followed by Air Commodore Graham Pitchfork who will highlight the impact of RED FLAG Exercises which were introduced in the 1970s. The third of our afternoon presentations will be given by Group Captain Jerry Witts who will bring us up to date by discussing the training of the Tornado Force for the Gulf War in 1991.

Lastly, Wing Commander Andy Golledge will bring us right up to date by talking about Harrier training for operations in Bosnia. As in the morning, these will be followed by a full panel discussion.

TRAINING THE BOMBER FORCE FOR WWII

Air Vice-Marshal Michael Robinson



Michael Robinson graduated from the RAF College, Cranwell in 1948 as part of the first post-war entry. His first tour was on 45 Squadron flying Beaufighters followed by flying Brigands on Operation FIREDOG in Malaya. Then transferring to the new generation of aircraft he flew the Canberra Mk 8 in Germany and later the Victor Mk 2 in No 1 Group.

His interest in the pre-war period in particular comes from the time when he read for a degree after leaving the Service. His thesis was entitled 'The Labour Movement in the 1930s – Its View on Air Power'. As we know, the simple answer was that the Movement did not actually hold any coherent ideas on air power in general or on the efficiency or otherwise of the bomber in particular. He will now provide us with an insight into how we became so ill prepared for the task that faced our bomber crews at the start of the last war.

'The Bomber Force as a weapon of war is deplorably inefficient.' Such was the conclusion of ACM Sir Edgar Ludlow-Hewitt, CinC Bomber Command's letter to the CAS, Sir Cyril Newall, on the 10th November 1937.[1] The CinC cited the lack of suitable navigation equipment, unsuitable composition of crews and a lack of crew stability as the main reasons for the fact that his force was entirely unprepared for war, unable to operate, except in fair weather, and extremely vulnerable both in the air and on the ground. In subsequent submissions in May and July 1939, Ludlow-Hewitt amplified his fundamental misgivings and called for higher qualifications in each member of a modern bomber crew, only obtained by specialised training.[2] Specifically he argued for a far higher standard of navigation, a completely new technique for flight in clouds and a gun defence against fighters whose firepower had increased by some fourfold whilst the armament of the bomber had remained relatively unchanged. I quote, 'There is little doubt that the weakest point of our bomber force . . . lies in its gun defence. The gunners have no real confidence in their ability to use this equipment efficiently in war, and Captains and crews have, I fear, little confidence in the gunners to defend them against destruction from enemy

aircraft'.

It is a moot point if gun defence was the weakest point, weaker than the skills required to locate the target by night or in cloudy weather. Even if professional skill and aircraft performance managed to get to the right target, would the bombs available in the 1930s have worked? Terraine writes that British bombs in 1939 were generally speaking awful.[3] Often they failed to explode and the standard 250 lb bomb frequently produced negligible results. The lack of adequate range facilities in the UK was a factor. Terraine cites the procreative habits of cockles and the peace of mind of swans as reasons given for the failure to provide ranges for the realistic testing of air to ground weapons. The design of the casing and performance of the explosive content were other factors which, when compared to the state of the art in Germany, rendered our bombs so poor.

In their book *Bombs Gone* Wg. Cdr John MacBean and Major Arthur Hogben do their best to exonerate the Air Chiefs for the problems once they had become identified in the early days of WW II as bids for new designs of bombs had been made as early as 1921.[4] But as we all know the end of a war leaves a huge arsenal of contemporary weapons which have to be used up before there is a strong incentive to design, test and produce better versions. The WW I bombs seemed to be adequate for the Imperial policing role which was the RAF's offensive commitment in the inter-war years. They were filled with Amatol, a mixture of TNT with ammonium nitrate. It did not become apparent until late 1941, when static trials were done, that Amatol had outlived its useful life. The relative effectiveness of German bombs during the 1940-41 blitz on London and other cities showed that, weight for weight, the *Luftwaffe* bombs were about twice as effective against built-up areas, bridges, railways and public service installations as our General Purpose bombs. Targets such as these were not readily available in the undeveloped areas of India and Arabia.

The 1921 Air Staff requirement for a standardised type and shape of GP bomb called for 50, 120 and 500 lb variants, the size and weight being limited by the types of future aircraft then foreseen. The requirement made no mention of performance criteria, other than that they should be reasonably efficient. Some dropping trials in 1925 showed improved trajectory and stability in flight compared to existing wartime bombs of similar weight but it was 1927 before the first penetration trial was attempted. Inert bombs were fired at the Shoeburyness artillery range from a test gun into a series of vertical concrete walls to represent building

floors. Although the first 500 lb bomb broke up in flight, its front ¾ penetrated all four walls. This single trial was deemed to 'indicate the improbability of such a target resisting a bomb of such type and weight.' The fact that bombs do not behave like artillery projectiles and do not invariably hit at right angles to the floor, seems to have been ignored. In 1928 two new concrete targets were constructed, one tilted at 20 degrees to the vertical, the other at 10 degrees, to simulate the likely strike angle of a bomb dropped from 2,000 and 10,000 feet respectively. No live drops were directed at typical targets.

Not until 1935, with the formation of an Aircraft Bomb Sub-Committee, was thought given to whether our arsenal held the necessary and appropriate types of bombs and components to ensure efficient attack on potential enemy targets. This committee called for a new 20 lb anti-personnel bomb and a GP bomb of between 30 and 50 lb for use against vehicles, houses and aircraft on the ground. In September 1939 Air Commodore Huskinson was appointed the RAF Member to the Ordnance Board. He decided that all new bomb designs should be fully tested against realistic targets before they were cleared for operational use. A trials target was set up in an abandoned ammunition filling station near Gretna Green on the Scottish border. Some of the bombs then in service were subjected to trial; many if not the majority failed to function. Between 10 and 15% of all 250 lb GP bombs dropped by Bomber Command during the war failed. WW I experience had clearly shown that bombs of this capacity were notably ineffective against hardened targets such as the German naval installations on the Belgian coast, and little damage was inflicted on Germany's industrial complexes. Yet these were the bombs which the Air Staff tried to perpetuate, possibly believing that a goodly number of small bombs would meet the need.

So, due to the pervasive financial constraint of the Ten Year Rule, initiated by Winston Churchill when Chancellor, the lack of urgency in design and the total absence of a valid test facility the offensive forces entered WWII with an untried arsenal of ineffective GP bombs, and with aircraft which could carry nothing bigger than the 250 lb variant. I should add that the inter-war story of the semi-armour piercing bomb designed to attack warships is very similar. There is one nice variation: a proposal to hold live dropping trials against a naval target ship in 1930 was opposed by the Admiralty on the pretext that if sunk it would prevent further trials.

The story of the 4 lb incendiary bomb is more encouraging.

Development by ICI in conjunction with the RAE meant that live bombs dropped in September 1936 functioned correctly in that they ignited and did not break up on impact. None were dropped on representative targets. The story of the 25 lb incendiary is very different. Put into production in August 1937 after six year's design and development, it was not tested if it would start a fire on a representative target until April 1939. The bomb was a total failure. On hitting anything hard it broke up or buried itself in soft ground. MacBean and Hogben conclude 'much time, money and effort could have been saved if the 25 lb incendiary had been subjected to realistic trials during the early days of its life, before the pressures of war forced compromises on an already discredited design'. An appropriate summary of much of the inter-war design and development of our bombs.

You might ask what has this unhappy tale of ineffective bombs got to do with Training in Peace. Proper preparation for war demands the use at squadron level of weapons to give both ground and air crews confidence in their use. Guy Gibson's experience, of getting airborne for the first time with a war load of bombs at night on his first operational sortie, is not untypical.

The 1996 symposium on navigation told us of the deficiencies in techniques and equipment which led to a report, May 1939, by the AOC 3 Group to his CinC that, 'Dead reckoning navigation by day above cloud can only be expected to get aircraft within 50 miles of the target.' In 24 months Bomber Command had 478 forced landings due to pilots losing their way. It was this sort of evidence which justified Ludlow Hewitt's 25th May 1939 letter to CAS where he called for a far higher standard of navigation. Here one must point to the inconsistency whereby, war-saving developments in the use of Radio Direction Finding for air defence were well in hand, there was not the same progress in the application of radar for the navigation of the bomber – GEE did not become available to squadrons until the night of 8-9 March 1942 whilst OBOE and H2S were still on trial. Here I note a letter quoted by Webster and Frankland from Sir Henry Tizard, Chairman of the Committee for the Scientific Survey of Air Offence to Air Marshal Sir Wilfrid Freeman on 8th November 1938: '. . . the Defence Committee works quite well. I cannot say the same for the Offence Committee. But the fact is that no one seems very anxious to get our advice on these subjects or to follow it if offered. We have had no meeting for a long while and there seems to be no anxiety on the part of the Air Ministry that we should meet'.[5] Serving officers were not members of

the Offence Committee, though some attended (presumably as observers). A Bombing Committee had been set up under DCAS in January 1934 and proposals had been made at the 2nd, 3rd and 10th Meetings – covering the period from May 1934 to May 1936 – to set up a centre for experiment and research into hitting targets. Such a facility came into being in 1938.

In February 1938 CAS responded to a set of eleven questions posed by Major Clement Attlee, some were inane, others shrewd.[6] I have found no evidence to suggest that Attlee had been 'primed', comparable to the facts given to Dalton by unknown serving group captains on the deficiencies of our air defences which he deployed in a critical speech in the Commons, 25th May 1938. One question wanted to know 'how many pilots are capable of flying to Germany and back?' The answer was: 'If the question means flying under war conditions against enemy opposition then 649 pilots in Bomber Command are so 'operationally' efficient. This number represents 51% of pilots strength. In 6 months time 51% will be 75%.' Question 5 challenged the Air Staff to admit that the radius of action of bombers then in squadron service was insufficient to reach German airfields. Attlee was told that the bombers would reach many airfield targets 'when operating from their bases in France.' The statistical answers avoided any attempt to assess the relative effectiveness of our bombers and the German air defence system. A few months before, in September 1937, a paper submitted by Gp Capt Slessor with his fellow Deputy Directors told CAS: 'the Air Staff would be failing in their duty were they not to express their considered opinion that . . . Bomber Command in particular is at present almost totally unfitted for war.' The CinC's report only served to confirm this. The picture painted so far is of unrelieved gloom and apparent failures to train or equip the force for offensive operations. But the inter-war period obliged our Service to move from a force which the British Government's Draft Disarmament Convention of March 1933 proposed to abolish 'so long as an effective system of supervision of civil aviation could be assured', to one ready for war only six years later. Baldwin was probably confident that the supervision of civil aviation would prove beyond the art of the possible.

Between July 1934 and November 1938 the Air Force was subjected to eight expansion schemes, each one overlapping on its predecessor, and none being achieved before it was overtaken by the next.

Such expansion became an expansion of inefficiency, or as Harris had written in September 1937 when AOC 4 Group: 'The present system of

training failed markedly to exploit even the sub-standard equipment it had. We cannot run a highly complicated and technical business on the floating population of a casualty ward.' In November 1938 the new Minister for Air, Kingsley Wood, writing to the Prime Minister in the immediate aftermath of Munich reminded him that, 'during the period of disarmament discussions, all developments in the large types of aircraft (maximum weight 3 tons unladen except for troop carriers and flying boats) had been discontinued in deference to the view of the Treasury and the Foreign Office.'[7]

Webster and Frankland commented that Bomber Command would have been stronger in 1939 if it could have grown more gradually and directed more attention to training and to solving the operational problems as they revealed themselves. The result was, and I quote, 'that even as late as 1939 the Air Staff had little realisation of the tactical problems raised by the strategic plans which had been adopted.' I question if this apparent inertia towards realistic operational training to identify and resolve the tactical problems was but the first expression of a long-held view that the bomber's performance would of itself suffice, and did this implicit confidence in performance – height and speed – persist until the Gary Powers U-2 incident?

The rapid expansion and associated turbulence is illustrated by the postings of Pilot Officer Hugh Lynch-Blosse who graduated from Cranwell in July 1937.[8] He first went to Hucknall to join No 104(B) Squadron flying Hawker Hinds. In May 1938 he moved to Bassingbourn to convert onto Blenheims. In both 1938 and 1939 his total flying hours were just over 130 hours per year, average duration one hour or less. In the first week of the war both 104 and its sister squadron, 108, were taken out of the front line and moved to Bicester in the role of Training Squadrons to convert new pilots. The priority was dual instruction to pilots straight from Flying Training Schools, whilst keeping up with his own bombing, navigation, formation and instrument flying. 'Very little night flying'. In 1938 from a total of 163,073 hours flown by Bomber Command less than 9% (14,615) was at night. He got back onto operations with a posting to 110 Squadron at Wattisham and the Mark IV (Long Nosed) Blenheim. His first 'op' was the next evening where the target was the invasion barges at Boulogne, take-off 8.30pm. His total night flying on all Marks of Blenheims was 12 hours. This was to be his first sortie in a Mark IV with a full bomb load at night. There was a final conversion onto Wellingtons but he became a PoW after

being hit by *Flak* over Berlin on the night of 12/13th March 1941.

In October 1962 Professor Donald Cameron-Watt wrote an article entitled 'The Air Force View of History'.[9] He concentrated on the air force version of the strategic debate which filled the inter-war years and, without naming Andrew Boyle's biography of Trenchard, published earlier that year, described it as presenting the RAF version of history in a manifestly outspoken and unashamedly extreme form. I do not intend to take up arms for or against this article other than to note that there is not a single reference in Boyle's book where Trenchard as CAS asked a question as to the efficiency or state of training of the bomber force which he saw as the power either to deter war, or to win it. Boyle may have anticipated this sort of internecine criticism when he wrote in the Preface: 'As this is primarily a biography, and neither a history of the Royal Air Force nor a study in strategy, I have refused to be drawn into the detailed discussion of large, rambling and endlessly contentious topics which not even qualified historians appear to be always capable of considering with detachment'.[10]

Cameron-Watt's description of Trenchard as a visionary, rather than a realist, may be fair. Whether my analysis of how our offensive arm was unready for war in 1939 is fair is for you to decide. My concern is that if history can teach anything we translate appropriate lessons on efficiency, training and equipment onto the contemporary stage. The Professor concluded his article with two lessons.

The first is that, since the civilian has to decide where controversy rages between Service experts, it behoves the civilian to educate himself in the nature of warfare, and the Services to aid and abet his education. I suggest that this indeed is one of the roles of our Society. The second is that, whilst deterrence is profoundly and devoutly to be hoped for, it is dangerous as an article of faith. It needs to be credible to those to be deterred. I would say Amen to that and humbly suggest to critical historians that the air force's post-war achievement of a nuclear capability did prove to be a credible deterrent. But that was yesterday's threat and deterrence.

Today's threats and responses may be different and, as always, *si vis pacem, para bellum*, these must be understood, trained and equipped for.

Notes:

1 PRO Air 14/58.

2 PRO Air 8/258.

[3] J Terraine. *The Right of the Line* (Hodder & Stoughton, 1985).
[4] J MacBean & A Hogben. *Bombs Gone* (Patrick Stevens Ltd, 1990).
[5] Sir Charles Webster & N Frankland. *The Strategic Air Offensive against Germany* (HMSO, 1961).
[6] PRO Air 8/234.
[7] PRO Premier 1/252.
[8] Letter from Gp Capt H Lynch-Blosse, dd 1 May 1997.
[9] D Cameron-Watt. *The Quarterly Review* (Murray, October 1962)
[10] A Boyle. *Trenchard* (London. Collins, 1962)

TAKING THE 'BATTLE' INTO BATTLE

Squadron Leader Rupert Parkhouse

58 years on – RP renews memories of 1940 and the Fairey Battle.

Born in 1921, the only son of an RFC pilot, Rupert Parkhouse was posted from Cranwell for operational training on Fairey Battles in March 1940, eventually joining 12 (B) Squadron AASF only to be shot down by ME109s on 13 June 1940 when attacking German armour on his second sortie. After five years as a PoW in Germany and Poland, he experienced difficulty in learning to fly again and spent nearly a year as a staff pilot on Ansons.

After further training on twin- and four-engined aircraft, he was promoted squadron leader in 1947 and attached as a supernumerary to 230 (FB) Squadron in 1948 for flying duties on the Berlin Air Lift. He took command of No 201 Sqn in 1949, but six months later a near fatal collision with a flare-path buoy taking-off in a cross wind at night in a Sunderland led him to re-assess his flying career, which resulted in a voluntary transfer to the Secretarial Branch. After various subsequent postings he retired prematurely from MOD (Air) in 1973 to administer the Industrial Architects Division of G Wimpey, retiring finally in 1984.

Today, the Fairey Battle has a reputation of near total inadequacy as an operational aircraft. So it is well to recall that the magazine *Flight* greeted its service debut in 1937 with the words, 'Now, at last the RAF has got a real aeroplane.'

This sentiment was surely endorsed by the air and groundcrew of the No 1 Bomber Group squadrons who were doubtless delighted to see their Hawker 'Hind' biplanes replaced by this sleek all metal monoplane during 1937/38.

Not for them, the grave doubts expressed by their CinC as to the war readiness of his Command to which the previous speaker so cogently referred.

In September 1939, No 1 Group was deployed to 'scratch' airfields in N France becoming the Advanced Air Striking Force (AASF), its HQ at Reims code named 'Panther', hinting aptly its threatening posture.

The HQ staff were appropriately housed in the Chateau Polignac, a prominent building, only second in size to the local cathedral. As the chateau was the home of Pomerey Champagne, one must not of course assume that the HQ staff enjoyed a champagne life style. It is only fair to emphasise that the building possessed vast cellars for use as air raid shelters.

A *Times* obituary in 1994 on a senior officer who was serving at 'Panther' in 1939/40 describes the Battle force as follows:-

> 'Ten Squadrons of Fairey 'Battles' were the nucleus of AASF, with forward operating bases in NE France to enable this short range aircraft to reach targets in Germany's industrial heartlands.
>
> In the event no such operations ever took place, since the Chamberlain Government under French pressure decreed that no bombs should be dropped on enemy territory.
>
> From September 1939 to May 1940 the 'Battles' dropped only leaflets. When the Germans attacked in May 1940 the role of the AASF became a tactical one and the Battle, a wretchedly obsolete design, slow, ungainly, packing a risible bomb load and a negligible defensive armament was shot down in droves in vain attempts to stop the German *Panzers*.'

The hurried withdrawal of the Battle squadrons from France in mid-June 1940 has left the impression that this seemingly inadequate aircraft ceased operations forthwith. This is not the case.

In July 1940, No 1 Group Bomber Command reformed with four RAF Battle squadrons linking up with four Polish Battle squadrons to carry out sustained night attacks on French and Dutch ports beginning in late July and ending, with minimal losses, in October 1940.

Thereafter with the 1 Group Battle squadrons converting to Vickers Wellingtons, the last Battle to leave UK squadron service was flown to Llandow on 16 December 1940 where it sadly crashed on landing with no recorded casualties.

It is now time to describe our operational training but before I do so, it will be helpful to review briefly the basic flying training already undertaken by the three air crew categories about to enter OCU. Pilots would have had about 150-200 hours dual and solo. I had 143 hours on Tutors and 'Hart variants over ten months.

Our navigators, mostly young keen VR sergeants (I don't recall any commissioned observers) would have undergone at least three month's navigation training followed by six weeks bombing and gunnery.

The WOp/AGs were given a nine-month course in signals theory and practice, during which, incredibly, they were expected to send/receive semaphore at 12 words per minute. Ten week's gunnery training followed, firing live in some cases from the open cockpits of Handley Page Heyfords.

I come now to the Battle OCU at Benson, formed from No's 52 and 63 Squadrons pulled out of the front line as 'poor' or training squadrons in September 1939. I joined 63 Squadron on the 8th March 1940. I found the Battle exciting to fly with its full IF panel, variable pitch airscrew, retractable undercarriage and landing flaps.

I felt sorry for our flying instructors seated a long way back with a very restricted forward view in a rudimentary cockpit with basic controls and instrumentation.

Thereafter, I completed some 40 hours general flying, with various crews. The air crew categories had separate crew rooms and we discovered our crews from the Authorisation Book. No bonding here!

Our routine training flights were mostly triangular cross countries, starting from a point west of Exeter, where we let down to 250 feet into the low flying area of west Devon and Cornwall.

In contrast to the pilot, the forward view from the navigator's station was virtually non-existent. Seated on his chest type chute he would plot ahead on his little map board, correcting as each new fix appeared to port or starboard. If we got lost, we could always 'Do a Bradshaw' along the pre-

Dr Beeching GWR to one of the 200 local stations in the area. Sometimes the aircraft intercom would fail and the pilot and navigator would confer by passing cryptic notes to each other in a little metal tray attached to an endless belt revolving round small hand wheels at each crew position.

Practical IF training was carried out in a Battle with a blacked out front canopy, the final test being a two-hour dual cross country under the hood.

Benson was one of the pre-war grandiose 'Lutyens' stations, and we did our ground school in the Education Section in SHQ. The one lecture I most recall was the Simulated Bombing Sortie. A charming rather elderly VR flight lieutenant with a flying 'O', MC and WW I medals would set up his epidiascope, issue maps with tracks to Ruhr targets thereon, and then illustrate the various kinds of targets from his library of photographs. He would describe with gusto how we would fly in close Vics of three or five aircraft at 250 feet at 200 mph with four 250 lb bombs set at 11 seconds delay. Enemy fighters would be seen off by our air gunners with their single K guns under the direction of an Air Gunnery leader in the lead ship!

Our little flight lieutenant never mentioned tactical support for the BEF in France. He may have talked rubbish but he certainly strengthened our morale as this was our first insight into any concept of war operations. One wonders now why there were no fighter affiliation exercises and, more importantly, no formation practices in the training plan.

Our night flying phase had just begun when the German Blitz on France opened on 10th May 1940. I left Benson with some 43 hours day flying and 3 hours night solo.

On 12th May 1940, about fifty ex-Benson aircrew, myself included, emplaned at Hendon for Coulommiers near Paris in an Armstrong Whitworth Ensign, replacements for the thirtyBattle crews lost in the first two days of the Blitz.

As we crossed the south coast I went forward to the cockpit and was amazed to discover that the sergeant captain with WW I Medals in the left hand seat had flown 10,000 hours as a captain with Imperial Airways.

On reaching Nantes by train we joined No 98 (Pool) Squadron at Chateau Bougon airfield. Here we lived under canvas in unbroken sunshine on the edge of the airfield with no attempt at concealment.

We carried out a series of triangular cross country flights in the Loire valley flying very low in totally unrestricted air space. We did high and low level practice bombing on the range at Pornic, and dive bombed targets from 10,000 to 3,000 ft. Lack of dive brakes made it difficult to hold the

nose on the target and the pull out at 340 mph was somewhat hairy, involving gentle use of tail trim.

The 16th May saw the first reinforcement air crew draft leave for 'The Front', only to return three days later, thwarted by the complete chaos on the French Railways. Two days later, a party of twenty VR Air Gunner Officers, commissioned directly from civilian life, arrived, having undergone 10 hours of A/G training in three weeks. Their average age was 40, most had WW I medals and it was soon obvious from their boisterous behaviour that they relished their freedom from domestic life, even in a tented mess bar.

Dunkirk being finished, we gathered a new line was forming south of Paris and we obviously had no inkling of Churchill's uplifting message to Reynaud and Weygand to the effect that:- 'The RAF will make a further increased effort to render assistance to your valiant hard pressed troops from 13th June onwards.'

Having completed a further 30 hours flying with 98 Squadron, on Saturday 8th June I joined No 12 Squadron based at Souge, a grass airfield some 26km west of Vendome. We were billeted among the villagers who were none too friendly. On Sunday, we were stood down from operations, passing a quiet afternoon by the riverside eating bread and tinned pilchards in tomato sauce.

On Monday 10th June, having been seen by the CO and Squadron Leader Flying, I went down to the airfield and reported to my Flight Commander, a trim figure in white flying overalls and bright blue tie. As I left him a flight sergeant with WW I medals, plus pilots wings, emerged from the adjoining tent and grabbed me for an air test. To my surprise, he followed me out to dispersal as I saw for the first time an operational Battle, its bomb racks lowered to reveal four 250 lbs bombs. I took off, for the first time with a full war load, climbed to 5,000ft, and carried out a genteel wing-over during which the aircraft flipped over so violently, that, as I learned on landing, the ammunition pan detached itself from the rear K gun to connect neatly with my gallant passenger's head.

Returning to the airfield, I undershot badly, screaming over the hedge in fine pitch with ¾ throttle. Surprisingly, I made quite a smooth landing. Passing the flight sergeant's tent later, I couldn't help overhearing my gallant, bruised ex-passenger announcing to his eager audience of airmen that he was never going to fly with 'Bloody bastard Pilot Officer Parkhouse again.' I didn't blame him and, in the event, he never did.

That evening, as Flare Path Officer, I pre-dated Brian Hanrahan by counting six out, and to the immense relief of the flare path party and myself, counting six back in, 90 minutes later.

The next day, Tuesday 11th June, we stood edgily by until called down to the Operations Barn at 17.30 hours to be briefed to attack German transport going southwards down the coast road into Le Havre from Fécamp. No fighter escorts were envisaged.

Six aircraft took off in cloudless evening sunlight and thirty minutes later at 8,000ft, were passing over burning fuel tanks in the port area. Further north, the road was completely deserted. Having no alternative target I flew home, in a shallow dive in the evening sunshine over what seemed a blissfully peaceful countryside. About five minutes from base, I suddenly wondered if I would be the only one to return with a full bomb load. My mind's eye conjured up a H M Bateman cartoon, me, cowering in a mess chair, surrounded by glowering faces – the caption – 'The only pilot who brought his bombs back.' So it was with intense relief on landing that I saw the other five aircraft at dispersal lowering loaded bomb racks. I vividly recall the radiant smiles of our groundcrew as they welcomed us at dispersal.

My first op was over; my relief was needless to say profound. Wednesday 12th June was another day of waiting for the op order which never came. The next day, standby crews were called to the Ops Barn at 17.45hrs and briefed to attack enemy armour concealed in the Forêt de Gault, some 26km East of Vendôme. There was no mention of fighter escorts.

I took off, with a crew I had never met before, climbed to 8,000ft, with my cockpit hood open, thinking that, if closed, it would be difficult to open in an emergency. As we neared the target my navigator, Sgt Arthur Morris, a veteran of eight sorties, asked me to close the hood as the inrush of hot air and oil from the radiator through his open aiming panel was preventing the use of his bombsight. Incidentally this fault had been identified by Farnborough test pilots in 1937.

We dropped our bombs amid some inaccurate flak. Turning for base the WOp/AG, just 18½ years old Duncan MacDonald, came up on the intercom as ever Scottish, despite impedance, 'Enemy fighters astern, Soor!' These words heralded a frightful banging noise of crunching metal. I thought at first the engine was exploding. Turning sharply to port, and momentarily glancing to starboard, I saw flames belching from that wing.

Levelling the aircraft, I ordered the crew to bale out. No answer came, so for some twenty panic stricken seconds, I struggled in vain to open the hood. Realising that my earlier fear of being trapped was now reality, to my surprise, in retrospect, I became reasonably calm. I throttled right back, went into fine pitch, put down ½ flap and drove the flaming aircraft down into the largest field to appear ahead.

Despite a slightly buckled fuselage, I wrenched the hood open, hopped out and, running from the aircraft, performed a kind of mad dance, waving 'Biggles like' to the twelve Me 109s as they roared past in line astern at about 50 feet, a spectacle to remember forever.

Suddenly recalling my map in the front cockpit, I rushed to get it when the front gun ammunition started to explode alarmingly, while at the same time I glimpsed the Me 109s coming round for a second pass. Fearing they might shoot me up, I retreated hurriedly to the nearest ditch. By the time the last aircrcarft had climbed away, the front cockpit was burning merrily. I never got my map. Thus my short operational career ended. No 12 Squadron lost two more aircraft the next day, the base at Souge was bombed the same evening, and all serviceable aircraft were flown to Nantes on 15th June, leaving for UK bases on the 18th.

In all, 137 Battles were lost in action in France, which according to Wg Cdr John MacBean and Major Arthur Hogben in their excellent book, *Bombs Gone*, formed the greatest losses in percentage terms suffered by the RAF in WWII.

These authors also give a memorably balanced view of aircrew morale in what has been described as the British 'Kamikaze'. 'Few of those involved survived the war to see both their aircraft and bombs deemed ineffectual. The members of the nine Battle squadrons in action considered they were doing their very best with what was available and paid scant attention if any to the rights and wrongs of aircraft design and bomb development. In any case, few had ever seen a live bomb till a few months earlier, much less dropped one'.

So what of the relevance of our pre-operational training. After the first five days of the Blitz, low level attacks were abandoned. Sorties thereafter took place at medium level or at night. There were no tight formations fighting their way to industrial targets. Fighter escorts were not expected, and few were provided. Our pre-op briefings were hurried and perfunctory, meeting our crews for the first time. By early June there were virtually no old hands left to get advice from.

In retrospect, it is amazing how ignorant we were of the general war situation. The only person who showed a growing concern as June 1940 unfolded was our French Liaison Officer.

Finally, looking back over our rather amateur training, one can't help feeling that the inter-war air force over-worshipped pure flying skill to the detriment of weapons application.

The late Hamish Mahaddie, doyen of Pathfinders, returning to the UK air force from Egypt in 1937, has this to say in his memoirs: 'Such was the style of the Service at the time that it was known as the 'Best Flying Club in the World', but measured against today's standards utterly amateurish and grossly incompetent.' But there were examples in WW I which showed the way to weapon effectiveness in war.

The caustic, C G Grey, long time editor of *The Aeroplane*, tells us about James Byford McCudden who rose from mechanic in the Air Batt RE to major in the RAF in six years, achieving 57 combat victories. 'He was a fine pilot, but never pretended to be a star flier. He prided himself far more on his shooting, on his mechanical contrivances and on his aerial tactics than he did on his flying'.

One recalls vividly that in pre-WW II Cranwell, the most coveted prize was the Groves Memorial Award to the best pilot of the graduating term. In retrospect, perhaps there should have been a prize of near equal merit for best results on the bombing and gunnery ranges at Armament Practice Camp.

TRAINING THE V-FORCE FOR ITS PRIMARY AND SECONDARY ROLES – LOW LEVEL TACTICS AGAINST THE SOVIET BLOC

Air Vice-Marshal Nigel Baldwin

Nigel Baldwin was one of the youngest Vulcan captains, a Flight Commander in Cyprus and later commanded 50 Squadron at Waddington; he was at the vanguard of operational training and took the first Vulcan to RED FLAG.
One of the first RAF graduates of the US Air War College, he has held a variety of staff appointments concluding as Assistant Chief of Defence Staff (Overseas). He is a founder member of this Society and our Chairman since June 1996.

The basic aim of the Medium Bomber Force (MBF) training system was very simple: to produce crews able to carry out their primary mission, that is individual nuclear strikes within close timing and tracking tolerances.

All my experiences were gained in the Vulcan Mk 2 force – I helped to collect brand new aircraft from the factory in 1963 and, by the time I left as OC 50 Squadron at Waddington in the summer of 1979, we were beginning to take the aircraft to St Athan for disposal. I began, of course, as everybody did, at the OCU – the Operational Conversions Unit, first at Finningley later at Scampton. That course took about four months for the pilots – after sea survival training at Mount Batten, aeromedical training and decompression from 56,000 feet at North Luffenham, six week's ground school, two weeks in the flight simulator and about 80 hours flying over six weeks. Then a fortnight at Wittering learning about nuclear weapons.

The Classification and BTR Scheme

Once on a squadron, the focus became the Classification Scheme. This varied over the years but, broadly, its foundation was the six-monthly Basic Training Requirement (BTR) – an allocation of training exercises to be completed by each of the five crew members. For instance: so many airfield and runway approaches using ILS and GCA, some asymmetric, some without some of the powered flying controls or airbrakes. Practice diversions. Navigational exercises with and without various bits of the

equipment working. A variety of simulated bombing attacks – sometimes dropping practice bombs, sometimes 1000lb bombs. Electronic warfare training runs through the facility at Benbecula where we could turn on some of the very powerful jammers the Vulcan carried in its tail. We had to do a specific number of fighter affiliation exercises – in my case, usually with Lightnings and later Phantoms. Overseas flights. Participation in Group and Command exercises – and so on. As far as flying itself was concerned, the best I ever did was about 300 hours in one year but the norm was 240/250. I finished up with about 3,000 hours on Vulcans after four tours.

And then a seemingly endless succession of airborne checks (on all crew members) by the resident experts. There always seemed to be somebody in the back looking over shoulders or sitting in one of the two pilots' seats checking the other pilot and the crew.

All this came to a head with the annual visit of the Group Standardisation Unit (GSU) (the 'trappers'). It was this report that we knew the AOC read, and the various tyrants under him. The GSU spent a fortnight with each squadron in turn. They flew with about half of the crews, grilled the rest on their professional knowledge, observed some in the flight simulator, and went through the squadron's administration with a fine toothed comb. If there was a can of worms hidden anywhere, they would find it, open it, empty it out, and examine the contents. These days we would call it 'quality control'. Much hung on the eventual debrief of the Squadron Commander and his Flight Commanders; even more hung on the eventual written report.

Going back to the BTRs – these were the dynamo that drove the squadron. The relevant data was laid out on large chinagraph boards in the flight commanders' office and those of the navigation leaders, the QFIs/IREs, and the AEO leaders. Activities along the top, crews down the side – to create a matrix of boxes each of which had to contain a tick by the end of the six-month period. This 'tote', incidentally, provided an excellent indication of which crews were good at utilising their sorties fully.

The BTR system formed the basis of the crew Classification Scheme. This started with Combat – which a crew was expected to attain within six to eight weeks of arrival (previous to that they were Non Operational and thus, obviously, not able to share in the nuclear standby burden). Declaration of Combat status told everyone that a crew was capable of standing QRA – Quick Reaction Alert – and, therefore, capable of going to

war.

Combat Star (or Combat *) was the next step up and was usually attained when the crew completed satisfactorily a full BTR training period – so about nine months to a year into the tour.

Next came Select – which required BTRs to be completed within more demanding limits; this was unlikely to be achieved until a crew was well into its second year, and sometimes not at all.

Top of the bill and quite rare (perhaps one per squadron) was Select Star. This demanded even greater accuracy and all round professional and personal qualities. Selection required the Commander-in-Chief's blessing. There were supposed to be a few perks for Select Star crews such as first bite at the overseas ranger flight cherry.

So that was the structure we all worked under – and it was good. It gave everyone an increasingly demanding standard to aim for, it kept the lazy up to scratch, and it gave the enthusiastic first tourists a worthwhile target.

It was an article of faith in the V-Force that the crew that flies together, dies together. In short, we were committed to operating as constituted crews (five-man crews that had been formed at the OCU stage, often on Day 1). This was one reason why there were so few Select * crews. In theory, the five-man team had to stay together and do everything together for a whole three-year tour and the exigencies of the Service tended to frustrate that. I, for example, had an RAF rugby player as my AEO and sometimes, it seemed, that the CinC, certainly the AOC, was needed to arbitrate on where the priorities lay.

In the short term, if the nav plotter broke his leg, for example, it could prevent the crew from taking its turn on QRA (and from completing its BTRs). The approved solution was to paper over the cracks by applying for a 'temporary reconstitution' and, having had its customary grumble, Group HQ would usually acquiesce. You could try cutting the corner, of course, and fly with a 'guest' nav radar, for instance, but this could lead to lengthy debates about whether the targets attacked counted at all and, if they did, to which crew? While these problems could be quite severe in the QRA days, a more relaxed attitude began to prevail once the primary deterrent role had been passed to the Royal Navy's Polaris fleet in 1969.

Today, a substantial element of ground training is carried out in sophisticated, digital, three-axis, full motion simulators. The V-bombers were firmly rooted in the analogue era. Nevertheless, there were flight simulators for the pilots – advanced for their time, a reasonable

reproduction of the two-navigator station complete with the radar, and an electrical trainer for the AEOs. But they were all located in separate buildings. Indeed, at one stage, there were only two Vulcan cockpit simulators which meant that pilots at stations without one had to take a whole day every month to meet their training commitments. We never had one at Akrotiri in Cyprus so the rules had to be changed. As the force contracted, however, we eventually finished up with a full set at each base, and it proved possible to co-ordinate the three isolated crew positions so that they could be made to work together, even if they were in different locations. It was a bit Heath-Robinson, with complicated wiring looms linking the sites. Nevertheless, on a good day, it became possible to 'fly' a war sortie as a complete crew, complete with threats and battle damage. And an exhausting and thrilling experience it was too.

Like the rest of the RAF, the V-Force believed that any overseas flight, even one as humble as a weekend away at Wildenrath, yielded excellent training in airmanship and captaincy while more ambitious deployments by individual V-bombers provided opportunities to train over different terrain and to show the flag. During the 'withdrawal from empire' phase in the 1960s, the V-Force went all over the place to prove that we had not withdrawn from the world stage. In 1962, for instance, V-bombers visited 24 countries. This began an era of Lone Ranger flights to newly independent states in Africa, to Malta and to Libya, to Canada and to the United States and westabout across the Pacific; and a prolonged presence in the Far East during the Indonesian Confrontation.

Associated with the need to reinforce, particularly the Far East, air-to-air refuelling was introduced in 1960. Only limited training was carried out, however, and not many crews were ever qualified, although the basic equipment was kept on board the Vulcans. At one stage, when Skybolt was in prospect, serious consideration was given to maintaining V-bombers on airborne alert. A series of trials at Waddington explored the feasibility of the idea but it proved impractical for a number of reasons (the cockpits were simply too small and cramped, and we did not have enough tankers; and the strain on the whole organisation was just too much). With the demise of Skybolt, the idea was abandoned. But back to the task and how we trained for our war role.

Low-Level Training

To counter the Soviet deployment of SAMs (remember Gary Powers

had been shot down in 1960), the Medium Bomber Force – the V-bombers –were driven to adopt low-level tactics. I flew my first Vulcan low-level training sortie out of Coningsby as a IX Squadron co-pilot in March 1964. The existing handful of recognised low-level training runs in the UK was rationalised and extended to provide a single route which started in Kent and ran clockwise right around the UK to end at the Wash just north of Scampton. The route could be joined and left at numerous points but it worked in only one direction. Inevitably, overfamiliarity began to undermine its value. It was also very limiting tactically, as deviations from the route were not allowed. It suited the V-Force, however, as we were not really in the *tactical* business; our wartime task was to fly low on track and on time. To do otherwise would have disrupted the whole of the tightly co-ordinated strike plan. Those who flew smaller aircraft, such as Jaguars and Buccaneers, found the degree of confinement imposed by the rigid route structure increasingly irksome, but the fact that you could not see much out of a Vulcan's cockpit precluded any relaxation of the rules although later on some brave hearts authorised flight in low-level *areas* as distinct from pre-ordained *routes.* With the Vulcan, to keep aircraft fatigue down, we would fly about an hour at low-level – mostly at 250 knots accelerating to 350 for the two or three bombing attacks. Most crews flew at 500' agl but some of the more experienced were allowed down to 300'.

To provide a change of scene and a more demanding environment, we made excellent use of the almost empty wastes of Labrador in Canada operating out of a formal RAF detachment base at Goose Bay. This, then, was a very active forward Strategic Air Command base with a ramp full of KC-135 tankers on QRA and a resident squadron of F-102s (whose noses were frequently put out of joint by departing Vulcans which only needed a third of the runway to get airborne, could beat the F-102 to 40,000 feet, and out-manoeuvre it when it got there). Every crew spent about a week at Goose Bay every year, and the low-level training was excellent. A little later, we set up a similar facility at Offutt AFB, Omaha, Nebraska – the home of HQ Strategic Air Command – and this allowed crews to fly low-level and attack targets over the USA using the USAF's network of so-called 'Oil-Burner' routes. A crew did this about once, or perhaps twice, a tour.

Another opportunity for different low-level training emerged by detaching to Luqa in Malta or El Adem to fly routes over pre-Gadaffi Libya. On the face of it, the terrain may appear to have had little

application to the primary operational mission but remember that, in war, the pilots would have been flying blind (we had a screen which was designed to prevent us being blinded by nuclear flashes) and, to the rear crew (who couldn't see out anyway) the relatively flat and featureless desert, providing few unambiguous, discrete radar returns, was a reasonable facsimile of the western USSR. (I used to pontificate to anyone who would listen that the highest ground between HQ Bomber Command at High Wycombe and Moscow was Harrow-on-the-Hill. So why were we flying through, and sometimes into, the Welsh Mountains?).

The only V-bombers to be permanently based overseas were the Vulcans of 9 and 35 Squadrons at Akrotiri for the first half of the 1970s. We (I was a Flight Commander on 35 Squadron) were a bit limited in scope – a high-level navigation stage to Crete and back then once around the island at 500' agl attacking, with an F95 camera, two or three village churches was hardly demanding but, being assigned to CENTO, we did get into the Shah's Teheran and fly low-level routes over the wilds of Iran, into Masirah and Oman, Turkey and Greece occasionally, and my crew got as far as New Zealand and Mauritius. But EW training was particularly limited, and we had to make the most of the ECM ranges at Stornaway whenever we got back to the United Kingdom (which we did twice a year).

Exercises

Apart from the BTRs, the routine was punctuated by formal exercises. For the UK squadrons, the regular Group HQ-sponsored monthly affair would require each squadron to field three aircraft to fly a simulated navigation and bombing profile. Although these events often began with a scramble take-off (to get a tick in the BTR box), these activities were always preplanned. The real test was Exercise MICKEY FINN – a no-notice exercise, usually once a year – but if the first one didn't go well, Command HQ could and would order it done again. MICKEY FINN required the recall of all available crews, the generation of the maximum number of aircraft, dispersal of the entire force to its wartime launch bases where they sat on ORPs, at 15 minute's readiness, for a couple of days or so.

After being called to cockpit readiness several times (and, although you could make a reasonable guess, you never really knew which one would be 'for real'), we would eventually be scrambled. Dispersals were usually released individually, crews then flying a simulated war mission. One year,

however (probably 1967), the whole lot were scrambled at once. More than 100 Vulcans and Victors were airborne within 4 minutes. It worked but it gave Air Traffic kittens, and the next problem was to get them all safely down again. The subsequent 'sortie' involved everybody flying time-wasting 'trombone' patterns to establish a reasonable degree of separation at the Group Dispersal Point through which we all had to funnel for recovery to our Main Bases. The lucky ones were home within the hour, but some were much later.

Bombing and Navigation Competition

The other high point of the annual calendar was the Command Bombing and Navigation Competition. The rules were constantly being changed (not least, we thought cynically, to make sure that visiting SAC crews could not possibly win) and the level of participation varied. In some years, all crews took part, while at other times it was only representative crews, selected after a fly-off at squadron level. Just how useful all this activity was is questionable. It was supposed to stimulate innovative approaches and, in the early days, it probably did, but once the best techniques had been devised, the competition really became a diversion of effort, not least because it placed a great deal of emphasis on celestial navigation which was, in truth, no more than a get you home aid. We were supposed to be training for war, and you could not realistically go to war on astro, certainly not at low level. But looking back on it from a distance, I now realise that the annual competition with SAC had a political importance way beyond our irritations in the crew room.

NATO

Now a word about NATO: although the first V-bombers, the Valiants of 207 Squadron, had been assigned to SACEUR as early as 1960, it was not until May 1963 that the whole of the MBF was put at his disposal. At squadron level, however, this had very little impact as training was still a wholly national affair, Command and Control continued to be exercised from High Wycombe. Although wartime targets were now allocated by SHAPE, the details were administered by HQ Bomber and later Strike Command. Nothing seemed to have changed. SACEUR did not make much impression at squadron level until the late 1970s when his TACEVAL policy obliged us to paint everything green, fill sand bags, and carry our NBC kit with us. While we had certainly been assigned to SACEUR, and we had to accommodate the occasional NATO officer, we largely

conducted our affairs in 1980 in very much the same way as we had done in 1960 – right down to the Bomber Controller giving the same launch instructions over 'the Bomber Box'.

RED FLAG and Night Low Level Training

Although it was still an impressive air display performer, by the late 1970s the Vulcan was rapidly becoming obsolescent. It still had one more shot in its locker, however, and it proved possible to much enhance the aircraft's ability to operate at low-level at night and in bad weather. We are going to hear about the importance to the Buccaneer of the USAF training programme known as RED FLAG later from Graham Pitchfork. But, in 1978, the USAF invited the RAF to take part with the Vulcan in the first all night Red Flag. As OC 50 Squadron at Waddington at the time, and under the critical gaze of the SASO – one Air Cdre Mike Robinson – I was told by 1 Group HQ to select four aircraft from the fleet, six aircrews, and a small but highly expert team of technicians, work them up in the UK and at Goose Bay, then participate in RED FLAG 79/2 – and, 'by the way, don't have an accident.' There were to be no technical enhancements to the kit, so it was really a question of getting the most out of what we already had: a rather basic Terrain Following Radar which we had bought off the shelf ten years before and that had languished largely unused in the Vulcan's cockpit not least because pilots had preferred to look out at the ground passing by instead of keeping their heads down on instruments . . . Now, once we concentrated on it and improved its reliability, it served us well. It was not drift or bank stabilised, nor could it anticipate the need to give a fly-down command as you approached the crest of a ridge. It simply looked at where the nose was pointing – which was not necessarily where the aircraft was going.

We pilots overcame these limitations by close co-operation with the rear crew (and that is why the crews were selected with such care). So long as the navigator radar could provide frequent accurate fixes, the navigator plotter's kit (essentially DECCA Doppler resolved around a very accurate Heading Reference System) permitted the aircraft's progress over the ground to be monitored with precision; the navigator plotter was able to provide a commentary forecasting, for example, when the TFR would give a fly-up demand and anticipating the need to push over, with the other navigator providing advice on radar 'cut offs'. Compared to the Tornado's fully automated system, this was a tactically limited approach (you *had* to

stay on the pre-planned track) and one which was totally hands-on and very labour intensive. But in 1978 we did not have any Tornados – and the system certainly worked – the key being mutual confidence back and front. We worked up both confidence and experience gradually and certainly impressed our American hosts at Nellis AFB when we flew through the mountainous RED FLAG ranges contour flying at night at 1000 feet agl – well below the B-52s and most of the F-111s.

For all that, I do not believe that it was a realistic approach for other than very competent crews. It was absolutely essential that the navigators had the maturity and confidence to say if they had any doubts at any time. Unfortunately, you could not simulate this technique and, to be proficient at it – and you had to be proficient – required a lot of practice. This meant lots of night flying with all the attendant problems of noise, anti-social hours and so on, although, on the plus side, we found that night low level flying was very economical in terms of airframe fatigue. It is also questionable whether it would have coped with really rugged terrain (although we did do it over Wales and the Lake District) but, as I have said before, there is not much high ground en route to the Soviet Union . . .

After RED FLAG, my crew went back to Goose Bay to fly routes there at 800 feet agl at night then we went to Offutt in Omaha to fly some of the USAF routes at 500 feet over some lakes and 800 feet over the plains – while the HQ 1 Gp SASO sat in his office at Bawtry biting his finger nails .. . My most gripping memory of the time was flying several hundreds of miles low over the flat terrain of Labrador on a pitch black night – unlike anywhere else we had flown, it was absolutely jet black – a phenomenon impossible to find in Europe. On one occasion, we flew in solid cloud for what must have been 20 minutes or so without realising it. I don't think I told the rear crew at the time .. .

Conclusion

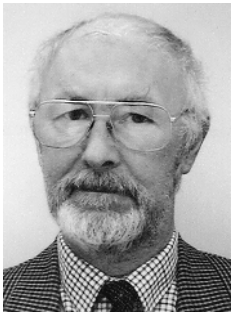
The ultimate question today, of course, is: did the V-Force do the *right* training? Could we have done it? Could we have got through the Soviet defences at low-level to the target on time? I suppose that all training turns out to be flawed to some degree when the system is actually put to the test. Operational experience would certainly have revealed that some of our techniques could have been improved – except, of course, that in WW III it would have been a one shot system. My own view, given reinforcement by our experience on the night RED FLAG and by subsequent night training,

is that our training was essentially right and, remembering all the peacetime constraints, that we did about the right amount of it. We had both *quality* and *quantity* enough to ensure that a proportion of us *would* have been able to reach our targets (several hours before SAC would have got there incidentally) especially if we had been launched at night or in poor visibility by day. I think that that was still true right to the end of the Vulcan's life. Whether we would have got back to base, I am not so sure – but I never lost any sleep over that problem nor did most of my colleagues.

And, talking of colleagues, they do not come much closer for this Vulcan pilot than the navigator plotter who guided him through the RED FLAG range at night: Jeff Jefford – who is now going to talk to you about another brief chapter of the Vulcan's extraordinary life.

VULCAN OPERATIONS IN THE FALKLANDS CAMPAIGN

Wing Commander C G 'Jeff' Jefford



'Jeff' Jefford was directly associated with the Vulcan for over 10 years and was Nigel Baldwin's navigator when he flew on most of those first RED FLAG sorties. Operating initially with BLUE STEEL and later in the free-fall role, he logged more than 2,000 hours on the type. Ultimately he became the last occupant of the Vulcan desk at Strike Command in 1982 which provided him with a privileged vantage point to observe the conduct of Operation CORPORATE.

I should make it clear from the outset that I am not here to play Mark Antony. I come not to bury the Vulcan – but neither do I come to praise it. Our theme today is peacetime training – and its relevance to war. The Vulcan simply provides us with an interesting case study.

I am sure that the Vulcan's actual contribution to the Falklands campaign is well enough known. Suffice to say that seven BLACK BUCK missions were planned. Of these, one was cancelled and one was aborted after launch. Five were executed; three delivering bombs and two in the radar suppression role.

The most significant characteristic of the Falklands campaign was its geographical remoteness and coping with this was the dominant planning factor. The first question that had to be answered was not 'What shall we do?' but 'How shall we get there?' Several 'pre-war' possibilities were explored on a contingency basis, including a variety of alternative basing arrangements – even the feasibility of stationing Vulcans *at* Port Stanley (a marginal concept at best) – but the only practical solution was Ascension Island. Similarly, mission options were constantly being reviewed and at one time or another consideration was given to mounting a four-aircraft fire power demonstration, mining sorties, leaflet dropping – and there was always the *possibility* of bombing the mainland.

Considering the aeroplane itself, the Vulcan was a very reliable airframe with ample power and a still respectable performance, but its utility was severely restricted by the capabilities of its analogue-based 1950's

computer technology and its 1940's weapons. Nevertheless, it still had considerable potential, even if much of this was dormant. Most significantly, although all Vulcans sported a refuelling probe, they didn't work. In fact they had never been much used by the B.2s. Why? Because refuelling was unnecessary for (and in any case incompatible with) its deterrent role within NATO and because our withdrawal from Empire during the 1960s had virtually obviated the need for strategic reinforcement. Since there was no longer any immediate operational requirement for AAR, the equipment had been inhibited and the crews had ceased to practice the associated techniques.

Similarly, in the heyday of the V-Force, when we had had nine squadrons of Vulcans, two full wings had maintained a conventional bombing capability. Although this remained a notional commitment for a time, it moved to the back burner in the early 1970s and in 1974 it was decided that there would be no more funding for this role – shorthand for no more thousand pounders. Inevitably, training declined and in 1980 the Vulcan's declaration to SACEUR in the conventional role was quietly withdrawn, more or less putting an end to *any* substantial involvement with iron bombs.

By the spring of 1982 the Medium Bomber Force was down to four squadrons. One of these was actually in the throes of disbanding and the other three were all to have gone by the end of June. Waddington was, therefore, thrown a *very* fast ball on 9 April (Good Friday), when it was directed to generate ten aircraft in the conventional role and to restore their AAR capability.

The flight refuelling instructors from Marham who supervised training were happy with the performance of the Vulcan pilots but at a loss to explain the serious problems which were encountered with fuel spillage, especially as it was known that Vulcans had successfully indulged in AAR in days of yore. Engineers from Flight Refuelling Ltd eventually diagnosed the problem which was to do with the assembly of the long disused valves within the probes.

Going back to planning considerations, it had soon become clear that the scale of tanker support required would limit any offensive missions to single sorties, as the tanker effort required to support just one bomber was considerable. Typically, as many as a dozen Victors could be involved, passing fuel either to each other or to the bomber on the outbound leg, with as many as four more tankers for the recovery, plus a Nimrod to assist with

the RV.

Another fundamental limitation was parking space. So many tankers were needed that there would be enough room at Wideawake for only one Vulcan, plus a spare. The original fleet of ten was therefore reduced to five, all of which had the Skybolt wing hardpoints. The first use for these was to carry a Westinghouse jammer borrowed from a Buccaneer, to upgrade the Vulcan's Electronic Warfare capability – another aspect of its armoury which had been starved of funds for several years.

Work was also in hand to provide the aircraft with a sensible navigation fit. For long-range oversea operations the only means of fixing a Vulcan's position was astro. This sufficed for the routine 2,000 mile trip to Goose Bay, but it was not really adequate for an 8,000 mile operational mission – after all this was 1982, not 1942. The solution was Carousel, an inertial platform, some of which were salvaged from stored VC10 airliners awaiting conversion into tankers.

A great deal of thought was devoted to devising the method of attack to be employed. On the credit side we had excellent mapping of the target area, so the selection of offsets for radar bombing was not going to be a problem. Where we did encounter difficulties was in the field of weaponeering. There was no dispute that, to gain the advantage of surprise, the attack should be carried out at night and at low-level. But there were conflicting views as to what the final height ought to be and whether to use ballistic or retarded bombs. The problem was to find the right balance between accuracy and the required level of damage – and survivability – losing a Vulcan would have represented a serious loss of face.

One faction of the planning community maintained that a retarded release from 900 feet would result in impact detonations sufficient to create (almost certainly two) craters. The other school of thought believed that these bombs would do little more than scab the runway. To guarantee penetration, they advocated a ballistic release from a pop-up manoeuvre to about 8,000 feet. The 900-foot brigade thought that this would be so inaccurate as to risk not hitting the runway at all. The problem was that there were no *definitive* answers. There were plenty of experts to consult – Boscombe Down, the RAE, various desks at the Ministry and at Strike Command, the weaponeers of the Department of Air Warfare at Cranwell, CTTO, Huntings and the Ops staff at Bawtry and Waddington. Unfortunately much of their advice tended to conflict. We had lots of informed, and often strongly held, opinion but no one really *knew* – hence

the polarisation into high and low level schools of thought. This lack of conclusive answers to such a fundamental question was a serious deficiency.

Intelligence on the defences was also very sketchy. Waddington had its own, apparently reliable source, an arms dealer, who was quite sure that the opposition would deploy only radar-laid guns with an effective radius of no more than 6,500 feet, plus the relatively innocuous Tigercat. Other advice indicated that Argentina also possessed a far more potent SAM system – Roland – and again it proved difficult to obtain a definitive assessment of the engagement envelope of this missile.

In the event, it was really Waddington who finally called the shots – after all, they were going to have to fly the mission. It was agreed that the first attack would involve a ballistic delivery of twenty-one one-thousand pounders from a pop-up to 10,000 feet following a low-level approach. Increasing concern about the capabilities of AAA and Roland drove later operations up to 16,000 and eventually 20,000 feet. It is worth noting that, while the pop-up manoeuvre was not a particularly difficult one, it *used* to be a standard tactic but, like so many other techniques, no one had practised it for years, not since the withdrawal of YELLOW SUN and BLUE STEEL at the end of the 1960s.

Prior to the pop-up decision being taken a retarded delivery had been the favoured option and most, if not all, of the practice bombing sorties which were laid on were flown at less than 1,000 feet. In the context of today's seminar, this may have revealed an interesting flaw in our peacetime training. Ever since the early 1970s, when the V-Force had adopted the WE177 lay-down weapon, the majority of its bombing attacks had been carried out against simulated targets on the UK low-level route. The results were assessed by F.95 photography. Although the primary method of bomb-aiming was still supposed to be by radar, in the interests of getting good academic scores it became the usual practice for pilots to handle the final run up on the target visually. This virtually eliminated line-error, leaving the nav radar to sort out the release and to carry the can for any range error. The problem was that our cameras were not affected by the wind. Bombs are. But we had rather forgotten this, as we hardly ever dropped any real bombs any more. During practice sorties at Garvie Island, it was something of a disappointment to find that, having flown *directly* across the aiming point, a stick of retarded bombs would drift downwind and fall in the sea. I hesitate to draw a sweeping conclusion from this one

piece of evidence but it does rather suggest that our lack of live bombing training in peacetime may have encouraged bad habits.

Before leaving bombing, by stretching a point, there may be another peacetime training lesson embedded in the CORPORATE experience. In order to refine the calibration of the bombing system, Waddington needed an accurate assessment of the results of the first sortie. We knew that there was one crater – but where was it? – and which bomb of the stick had made it? Carrier-based aircraft were operating over the Falklands within hours of the first Vulcan mission, but, despite repeated requests, at the highest level, there had still been no feedback from the Task Force three weeks later. Post-strike reconnaissance is an important feature of sustained air operations. Had we, the RAF, failed to impress this on the Navy in the course of our joint peacetime training activities – or had the Fleet Air Arm simply neglected its PR capabilities?

So much for bombing. With the Task Force within striking distance of the islands there was growing concern about the presence of surveillance radar. It had already been decided to adapt the Vulcan for the radar suppression role, using the only available missile – MARTEL. Waddington's engineers designed and manufactured a carrier beam which could be suspended from the Skybolt hardpoints. A trial firing was carried out at Aberporth and two Vulcans deployed to Ascension, each armed with a single missile. There had, however, always been reservations about the suitability of this particular weapon and there were grounds for doubting its reliability. Concerned about the risk to civilians in the target area, the Air Commander sought a positive assurance that the probability of success would be reasonably high. Such an assurance could not be provided and the MARTEL option was dropped.

Fortunately, an alternative was already under investigation in the form of US-supplied Shrikes. Thousands of these had been fired in south east Asia so their reliability was beyond question. Engineering work and indoctrination began at Waddington on 21 May and a week later there were eight Shrikes at Wideawake being looked after by technicians who were now familiar with the missile. Single and double mounts were available and a crew had been checked out on the use of the system. I simply don't have time to go into detail, but, because Shrike was a relatively unsophisticated missile with no memory and limited homing capabilities, the tactics were quite complicated.

At one time or another, several other options were actively explored for

the Vulcan, including the fitting of OMEGA, the use of Night Vision Goggles and the carriage of cluster bombs, Sidewinder, mines and Laser Guided Bombs. Of these, only the LGBs reached the hardware stage, but they were not used in action.

Although I began by saying that I had not come to praise the Vulcan, I would like to take this opportunity, at least, to defend it. In the aftermath of Operation CORPORATE there were some who sought to belittle the Vulcan's contribution. It was argued that, in view of the limited material success which had been achieved, its participation had absorbed a disproportionate amount of effort. Such charges revealed a lack of appreciation of the realities of using 'dumb' bombs. I suspect that those who brought them were simply disappointed by the absence of a spectacular degree of destruction. The fact that the two sorties which attacked the runway produced only one crater was entirely predictable.

I was, incidentally, later asked what level of effort would have been required to leave a Minimum Operating Strip of no more than 2,000 feet. Bombing from 16,000 feet, it would have taken thirteen very expensive sorties to provide a 90% probability of achieving that aim – which is to say that there was still a 10% chance that thirteen would not have been enough. Nevertheless, the Vulcan did inflict a worthwhile degree of physical damage on the runway and, by demonstrating its vulnerability, deterred the opposition from using it for their Skyhawks and Super Etendards, obliging them to operate at the extreme of their effective range.

The Vulcan's detractors also chose to minimise the considerable psychological impact of the raids, not least the 'Doolittle effect', and the important political message that they conveyed. BLACK BUCK I was the first overt action taken by the British and it dispelled any doubts about the UK's resolve. Furthermore, it was quite clear that if the Vulcan could bomb Port Stanley, it *could* bomb the mainland too. While the Vulcan's critics refused to recognise this as a viable option, Argentina certainly got the message and a proportion of its Mirage III force was reserved for home defence, preventing it from operating over the islands.

To sum up then. For ten years or more the routine training of Vulcan crews had involved only those activities which directly supported the sole operational concept to which the force was committed; that is to say low-level, lay-down attacks using nuclear weapons. Non-essential techniques had been abandoned; apparently redundant equipment had been inhibited and, in marked contrast to the USAF's B-52s, we had long since ceased to

upgrade the Vulcan's armament and its navigation, weapon-aiming and ECM capabilities. By 1982 the Vulcan was a wasting asset and, under the circumstances it was a remarkable achievement that it took part in Operation CORPORATE at all. That it did so was a tribute to the ingenuity and the industry of its groundcrew and to the flexibility of its aircrew. In the specific context of today's seminar, however, it has to be said that much of their peacetime training had been – irrelevant. There were very sound reasons for this, predominantly financial of course, but the fact was that we had practised for one role, albeit a very important one, to the exclusion of all others.

The crews' *extensive* experience of low-level, overland operations using radar fixing had little application over the South Atlantic. Within a very short timescale they had had to become accustomed to in-flight refuelling, to relearn (in some cases virtually to learn from scratch) about conventional bombing, and to handle a new jammer, inertial navigation equipment and missile technology. The Vulcan team were not alone in having to learn a lot of new tricks, of course – most of the other aeroplanes involved had had to be extensively upgraded to permit them to participate in CORPORATE. Now – whether all of this activity had represented a triumph for British improvisation or whether it was just a successful exercise in papering over the cracks rather depends upon whether one perceives the proverbial bottle to be half empty or half full. What is certain, however, is that most of the considerable amount of time involved in revitalising the Vulcan had had to be devoted to re-acquiring skills which had once been relatively routine activities.

It had been a formidable learning curve and, with hindsight, we can see that this curve had been a lot steeper than it needed to have been. On the other hand, while our peacetime training system may have had very little direct application to the task in hand, the fact that the crews were able to cope does say a great deal about the core skills which they had absorbed.

Is there a moral to this story? Probably not – not in the real world – the world of budgets. But it does point to an ideal – one really ought to maintain currency in all of the roles in which one's aeroplane is capable of operating and one needs to upgrade its systems from time-to-time. But you all knew that already. The real point is that you never know what you are going to be asked to do next, or when, but you can bank on its being the unexpected and at short notice. For all its tensions, the Cold War did

produce a period of relative stability. The future looks far more uncertain. What history, even very recent history, teaches us is that we would be wise to maintain the broadest possible range of skills so that we are as well-prepared as we can be for anything.

Having begun with a Shakespearean reference, I will end with a quotation. Hamlet wasn't actually talking about a MICKEY FINN, or a Part One TACEVAL, or even an unforeseen international crisis, but he got it right when he said:

> If it be now, 'tis not to come;
> if it be not to come, it will be now;
> if it be not now, yet it will come;
> the readiness is all.

MORNING DISCUSSION

AVM 'Sandy' Hunter: May I offer a couple of observations on what already has been a fascinating morning and then ask a question. Squadron Leader Parkhouse I think struck an enormous chord with me, because the Benson that he described in 1940, was almost identical to the Bassingbourn of 1964, except that I suspect at Benson in 1940, you were given more by way of an operational slant on things, and when you said at the end that the veneration accorded to pure stick and rudder flying was alive and well at the beginning of the Second World War, I think exactly the same problem pervaded the '50s and '60s, the period which of course we haven't discussed much about. And I would put it as a general observation that the Central Flying School, which is held out as having been the birthplace of Air Power, according to the book written about it, actually may well have had an inhibiting effect on operational effectiveness in the RAF, because of the interest in pure flying. However, that's by way of an observation.

Could I ask a question about the BLACK BUCK sorties. Nigel Baldwin said that crews that fly together, die together, but my understanding is that for BLACK BUCK, one of the great complications was that crews were mixed and matched for the event. Is that true?

Wg Cdr 'Jeff' Jefford: As I recall they were constituted crews. Certainly for flying in the American Bombing Competition, we used to make up crews and break the standard rule of constitution, but for BLACK BUCK, my recollection is that the crews were constituted crews and they were selected on the basis of captaincy. This was not actually about 'captaincy', this was about dropping bombs and what we wanted were the best bomb aimers and I think that we selected the best captains based on the fact that they were the most experienced pilots. That gave us a problem with one particular sortie where the inexperience of the rear crew let us down a bit.

AVM John Herrington: Can I go back to your opening address Mike, and ask perhaps a question outside the military but relating to the environment, the political and civilian environment in which the armed forces were preparing for war. It was not only the *Luftwaffe* that got their tactics and most of their aircraft right, but their procedures and tactics for the Army were infinitely better, their equipment was better than our Army. It seems to me that we, as a democracy, and the Americans were no better of course by the time they came into the war, left us politically, financially and in

every other way, unprepared to fight a war. A dictatorship which was setting about going to war on the other hand, seemed to spend both the time and the money and have the men to devise the tactics and the weaponry, and get it approved.

AVM Michael Robinson: I think I would prefer to muddle through and continue to live in a democracy. But it's a risky business and the Second World War, and this is contentious the way I put it, was actually lost by Hitler, because having failed to achieve an invasion of Britain, for which he also had not actually made many plans as I understand it, he got impatient and went east. And that gave us the long war which our lack of preparation in the '30s had made essential.

We mustn't forget that some very right decisions were made, but of course they hadn't come to fruition by the time my talk deliberately stopped, which was at the beginning of the war. The decisions to go for four-engined bombers that could carry bombs, not just to attack German airfields from bases in France, but had the radius of action to attack from England, into the German industrial heartland and Berlin. They had been ordered.

The other major decision, which I found extremely interesting, was the decision made by a much derided man, the First Minister for Co-ordination of Defence, who I think Churchill, who had hoped to have the appointment himself, described his appointment as similar to that of Caligula's horse. He was a barrister, Sir Thomas Inskip. He sat down one day and did a classic service appreciation and said, 'What are our difficulties? Shortage of material, metal, shortage of electrical wiring equipment, shortage of training facilities.' And he concluded, and he had to oppose the air staff quite fiercely, that much more effort should go into the production of a single-pilot fighters as opposed to a three- or four-crew bombers, which took up far more material. It was his decision that produced the fighters, just about in time for the 1940 defensive air battle, which actually helped us to win the war and to make it the long war, which the bomber force needed to build up. But to answer your question John, no, you're right – dictatorships can cut through. What we must hope for in a democracy, and we still in some ways have to go on hoping, is that the political leaders can be convinced, and I come back in a sense to Cameron Watt's point that we have to educate those who make the decisions for us. We have to educate them and get them to understand the nature of war, the nature of

requirements, the fact that you have an expansion plan and it doesn't happen overnight.

Colin Foale: Have you any information on how thinking has developed about the height of aerial attack. As someone pointed out, in 1960 when Powers was shot down, we all very quickly went to low-level, very low-level indeed, and of course we developed weapons which could be delivered from very low-level. And yet, and I was in the air force of course during that time, I have an uneasy feeling that throughout this period, the United States didn't really agree with us. I've never quite got to the bottom of this. I know that in Vietnam most of the attack sorties were nothing like as low as we were training for. They did get shot down, but they also practised the evasion of missiles and then when we had the Desert War, I happened to be in America at the time and we lost a few Tornados, and some Vietnam veterans that I was with at the time said, 'You're going in too low.' May I have a comment on that please?

Michael Robinson: Well, in parts you're going to have to wait until this afternoon when you've got the people who actually did low-level in the Gulf and trained at low level. Graham Pitchfork will tell you of the impact the Buccaneers made and I'm going to ask Nigel Baldwin if he's got any comment on the Vulcan Cold War era and the change from the high-level profile to the low-level penetration.

AVM Nigel Baldwin: Kindly jump back twenty years into the Crew Room, Flight Commander's Office whatever, when these sorts of questions went through our minds too. Why was it that our SAC colleagues weren't flying as we were and why were we trying to do it lower all the time? I remember thinking twenty years ago that one of the reasons why we were not so well equipped and why also we were not well supported by higher authority when we came up with new whiz-kid ideas for whether it was more advanced electronic equipment or better terrain following radar or better weapons, was that the cheap way of answering the question of course was just to go lower. I think this is quite a strongly held view that in our case, we had decided that the lower we went, that solved the problem, or it was decided for us that the lower we went, that solved the problem. The Americans seemed to settle down a couple of thousand feet higher with more sophisticated bits and pieces, whether it was on the B-52 or with other aircraft. I can remember feeling frustrated, but, I see Kevan here, you may

have a thought.

Have I remembered that correctly for that period of our time? I'm now thinking back to our period say in Cyprus, about the end of the '70s, the middle '70s, where we had a frustrating time putting forward ideas of trying to get new equipments, whether it was equipment for the aeroplane or whether it was new bombs. We were always worried that the weapon, at the end of the day, was still a Second World War, simple, old, very old in most cases, 1000lb bomb. We got over the problem by just flying lower and lower. And I think that's always been my explanation as to why we seemed to want to train lower than the Americans.

'Jeff' Jefford: I think it's certainly true that in 1960, when surface-to-air missiles, the first generation, became capable of taking out Gary Powers, they could not take out targets below one or two thousand feet, and going low-level in 1960 was the right thing to do. It completely neutralised the defensive missiles of the day. But as time went by, subsequent generations of ground based missiles got a better and better low-level capability, then you had to introduce your hi-tech jamming devices to counter those missiles like our own Rapier, that had a considerable low-level capability. Those didn't exist in the 1960s. It was the right answer in 1960.

Whether low-level is the right answer in 1990 is questionable, because we finished up in the Gulf – that will be talked about this afternoon – but the Vulcan that I've already talked about finished up going at 10,000 feet, having spent twenty years training at 500 feet. When it came to the crunch, it went in at 10, 15 and eventually 20,000 because the ground defences had actually advanced, and we had not provided ourselves with the counter-measures to those.

Kevin Dearman: I was fortunate to fly both the Canberra and the Vulcan and in fact finished up as the last CO of the Vulcan OCU and I went through the period from the '60s to the end of the '70s and watched the development of the low-level tactics for the Vulcan, and of course they had been practised by the Canberra before that, in its CENTO role, where it too had fundamentally a nuclear role, but also had a conventional weapons role, both using the dreaded 1000lb and also the Microcell two-inch rockets, which were very useful for Middle Eastern type low intensity conflicts.

I've always been interested in the dichotomy that the Air Force has displayed between buying its shiny aeroplanes and buying the weapons for them, somewhat later. And when it comes to defensive aid suites, well

they're terribly expensive aren't they? – and if we can go low and avoid the need for them, so much the better. So I'm sure that was a factor. But, as 'Jeff' says, in that middle '60s period, if you looked at the capability of the Soviet Union to deal with a major incursion by the Western Powers, there is no doubt that a mixture of low-level and higher and medium level attacks with heavy defensive aids package, would have put their defensive capability to a very severe test indeed. And I have no doubt in my mind that part of the philosophy that the Americans were interested in, was in fact backing more than one horse at once. But, to revert to the training point, it was very interesting that OCU training in the '60s and '70s was based fundamentally on flying the aeroplane from a pilot's point of view and operating the systems from the rear crews' point of view. The weaponeering training had to be carried out on the squadron, and I was always struck by the difference between the very regulated regime that took place in the UK and the somewhat more relaxed rules and regulations that applied out in the Near East. We certainly, in Akrotiri in the early '70s, used to have some wonderful fun with the fighters. In the UK, you couldn't put on more than 30° of bank and you couldn't turn more than 180°, in case you upset the fighter!

I'm sure that we developed very good evasive tactics out in Cyprus because we had the freedom to work up our own tactics. But the key question I would like to put to the panel is, did we in fact ask too much of our young men or were we overprotective to them in the training that we gave them, both at OCU and subsequently on the squadrons as they worked their way through the training system?

Nigel Baldwin: During the period that I was talking about, and that influenced most of my operational flying, I concluded that on balance, we probably got it about right, and our masters got it about right.

If the jury is still out in some areas it would be in the dominance given by some of our masters, not all, though I have to be careful because some became very great men indeed, and are still with us, on the bombing and navigation and the SAC. And I didn't convert to the theory, to the deduction, that the politics was more important than the operational flying actually, and probably until I became an air vice-marshal and then I understood that you do see things in different lights the closer you get to Whitehall or the Commander-in-Chief, or the Headquarters in that case.

But to answer your question, in the V-Force in the round, given all the

circumstances, probably about right, we asked about the right things of our young men, some were quite older men too, and I have no regrets.

'Jeff' Jefford: I think it's more or less inevitable that you have to play 'safety first' because things are so expensive. And my impression is that when a new aeroplane is introduced into service, Group Air Staff Orders are about two pages that say, 'Please don't break this aeroplane.' When it is retired twenty years later, GASOs are two inches thick and each one has been written following an incident. There's a Board of Inquiry and an order is raised that says, 'Don't do this again' – whatever *this* is; don't land on the grass; don't overstress the aeroplane; don't do exciting things with fighters. We just bind ourselves round with regulations which we make tighter and tighter, to prevent accidents. I think you have to have a considerable political, emotional change of atmosphere before you'll accept risks – as in the RED FLAG circumstance. Losses in Vietnam were very high and this drove the Americans to institute a training regime in which they *expected* to lose aeroplanes; but they would lose fewer than they were actually losing in combat. By bending the odd one, they weren't getting them shot down. My recollection of going to RED FLAG was a briefing where the colonel welcomed us and said, 'We always lose an aeroplane on a RED FLAG. Let's make this the first one where we don't,' which was a bit sobering to RAF chaps. And when our nav radars were familiarising themselves with the ranges, which were about the size of Wales, and trying to find nice, nutty little radar reflections to use for fixes, they were going to the F-111 crews who had been before to ask, 'Where are the good radar reflections?' and they'd say, 'This is a good one here, this is old Charlie Bloggs. He piled in on RED FLAG two years ago. This is his heap of aluminium.'

I think it was the Vietnam experience that drove the Americans to accept risk. We didn't have the Vietnam experience.

Sir Freddie Sowrey: One of the lessons which the Society has brought out is how those experiences of the First World War were lost to view in the period of peace which followed, and that is particularly so in anti-submarine warfare. Now, I know that the work that 'Jeff' Jefford is doing in another place on observer training in the First World War has brought out, as I understand it, that they flew together as constituted crews, as pilot and observer/gunner. It appears by 1937/38 that they'd lost the sight of that in the Battle force. Whether that is because some were non-commissioned

and others weren't, or whether there were decisions not to have common Crew Rooms, I know not. This hasn't happened since 1945 because we have a conscious threat against which we have had to train and prepare for war. How do we ensure that with the disappearance of the Soviet Union as such, that we can maintain our standards of training, which have been outlined already by Nigel Baldwin and others, into the foreseeable future?

That is one question. May I ask a supplementary, on another subject, which will perhaps bring out different views, and that is, I understand in Operation CORPORATE, that much of the work which was done to modify aircraft, for instance the Nimrod for air-to-air refuelling, was done at a comparatively low rank level. It was done by wing commanders, as we've already heard, who aren't brainless, got plenty of good sense in them. Wing Commander Project Officers, working with technicians to decide what was technically possible and then going to see the crews on the squadron to say, 'This will mean that you won't be able to use the escape hatch from the cockpit, because three inches of piping is going to be coming across the top of your heads.' The crews would accept it, enabling it to be done in a time where, had it been done at upper echelons of a hierarchical organisation, would never have got through in the time, even under the pressures of war.

Michael Robinson: Sir Freddie, I think an answer, or the beginnings of an answer to your question on the need to train for the unpredicted, may come out this afternoon, but there is this classic difference between, the period prior to the Falklands and today. We were training, either in the '30s against an identifiable enemy and in the Cold War, against an enemy who could be identified and whose targets could be analysed and given priority. Now we're in an entirely different ball game because, for example, there are many people who say today, the next cause of a major conflict will be over who controls supplies of water. Now, which African state are you going to choose? There can't be the sort of plans that one was used to in older days, that were regularly revised, although I must admit that just as I was leaving the air force in 1982, a routine plan came across my desk as DGO, asking for an update on the Falklands, and that plan in the early months of 1982 was still talking about a frigate and a detachment of Marines. So the Falklands was a very good example of having to cope with the unexpected.

What may come out this afternoon is whether there are limits to which crews can be trained? Are they to be masters of everything or attempted

masters of everything – every possible permutation that the weapons system they operate could use. I think there may be some markers of the things that certainly should be standard training.

Your second question was . . . the flexibility that came with the enormous rate of modifications that were achieved and AAR was given to aircraft. Nimrods got it, just about everybody got it, and it worked.

'Jeff' Jefford: Regarding the technical modifications that were made to standard in-service aeroplanes during the CORPORATE campaign, I talked about the Vulcan, but they were legion. The Nimrod was given tanking, but it was also rigged to fire Sidewinder and to carry Harpoon. There were Hercules tankers and Hercules with ECM; Sidewinders on Harriers; Harriers on carriers. It just went on and on, the things that were done to aeroplanes – really on the basis of field modifications. That has got to be done at station level, where the nuts-and-bolts expertise is, and that stops at OC Eng Wing really; so it was wing commanders who were doing it. You dreamed up what you wanted to hang on your aeroplane, where you thought you could nail it on; it came up to Strike; we got on to Boscombe Down and said, 'Would it be alright to put a Sidewinder on a Nimrod, do you think?' And they'd say (this is papering over the cracks a bit) but they'd say, 'Yes, probably. See if you can get one on and then we'd like to fire it?' So you'd put one on – like the MARTEL on a Vulcan. Waddington made the suspension rack for it in the local workshops, nailed it on the Skybolt points, got a MARTEL mounting from the Buccaneer force and screwed that on, ran some wiring round the wing and the MARTEL went on. Boscombe said, 'You'll get a 9 out of 10 for that. That's excellent. We would like now to come down with a crew and we will fly with one of your crews and we'll poop the thing off at Aberporth.' Which they did, and it worked. And they said, 'Limited Release to Service'.

After the war, Boscombe Down sent a travelling circus round the entire air force and it gave us briefings that said, 'All of your magic Releases to Services are now withdrawn, and if you think it's going to be like this in the future, forget it. If you want to put a MARTEL on a Vulcan, it'll be a four year project.'

We accepted the safety risk for the Falklands – while the crisis was there. As soon as the crisis went, it was taken away. That said, one or two of those temporary clearances were allowed to stand. The Vulcan was turned into a tanker and, instead of having a years-long project in which,

say, a Phantom would be tanked at different speeds and different heights to explore the whole envelope before we got a release, they did a couple of prods with a Phantom down here, a couple with a Buccaneer up there, a couple with a Lightning up there and then read across, and said, 'Well it'll probably be alright.' And because we really needed those tankers, post-Operation CORPORATE, because we'd worn the Victors out, the Vulcan flew as a tanker for about a year on that limited Release to Service. And there is a story, which may be apocryphal, that some time later, a Lightning was refuelling off a Vulcan and he got a little bit high and got the fin in the wake; it stalled the fin and the aeroplane spun off. Now if Boscombe had done the full trials, that just wouldn't have happened but, in order to fill a gap in the armoury, it was pencilled over and we used it that way. So it's 'pressures'.

John Price: At the time in question I was D of Ops Strike and I think the question about how did we get it done in the field, goes right to the top. It was the Prime Minister, Maggie Thatcher at the time, who was asked by the Treasury, 'How shall we do the financing of this war which you have started', and Maggie said, and I remember her words, 'We will not count the cost; we will keep an account of the cost.' And that flowed down through CAS, Sir Michael Beetham at the time, and we were able to get that message through. I ran a thing called the Alert Measures Committee which ultimately, I think, approved all these modifications. I did not have a member from F6 on that Committee until the day before the war ended, when I allowed him in. And we did all that lot without any problem at all. Did it work? Did we need it? Let's get on with it. But we did have the guidance from the Prime Minister. I think it was the political drive which really enabled us to do it.

I make two other points. One, about the bombs used at Port Stanley. I ran a meeting and asked a 1,000lb bomb expert from Farnborough to come and tell us the weapon effects of this 1,000lb bomb on the Port Stanley runway. He came along and he said first of all he didn't know the composition of the Port Stanley runway so it was a bit difficult. We happened to have the specification because it had been built or designed by, I think W S Atkins, Consulting Engineer, and we had got the construction. I gave them to him, he then said, 'Ah, I can't give you an answer, because I haven't conducted any trials.' And I'm told afterwards that I got rather rude to him and accused him of taking the Queen's money for years and giving

us strong advice in peacetime and when we really wanted him, he shuffled off.

But I think one of the messages on training out of Operation CORPORATE was that we had done a lot of very good training, we had got well trained airmen, well trained technicians, well trained aircrew, and when the task changed, they were able to rise to the challenge. And I think the message I draw from that is, don't specialise too much in your training, the next war won't be as you thought, you've got to have flexible people, well trained in basics and intelligent people who know what to do, who look at orders. Someone once said to me, 'Orders are for the obedience of fools and the guidance of wise men', if you've got an air force who observe that and understand it, you can do things.

Nigel Baldwin: You've connected quite nicely to something I want to say to pick up from Sir Freddie Sowrey's initial question. Here we are in peacetime, not sure what's going to happen next – how do we keep imagination alive? I think our masters, the Air Force Board downwards, and the Commanders and the very senior people, who of course will be very worried about aircraft accidents and the costs of everything, they must continue to set such an atmosphere within the command chain, that the imaginative, full of initiative, go-getting young officer, is given his head sensibly in peace time.

Anthony Furse: Hugh Pugh Lloyd worked as an ADC for Ludlow-Hewitt and in his memoirs he said he was the most incorrigible muddler, incapable of making up his mind on anything. He was wonderful on paper, had all the right ideas and could explain things properly but he could not make up his mind. Is it not possible that in the '30s, many of the top brass who came on to the Air Council, or to Bomber Command or Fighter Command, were reluctant to accept advice from junior officers, were reluctant to take advantage of Tizzard's Offence Committee and were handicapped, both by the Treasury, who kept putting off the decision to order the four-engined bombers, and by the lack of modern aeroplanes. Much criticism has been laid at the foot of the Fairey Battle, but at the time it was ordered it was 20 or 30 mph faster than our fastest fighter and carried twice the weight of bombs of the available day bombers. History and technology is very unfair to the events of the late '30s.

Michael Robinson: Thank you. I've also heard this, or read of this

criticism of Air Chief Marshal Sir Edgar Ludlow-Hewitt, but the emphasis of his letters from High Wycombe to Whitehall suggest that he was getting a very clear understanding of the problem. Now, 'Jeff' may come along later and say it was a road to Damascus conversion when Ludlow-Hewitt said that you should have a specialist navigation training because previously he had been opposed to it. But I would give him full marks and his letter that I quoted at the beginning of my talk was the result of his initial tour round his Command. He'd been in post about three or four months and Cyril Newall, who was the CAS had similarly been in post about three or four months, so he must have loved getting a letter like that. There is of course the difference between identifying the problems and beginning to move to solve them.

'Jeff' Jefford: I think the question you raised, or the point you made, about the Battle, is very valid. The Battle was an advanced aeroplane in its day and it just turned out to be still there in 1940; that was too late as technology had moved on.

Rupert Parkhouse: There is one point that I'd like to make about the Battle and that was although there were 2,201 produced, about 700 went to Canada for our training purposes and a considerable number also went to the RCAF, likewise for training purposes. We also supplied about 16 Battles to the Belgian Air Force and about 10 to the Turkish Air Force, and the final point is that over 30 Battles were used as engine test beds throughout the industry. So, it wasn't entirely wasted and it was an extremely pleasant aircraft to fly. The only trouble was of course that one couldn't really communicate with one's navigator.

Malcolm Heron-Grinham: A question which relates more to the morale of the crews, which, in turn would affect training, and it relates really to the fact that in the early '50s when the V-bombers were coming into service, most high performance aircraft were fitted with ejection seats. They either all had ejection seats or none. And in this case we had aeroplanes which the front crew enjoyed two bang seats and the rear crew, presumably, would have found it extremely difficult to escape. There have been a number of things written as to what led to the difference from the effect of all that weight and therefore reduced bomb load, and the affect on morale.

Michael Robinson: I'll answer first if I may as a Squadron Commander of Victor 2's. No, it didn't have an effect on morale. The question of fitting

bang seats into the rear, which would have been easier in a Victor, to the extent that the three crew members were on the same level, as opposed to the Vulcans where the AEO was even one stage further down. But, it would have involved such a total redesign of all the wiring and tubing and things that went across the top of these positions, to create an area which could blow open. I think the implications, the down time the aeroplanes would be away from squadron, and remember, part of the Cold War game was numbers, availability, QRA, response times and levels and it must have been very unattractive to a Commander to consider having a steady trickle of aircraft away and I dare say that the manufacture's forecast might have been, 'Oh well, we'll do the job in nine months per aircraft.' If it was anything like the time it took to convert the Victors to tankers, it would have been the best part of years.

Nigel Baldwin: I think you can find on the record now, expressions that it was technically quite capable of being done, certainly with the Vulcan, and around 1960. I came to the conclusion long ago that it should have been done because all those pilots who sat in the front had big responsibilities and I suppose, influencing my thought is that I have stood in a lot of cemeteries. I buried my first Vulcan crew on my first wedding anniversary, with a young wife by my side and we went on to do that several times in our careers, and there's no doubt that I wouldn't have been there in that old cemetery in Coningsby churchyard in 1964 that day, if there had been five ejection seats in that aeroplane. And so I'm emotionally involved in this question and, looking back on it now, I think you could begin to argue that it was disgraceful, that it wasn't done. Now, to cheer up a bit, I don't really think it had a profound affect on the morale of the Force, either the pilots or the rear crews. There was always a dipping when we lost a crew and especially when, and there was the odd occasion, there were some very successful ejections and rear crew escapes from Vulcans, there's no doubt about that, but there were of course some dramatic failures as well. But I cannot remember morale dipping for more than a few moments and in the round, we just got on with it and that was the way it was. It was only later when we became clever and more sophisticated and thought about it a bit.

AVM Larry Lamb: It just so happens that I became the first Air Commodore Ops at Strike Command and had the responsibility for the closing ceremony, if you could call it that, of Bomber and Fighter, which was held at Scampton. At the luncheon, I found myself sitting next to Sir

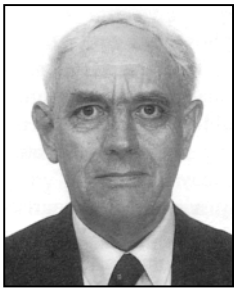
James Baker and I simply wanted to say that he echoed Nigel Baldwin's comments. He seemed to spend most of the lunchtime telling me what a tragedy it had been that ejection seats hadn't been fitted in the V-bombers and that it was perfectly possible to have done so.

Michael Robinson: I won't misquote Mandy Rice-Davies, but of course Sir James would have said that. I think the point is that if the bang seats were going to be provided for all crews, it should have been in the original specification.

'Jeff' Jefford: As Air Marshal Baldwin said, one can get a bit emotionally involved in this one. I don't think it had a great impact on morale. I don't remember us rear crew as sitting around muttering, except in jest. I mean it was always something you could sort of tweak a pilot about – 'It's alright for you Jack, you've got a bang seat!' But it didn't really have an enormous affect on morale. One took a fatalistic attitude to it.

The problem with the Vulcan was if the undercarriage was down, you slid down the door and wrapped yourself round the nosewheel, so you had to do a 'Tarzan' swing round a hydraulic jack and that produced a little bit of a question, 'Why can't you just slide down the door? It says here that you can.' But no, it wasn't a morale problem in my experience.

BATTLE MANAGEMENT IN OPERATIONAL TRAINING
Group Captain Nigel Walpole



Graduating from Cranwell in 1954, Nigel Walpole spent his early years on Hunters and Swifts and is currently engaged in writing a history of the latter. He has extensive experience of the 'sharp end' from six flying tours in the fast jet force, not least in RAF Germany where his various appointments included Group Captain Operations and then NATO's Assistant Chief of Staff Operation in 2ATAF

'Our Task in Peace is to Train for War – And Don't You Forget It!'

This rather emotive, US-style welcome to Brüggen, circa 1976, may have given rise to some derision from our more conservative traditionalists – and the sign has since been removed. However, I can tell you that it did help generate the spirit and dynamism we needed at a time of radical change in RAF Germany. I was Wing Commander Operations there then, under a master who stirred similarly mixed emotions as he presided over our hardening programme and the generation of four Jaguar strike/attack squadrons, co-located with Rapier and Bloodhound squadrons. I would remind those who were less than kind about our battle motif that we were the first station to be awarded the ultimate accolade of four 'ones' in our initial NATO Tactical Evaluation (TACEVAL)

We did well because our military activities on the ground and in the air were geared very closely to the way we expected to fight in war; we practised what we preached, going all the way – or did we? We will return to Brüggen later.

I assumed that I was invited to contribute to this symposium on operational training because in the early '70s I was TO2(RAF), the wing commander in the Ministry responsible for the initial operational training of the fast-jet force, then in 1979, DDTO, the group captain overseeing all pre-front line operational training. I would not have enjoyed confining myself to a résumé of how we prepared our crews for the front line – sending you and perhaps myself to sleep with dissertations on task charts, syllabi, SOPs and statistics. I do welcome the chance to speak on an essential and inextricable part of the total training package, that of 'battle management' – its impact on our war-fighting capability and its neglect.

For my purposes here, battle management implies the co-ordination of all that is involved in the employment of both offensive and defensive assets and their necessary support, be they nationally retained, assigned or earmarked for collective defence. It would include intelligence gathering and dissemination, targeting, tasking and communication between all agencies and levels. The text books may call it 'C3I'. But I am not speaking from text books today, nor have I plagiarised the works of others; I speak entirely from my own experiences as a front line operator turned battle manager, from six flying tours in the fast-jet force to the national role of Group Captain Operations in RAF Germany, then as NATO's Assistant Chief of Staff Offensive Operations in 2ATAF. In 1982, a 'poacher turned gamekeeper', I became a battle manager and spent the next six years trying to get to grips with a determinant of our total military capability which I had not until then properly appreciated and which was sorely in need of a total overhaul.

That then is the background and timing against which I make my case that battle management must be accepted by all as an integral part of operational training. I shall suggest where we went wrong in the Cold War and what had to be done to get it right. I readily admit that I have little or no first hand knowledge of how this management was conducted at other times or elsewhere, either nationally or collectively. I can say nothing about the Falklands, the Gulf or Bosnia, which were of course very different scenarios. It might be, however, that the principles I espouse are fundamental and should hold good in most situations – necessarily adapted to every different circumstance.

Having hopefully whetted your appetite, I now lead you into that front line which was determined by the Cold War from the mid-1970s, via a sequence of training with which you may be familiar. I suppose you could claim that the operational training of aircrew begins with flying training itself, general handling and aerobatics providing the rudiments of air combat, navigation and low flying the basis for penetration to and egress from target areas. However, it was generally accepted that we started to think operationally at the then Tactical Weapons Units (TWUs) at Chivenor and Brawdy, where a standard, all-purpose course had been established for all pilots earmarked for the fast-jet roles. Then, with two-seat Hawks at the TWUs, we were also able to acquaint student navigators with these roles, by flying them in the spare seat of aircraft used by instructors supervising pilot trainees. Now, TWU and FTS courses have been combined at Valley

– with a reduced syllabus and flying hours.

At the next stage, the Operational Conversation Units (OCUs), operational training began in earnest – but with rarely enough flying to satisfy anyone. Some of the capacity at both TWUs and OCUs was taken up by post-graduate courses and additional, often controversial tasks such as refresher training, senior officer conversions and public relations exercises, and much of my time was spent in arbitration, assessing priorities and attempting to match tasks with resources. Despite all the controversy, I think the system produced a worthy product.

Theatre and specific role training was usually best left to the squadrons, with their particular requirements. For instance, the Jaguar recce squadrons at Coltishall and Laarbruch had different commitments and their training was orientated accordingly. Aircraft of similar type and role within a theatre carried out their day-to-day operational training according to standard procedures and priorities prescribed by their operating authorities, enabling crews from one squadron to fly with other like units, with a minimum of additional preparation.

These national capabilities and modus operandi were then given to the NATO agencies for incorporation into collective operating procedures. This guidance to hand, battle managers could then optimise employment, put together coordinated attacks and mixed force packages – to maximise our potential.

So far so good; with everyone seemingly on board and well rehearsed we had taken care of everything – or had we? Back at Brüggen, were we really happy that everything would be alright on the night? We were training in peace as we would fight in war – and we had earned our spurs in TACEVAL – surely that was sufficient proof of our efficacy?

NATO TACEVAL was developed in the 1960s to test the operational capabilities of all front line units, by national consent, albeit with national constraints imposed. Appropriately constituted teams would draw representatives from any member nation having the requisite expertise. They would arrive at a base, without warning, initially to test alert plans, readiness and reaction. Three further phases would then evaluate operations, support functions and ability to survive. On a station such as Brüggen, a team of 100 would be typical and the exercise might continue, without respite, day and night, for three to five days, much of it conducted in gas masks and NBC protective clothing. Judiciously run, against a realistic scenario, such an exercise should surely suffice to measure a unit's

total combat capability – at least on a comparative basis with like units? If this was so then everything at Brüggen was fine – but was this the whole story?

The trouble was that our battle staff in the War Headquarters, deep down in the 'Caves' at Maastricht, had little to do with this great success story. The plot had been set by the TACEVAL Team, the simulated war missions ' canned', with little or no scope for free play. Accordingly, any involvement by those established to conduct operations in war could be limited to the processing of tasks and reports; their management skills remaining untested. Had they been tested, the story might have been very different.

The one thing on which we of the front line all seemed to agree (and I speak now as one of them) was that the command and control organisation on which we would have to depend in war, was ineffective. To many it was too remote, out of sight, out of touch and sadly out of mind; it should be avoided at all costs if our reputations were to be upheld. Whoever 'they' were, wherever they were, battle managers did not know what we were best at, how to get us to the target and back safely, what weapons to use, in what delivery profiles, in what numbers and with what support (recce, EW, fighter et al). In short, we would rather go out and play on our own because 'they' would only lose us the 'war'. It was a bad joke in our Combat Operations Centre that the loss of all communications would be welcomed so that we could get on with the job in our own way (nobody explained how we would do this without the game plan, jointly agreed targets, deconfliction or support). This was a terrible indictment of a system which we knew we could not just ignore or avoid – and of us for not being more realistic, constructive and co-operative.

Perhaps I exaggerate for effect, but I learned the sad truth that most wings in most, if not all, 2ATAF nations, felt the same way at the time. Our own units would do all they could to avoid NATO exercises, play with minimum forces or pay only lip service to them. Subterfuge was rife; two of our squadrons got me to release them from a 2ATAF exercise, widely considered to be unproductive, on grounds of 'overstretch', so that they might rest and recuperate before two busy detachments. They then laid on their own, very much more intensive domestic exercises – but free from any interference by battle management!

When forced to play, squadrons quite rightly objected to many an unrealistic task, to being committed outside their range, against unsuitable

targets, with the wrong weapons, into unsuppressed danger areas and poor weather. This happened frequently; it was all written up, reported back and repeated at the exercise de-briefings, drawing promises that it would all be better next time.

This was not a failing of the '70s and '80s only, it had been going on as far back as I can remember. From the 1950s, I recall one Swift pilot telling me that his pre-planned war mission was well beyond his low-level range and on querying this, he was ordered by a senior RAF officer to plan a 'hi-lo-hi' sortie, descending into and climbing out of hostile airspace – 'like the Dutch do'. Needless to say the Dutch had no intention of doing any such thing!

Having flown and worked with all the NATO air forces in the Central Region, on their home bases, at RED FLAG, the Tactical Leadership Programme, tactical Air Meet and in TACEVALs, I can vouch for our generally excellent operational skills in the air and on the ground, and the effectiveness of our support for the front line throughout NATO. That is where we all put most of our effort – but all that effort could have been wasted if we had gone to war with inept management. So what was wrong there, who was at fault and how could we put it right?

Many of us who were involved in any executive capacity, in any way with this management or its consequences, may be guilty of some blame. On manning, it was generally believed (if officially denied) that national policy and personnel staff did not give a high enough priority to NATO staff-cum-battle management appointments. Many of the incumbents believed this, and that such postings were detrimental to their careers; others saw the posts as 'comfortable billets'. As a result, there was the temptation to become a little too relaxed in their duties, failing to 'add value' or respond constructively to criticism from their 'customers'. Above them, national and NATO commanders, often absorbed in other matters and perhaps lacking the requisite expertise themselves, either failed to recognise this, the flaws in the system or the remedies necessary.

At national headquarters, commanders and staff, also distracted by other priorities and concerned more with the proficiency of their fighting units, may also have paid too little attention to crucial failings in NATO battle management or provide essential national support. For instance, NATO needed national specialists in war and exercises to advise on and ensure the best use of their own nation's assets, but these were often found to be unavailable in peacetime. After these exercises, headquarters staff, although

fully primed by their flying units, may not have made their points convincingly or followed through.

I have a lot of sympathy for station executives, who were understandably very preoccupied with their units' performance and ever under international and national scrutiny. Many made their unease over C3I known very forcefully, often directly to me in the middle of an exercise – but some had clearly not read the script and seemed to believe that every exercise was solely for their benefit. Their hearts were often not in these collective exercises and when each was over and other pressures returned, their follow-up action might not have been enough to avoid a repetition of mistakes. The same went for the executives on squadrons, equally anxious to do their best and to be seen doing so. However, without the big picture, prevailing aims, objectives and associated activity, they frequently challenged the tasks they were given, which may have been within their competence but not to their liking. Escalating this up the line during an exercise choked communications and wasted time. These emotions ran high during live flying exercises, when there was a natural desire to keep every available crew and serviceable aircraft airborne. Management often succumbed to continuous pressure to do so, whether or not there were suitable targets and in doing so could destroy any fluency in the battle play.

The provision of good quality, properly qualified and motivated, permanent and supernumerary staff was only the first imperative. These incumbents then required continuous up-dating on all the NATO assets within their purview and on-going training to ensure their most effective and expeditious employment (national assets would not necessarily be 'managed' by their own specialists). It followed that the nations would have to commit more of their resources to the collective training of these NATO agencies, on a routine basis, over and above those already allotted to major exercises – a commitment which the British, especially, were most reluctant to give. So we had a conundrum: most nations were loath to hand over more of their precious flying hours to inept management – but this management could not improve its proficiency without more live flying to develop its skills.

To recap, we had to get NATO and the nations to recognise the importance of battle management and battle staff appointments, to give the latter more status rather than have them seen as dead end jobs. We needed men at the top and in middle management who were happy to be there, for the right reasons, who had the necessary leadership qualities and expertise,

who could identify the problems and pursue remedial action relentlessly. At the working levels, we needed men from the flight line who knew their respective professions, were prepared to keep up-to-date with their own nation's capabilities and those of partner nations, in short, to 'add value' and gain the respect of the operators.

With the right men in battle management, national headquarters then had to ensure that they were given the wherewithal to train routinely and realistically, with constructive feedback. The flight line should remain hypercritical of their targeting and tasking agencies, but accept that their contribution was part of a broader plan, of which they might not be fully aware, which could require them to be employed in less than their optimum or preferred ways. They too had to appreciate that management could only improve if they were prepared to devote more of their flying to this training – and to do so constructively.

Acceptance of these basic tenets was the prerequisite to any improvement in this vital aspect of our war fighting capability. It had to come from the top and be followed by continuous education through vertical and lateral dialogue, within and between all the nations and agencies involved – and it had to be based on realities and practicalities not dogma. Until then, extraordinary but often unilateral and inward-looking efforts by each nation, to enhance its own specific capabilities, would be of little consequence in any collective effort.

Fortunately, the problems I have outlined were not insurmountable and I would like to think that in the latter days of the Cold War, at least some were tackled, albeit slowly and cautiously, political sensitivities in mind, with some success. How this was done is a story for another day.

LOW-LEVEL OPERATIONAL TRAINING
THE IMPACT OF THE RED FLAG EXERCISES

Air Commodore Graham Pitchfork

Having flown PR Canberras in Germany, Graham Pitchfork was seconded to the Royal Navy and formed the first RAF crew on Buccaneers, which period included 200 deck landings. Later he helped introduce the Buccaneer into RAF service and as CO of 208 Squadron was the first navigator to command a strike/attack squadron. More senior appointments followed and his final tour was as Director of Operational Intelligence.

By the mid-1970s the so called 'fast-jet force' was well established in service with the RAF. The Harriers, Phantoms and Buccaneers had been in service for a few years and the Jaguar had recently entered service. Our training was geared almost exclusively to preparing for possible conflict with the Warsaw Pact which had developed an extensive radar network and a concentrated air defence threat. To combat this formidable defence the RAF had adopted tactics built around the fast, low-level penetration of enemy airspace. Hence, all our training was geared to this fundamental tactical philosophy. Unfortunately, in peacetime, this type of training conflicted with the need to adhere to air traffic procedures, the avoidance of built-up areas and the need to limit noise and pay attention to the increasingly vociferous voice of the environmental lobby.

All these factors had a considerable influence on the way we could train and the problem was particularly difficult in Germany where the majority of our tactical squadrons were based. Strangely, the problem was not so acute in the United Kingdom. However, training for the major elements that underpinned our tactical doctrine suffered with some severe limitations. Low flying had to be conducted in specified areas, which soon became very familiar to us, almost all the weapons ranges were situated on the coast, with unrepresentative targets, and fighter affiliation exercises had to take place over the sea. There were no electronic warfare training facilities and we practised some of our tactics against warships – hardly representative of the Central Region. Collectively, these limitations created a situation where realistic operational training was extremely difficult and much of our

training could, in all honesty, only be classed as ‘academic’.

There was a further factor at this time which frustrated the aircrews. In the early days of the ‘fast-jet force’, almost all the expertise was held at wing and squadron level. Experience of operating these new, and highly sophisticated and capable, aircraft had not yet permeated to the Air Staffs at Command and Group. Hence, our flying training was driven by the need to achieve basic training requirements which were geared to an earlier age. But it was in the exercise arena where we noticed the biggest failings. Many of the major NATO and national exercises were not geared to the capabilities and operational needs of the squadrons. The exercise planners did recognise that the new aircraft had capabilities that they had not seen before but, instead of developing scenarios that benefited the squadrons, many exercise profiles were geared to using the Buccaneer, in particular, as targets. I well remember operating with another Buccaneer and we were tucked in close either side of a Vulcan. As we neared the Norwegian coast, we turned towards the UK and at an appropriate distance, we were ‘released’ by the Vulcan and flew a non-manoeuvring profile at 400 knots at high level before letting down in a long steady descent towards a warship. In our highly sophisticated and advanced strike/attack aircraft, we were simulating a Soviet air-launched anti-shipping missile! You can imagine our acute frustration at not being able to use our Buccaneers to their full potential. Unfortunately, this type of exercise was all too frequent in the early days and during my tour as a Flight Commander, I spent more time acting as a target for air defence organisations, missile sites and warships than I ever did practising attacks against realistic targets. Fortunately, this situation virtually disappeared over the next few years and, as I shall point out later, the content and value of our training improved greatly but those early days were very frustrating for the aircrew.

There is one other significant feature of this period that needs to be mentioned; the increasing impact of electronic warfare. With their experiences in the Vietnam war, the United States had recognised the crucial need for their tactical aircraft to have an EW capability. The Vulcan force had a modest capability but the new generation of fast-jets had virtually nothing. Eventually, it was the Buccaneer force that pioneered the way forward for the tactical force. The aircraft was fitted with a radar warning receiver and by the mid-70s, the Westinghouse active jammer was becoming available and we started to carry it on a wing pylon. Again, I remember this was a very frustrating time since electronic warfare was seen

by many as a ‘black art’ and was little understood by the staffs. Of greater significance, there were virtually no training facilities for using and developing this significant and crucial capability and we were rarely able to practise our tactics in a realistic EW environment.

By the mid 1970s, therefore, we can say that, while our flying was tremendously exhilarating and demanding, we had very few opportunities to train for our wartime role and the facilities available for operational training against realistic, simulated threats were extremely limited. The only exceptions to this overall situation were in the Harrier off-site exercises, which we will hear about later, and some of the maritime attack exercises, albeit, we spent a great deal of time attacking warships in a manner to suit their requirements rather than ours.

Prospects for an improvement in the attitude to operational training came from an unexpected but valuable source. During the mid-70s the United States armed forces conducted a major review to address the lessons learned from the Vietnam war. Some of the ramifications of this review did, in my opinion, sow the seeds for the most significant change of attitude in the RAF towards operational training for the strike/attack force and the benefits of those changes and the different attitudes stemming from that review are still seen today, twenty years later.

History shows that we are slow learners in the art of war. In particular, we seem to have a penchant for ignoring the lessons learned from previous conflicts. To illustrate this point; when I took up my last appointment in the RAF in 1991, I was the first incumbent of a new post established by the Chiefs of Staff as a direct result of the recommendations of the post-war analysis of the Gulf War. The first thing I did after taking up my appointment was to read those recommendations. The very first one said, ‘Implement the lessons learned from Operation CORPORATE.’ A conflict only nine years earlier!

With this in mind, it is interesting to note the United States Air Force reaction to the results of their studies of the Vietnam war. Amongst many other findings, these studies showed conclusively that combat aircrews stood a much better chance of survival if they could survive the first 8 to 10 combat sorties. This should not have come as a surprise since exactly the same conclusion was made following the analysis of the Korean war. Perhaps we should all have read Adolph Galland’s memoirs in which he said:

> ‘A steadily increasingly percentage of the young inexperienced pilots were shot down before they reached their tenth operational flight. As soon as our *Luftwaffe* leaders cut the training courses this soon became more than 50%.’

You will not be surprised to hear that von Richtofen had said precisely the same in 1918.

Returning to the Vietnam studies; these also showed that, not only were aircrew loss rates high, their effectiveness was low. Since NATO doctrine was based on the expectation of a short conflict, the USA recognised that these factors of high loss rates and low effectiveness could be decisive in the eventual outcome. They recognised the need for some new training initiatives. The US Navy took immediate steps and established their ‘Top Gun’ school and a kill ratio, which had been close to parity, was transformed to one five times improved.

The USAF decided to provide an operational training facility which could reproduce those first eight to ten war sorties. So, in 1975, Exercise RED FLAG was born. Before describing what RED FLAG is, let me make a very important point and first specify what it is not. It is not a trials arena nor an operational test and evaluation environment. It is not a school and does not aim to teach per se or to provide any answers to the tactical questions which arise. It is a training environment. It provides a facility for a unit to learn its own lessons, apply its own tactics, try new ideas and, above all, to expose its aircrew to an operational environment.

RED FLAG is based at Nellis Air Force Base just north of Las Vegas and it is the largest tactical fighter training base in the world. Normal ramp loading is of the order of 250 aircraft but it has peaked at over 350. The tactical weapons and electronic warfare ranges are to the north and occupy an area that would cover the southern half of England and Wales. We would enter the range area about ten minutes after take-off, flying through a series of corridors, a similar procedure to the system we would have used to cross the Inner-German border on the way to attack Warsaw Pact targets. Another example of realism.

The range complex included 50 different types of tactical targets. A battle front was formed with 220 replicas of Soviet tanks arranged in the way that intelligence indicated they would be deployed in combat. There were two convoys of trucks – one was 17 miles long – and they were spaced in exactly the same way as a Soviet convoy. Airfields had been

scraped out of the Nevada desert to the exact pattern of those in Eastern Europe and aircraft were parked in dispersal areas. Dummy and real missile sites had been constructed. There was even an industrial complex with rail access complete with a train. On all these targets it was possible to drop live weapons from first run attacks. A unique experience for our crews.

All these target systems are provided to create a facility for front-line operational squadrons in which they can train realistically for war. Battles are fought between Blue Forces, who are the visiting squadrons who spend two weeks at Nellis and are the attackers. The Red Forces, who are the defenders, and their resources consist of ground based defences and fighter aircraft which are permanently assigned to RED FLAG.

In early 1977, Tactical Air Command of the USAF invited the RAF to participate in a RED FLAG exercise and, in August, ten Buccaneers of 208 Squadron and two Vulcans from Waddington flew to Nellis as the first non-American participants in an Exercise RED FLAG. The Vulcans carried the bombs for our use and they remained to take a limited, but very valuable, part in the exercise. On a later exercise the Vulcans flew in the night phase as you have already heard from our Chairman. My comments, therefore, will be restricted to the Buccaneer aspects.

Aware of the unique opportunities that RED FLAG offered, our Command and Group staffs decided that all participating crews must first complete a formal training syllabus of eight sorties culminating in flying regularly at 100 feet. At the time, this irked we aircrew but I freely confess now that the formal work up period was great value and the Buccaneer crews could not have acquitted themselves with such distinction had they not first had this lead-in training period. The work up sorties were designed to allow each operational crew on the squadron to progress to four-aircraft formations flying at 100 feet against fighter threats and culminating in first-run attacks against targets on the weapon ranges.

By coincidence, 208 Squadron was due to deploy to Goose Bay just before the first RED FLAG exercise and the work up was carried out over Labrador. All subsequent training for future Flag exercises was fulfilled by detachments to Lossiemouth. A special 100 feet low flying area was established over Northern Scotland and the Phantoms from Leuchars attempted to intercept the Buccaneer formations. This Lossiemouth facility became crucial over the following years, not least because the Germany-based Buccaneer and Jaguar squadrons could not train adequately in German airspace.

The aim of RED FLAG was, and still is, realism. The various Blue Force units participate in war scenarios which are consistent with their own individual unit war plans and as requested by them at a planning conference held a month before the exercise.

Let me now outline the format of a RED FLAG sortie. The details of the day's operations were issued to each squadron in the form of a 'FRAG', the equivalent of a NATO Air Tasking Message. This FRAG would arrive during the afternoon for the following day's operations and crews would plan their missions to co-ordinate and deconflict with other participating units. This in itself proved to be a very valuable feature of the exercise allowing crews to review their tactics in order to fit into a package of sorties rather than operating in isolation which would never have been the case in a real conflict.

The following morning the strike/attack forces would take off and penetrate 'enemy' airspace, frequently with 60-70 aircraft entering the target areas through a series of corridors within a period of 20-30 minutes. No radio calls were required and clearance to drop live weapons was automatic. Once in the range area, we were constantly under threat from ground-based modern SAM systems, both real and simulated, and from the RED FLAG Aggressor Squadron which was equipped with the F-5 fighter. These aircraft were chosen because they looked similar to a small Soviet fighter and they had a comparable performance. To add to the realism they were even camouflaged in the exact schemes of the Warsaw Pact and the pilots had been indoctrinated and trained to copy and fly exactly as an enemy fighter pilot would. This allowed us to fly using the precise tactics that we would have employed had we gone to war. In other words, we were not trying to counter the tactics of our colleagues in the Phantom and Lightning force. Always a temptation when inter-squadron rivalry was at stake but not representative of war.

The ground threats were extremely realistic and this provided a unique opportunity to employ our electronic warfare tactics and to use our active jammers, something that was quite impossible during our normal training in the UK. This exposure to the real electronic warfare world was one of the most valuable aspects of the early RED FLAGs. Not only did we learn a great deal about tactics but it provided an excellent spin-off to assess the effectiveness of our systems and we identified genuine problems but we were able to introduce many improvements.

In the Buccaneer force, and I believe the Jaguars employed similar

tactics, we flew all the attack sorties in very loose tactical formations of two or four and I always tasked my crews as constituted pairs. This proved to be of tremendous value and we almost became telepathic and never once used R/T, except to call a fighter threat. We also developed tremendous confidence in each other. On each sortie we were able to drop live weapons from a first-run attack and we had complete freedom to chose the mode and direction of attack, speed and release height and there was no Range Safety Officer to baulk us at the last moment. Bombing with live high explosive bombs and cluster bombs provided another unique opportunity and crews had to be extremely precise in their timings to ensure that the following aircraft was safe to attack. This required great discipline and skill which could not possibly be replicated under the simulated conditions that prevailed during routine squadron training in the UK. We all know that aircrew like to 'claim' that they would have had a direct hit and been spot on time but in RED FLAG our results provided the proof of our claims – or otherwise. Certainly the level of traditional aircrew line-shooting and over-claiming dropped significantly.

After each sortie the debriefing phase began and this culminated in what many feel to be the greatest single value of RED FLAG – the mass debrief at the end of each afternoon. Here the provisional air and ground claims were announced by the directing staff as well as the validated claims for the previous days. The Buccaneer hardly ever featured in this phase of the debrief. All formation leaders then described their task, tactics, weapons used and success or failure of their missions as they saw them and any lessons learned by their particular unit. The subsequent pooling of ideas for future sorties was of tremendous value. It was unique.

My aim in this presentation has been to outline the uniqueness of the RED FLAG system and not to extol the virtues of the last great British bomber – the Buccaneer. I will let the editor of the US Defence and Foreign Affairs Daily do that for me. He said:

> 'RAF Buccaneers flying at RED FLAG have performed outstandingly well. Close observers say that the tactics adopted by Buccaneer crews have astounded the USAF.'

In addition to the obvious training benefits, there were other significant spin-offs from our participation in RED FLAG. As I said at the outset, RED FLAG is not a trials arena. However, our experiences clearly demonstrated a number of important and valuable points. As a direct result

of RED FLAG we changed the aircraft camouflage scheme, we discovered that our electronic jamming pod interfered with the threat warning receiver and a subsequent investigation and trial resolved that problem. The unique electronic warfare environment clearly demonstrated that we must have a chaff dispenser. Most significant of all, in my opinion, was the irrefutable evidence that attack aircraft must have a self-defence capability. All these points eventually came to fruition.

Perhaps I could conclude by making some personal comments regarding the significance of RED FLAG. First of all we had to recognise that, unique though it was, it did not provide everything. The weather and the topography could not have been more different than the Northern and Central Regions of NATO. In this respect, the sister exercise – MAPLE FLAG – which was held in northern Canada, was much more representative of the terrain we would have to fight over and this was particularly valuable for my squadron which was permanently assigned to the Northern Flank of NATO. RED FLAG, and MAPLE FLAG, did have some stunning plus points.

Initially, the greatest value was for the aircrews. We operated at our, and the aircraft's, limits. We had no restrictions on our tactics and the opportunity to drop live weapons and exercise our electronic warfare equipment was unique and unequalled. The threat was as realistic as one could get without facing the enemy. Most of us thought that if we could cope with the FLAG exercises and their threats, the Warsaw Pact forces would be no more difficult. We were constantly under scrutiny from the most critical and informed judges; our peers and international colleagues, not to mention our Chiefs and the staffs back in the UK. There was no room for boasting and line-shooting. The results spoke for themselves. The value of the in-depth debriefs and the discussions that followed was unique in my experience. Above all, our aircrews discovered their limits and their capabilities and the whole experience was a tremendous boost to our confidence. There is no doubt in my opinion, had we gone to war after a FLAG exercise, we would have acquitted ourselves very well and with fewer losses.

So much for the value for the aircrew. There was, I believe, a much more significant value. Indeed, I would go so far as to say that the experience gained in those early FLAG exercises changed the whole 'culture' and approach to operational tactical training in the RAF. As a Squadron Commander I could see that not only did the aircrew gain great

benefits and confidence, but the air staffs were also impressed and began to realise the need to develop more realistic training opportunities for the squadrons.

Let me give you some examples. First of all the air staff recognised the value of RED FLAG and continued to negotiate for further invitations to participate in the FLAG series of exercises, thus exposing countless aircrew to the experience. It is worth remembering that the first invitation to 208 Squadron was a 'one off' only. The 100 feet low flying areas in the UK became permanent features and squadrons regularly deployed to Lossiemouth for dedicated training. This was particularly important, since aircrew soon lost the cutting edge gained at RED FLAG if they could not have continuous training opportunities when they returned. Although the Vulcan force made regular sorties to Goose Bay, the facilities were developed to allow continuous deployments to Goose Bay by the fast-jet squadrons for ultra-low-level tactical training and such deployments became the norm. The major national tactical exercises took on a completely different character. The HAMMER BLOW and MALLET BLOW exercises, which were introduced after our exposure to RED FLAG, gave aircrew far more opportunities to fly as they would fight. The advent of the electronic warfare range at Spadeadam gave added value and the increasing involvement of our own air defence squadrons provided realistic threats and, of course, gave the fighters much more realism to their training. Indeed, Dial-a-Phantom, became a daily routine event on all attack squadrons and we flew very few training sorties that did not include at least one interception exercise by our fighters. Even our day-to-day routine training benefited with better weapons range facilities, an overhaul of the low-flying system and more realistic scenarios in our TACEVALs. All of this provided significant 'spin-offs' for the air staff manning the exercise tasking and operations cells in the Headquarters.

Just before I relinquished command of 208 Squadron in 1982 I led a detachment of four Buccaneers on a five-day Tactical Bombing Competition which involved six RAF and USAF squadrons. In some respects, it almost excelled RED FLAG. It was the most professional, demanding and rewarding flying I ever did in twenty-odd years. With fighter CAPS, Rapier missile sites and first-run attacks to meet a precise time on target against military targets on an inland tactical weapons range, the profiles we flew were as close to the real thing as we could go. It may surprise some of you but that exercise all took place over the United

Kingdom and it was four years after we had participated in the first RED FLAG. It was certainly a very far cry from my early Buccaneer days when we were forced to simulate Soviet missile profiles over the sea.

I believe the RAF's participation in the RED FLAG and MAPLE FLAG exercises created the most radical change in thinking and the most significant stimulus to peacetime operational training. Perhaps a fitting way for me to conclude would be by quoting a Squadron Commander who flew during the Gulf War. When I asked him to compare RED FLAG with a real war, without hesitation he said: 'Nothing was different; it all seemed familiar.'

He might have added that, ironically, even the terrain looked the same. It was the desert, not the Central Region.

TORNADO GR 1– THE GULF – TRAINING AND TACTICS

Group Captain Jeremy Witts

Having flown the Vulcan B2 in Cyprus, Jerry Witts then completed two tours in the low level/strike attack role at RAF Laarbruch on the Buccaneer S2B. Staff appointments followed in the mid-80s and in 1989 he took command of 31 Squadron, Tornado GR1 s, at RAF Brüggen. During the Gulf War he commanded the Tornado GR1/1A detachment at Dharan with distinction and was admitted to the DSO. On promotion to group captain he was Executive Officer to the USAF 4-star Commander at Ramstein, Germany, and currently commands RAF Northolt.

My aim today is to examine whether our training in the Tornado GR1 force was adequate to meet the tactical challenges posed by the 1991 Gulf War. However, before starting, there are some important caveats that I need to set in place and which I ask you to bear in mind:

First, as you will likely soon discover, I am no historian but, rather, an eyewitness or 'bit-part player' in a piece of recent Royal Air Force history. Nevertheless, I recognise, and have tried to avoid, some of the traps awaiting those seeking to analyse past events armed with 20-20 hindsight.

Second, because my participation in those events was as a unit commander, you will not be surprised if this is the perspective from which my comments derive. I will, however, try to relate everything to contemporary circumstances.

Finally, nor will you be surprised when I stress that my comments and conclusions are entirely my own and must not be taken in any way to reflect official MOD or RAF policy.

As clocks in London heralded in the 17th of January 1991, my two fellow Tornado GR1 Detachment Commanders and I found ourselves at the head of respective formations, flying in total darkness, at high speed and very low-level on our way to attack enemy airfields. Apart from it being the first wave of a real war, given our extensive training in the low-level strike/attack role in NW Europe, there should have been nothing particularly remarkable about this, except that:

(a) we were about to drop a type of live weapon that we had never dropped before;
(b) we were flying faster and lower than had ever been permitted in training; and,
(c) unless our nav kits were completely up the creek, we were flying over a desert, far outside the NATO area, and well and truly east of Suez!

If this was, after all, somewhat out of the ordinary, what had we trained for? The answer, of course, was, primarily, low-level airfield attacks against Warsaw Pact airfields, which sounds remarkably similar to the task we were engaged in but masks some very important differences. To bring these out, I need to briefly rehearse some Cold War history.

Introduced during the 1980's, the Tornado GR1 was the long awaited, albeit somewhat tardy, successor to the worthy Canberra. This replacement was, of course, to have been the TSR2 or, perhaps even, the F-111 but, while we waited, there had been some notable gap fillers: the redoubtable Buccaneer, the ubiquitous Phantom, and even the Jaguar. However, at last, by the late '80s, the RAF had eight Tornado GR1 squadrons based at Brüggen and Laarbruch in Germany and three more plus an OCU at home in the UK. This was a significant force, and 'so what?' if the Tornado couldn't fly as far as the Buccaneer or as high as a Phantom, for the first time ever, its terrain following radar and modern nav attack system, gave the RAF the capability to attack at low-level, with accuracy, at night and in bad weather. Better still, its comprehensive electronic countermeasures and modern air-to-air missiles gave it a good self-defensive capability and, best of all, in addition to the standard 1945 pattern 1,000lb free fall bomb and the anti-armour BL755 cluster bomb, it carried a new weapon, the JP233, purposely designed for airfield attack.

To back-up all this hardware, we had about 1.3 crews per aircraft, autonomous squadron engineering support and an excellent training scheme that gave us annual opportunities to visit Goose Bay in Canada to practise visual low flying down to 100ft and frequent participation in the US FLAG series of exercises. On top of this, we had daily access to 250 feet low flying and air-to-ground weapon ranges in the UK and Europe, frequent participation in NATO exercises and other, more limited, opportunities to practice IMC low-level tactics. In addition, we operated from extremely well-found hardened main operating bases where the synergy of operating up to four squadrons as a co-operative wing produced

flexibility and redundancy. By any standards – and perhaps the NATO TACEVAL scheme is the most objective – we were as good as anyone in NATO and, I believe, very well trained and equipped for our primary offensive counter-air role. And, what's more, with NATO in the Central Region outnumbered 6 to 1 by the Warsaw Pact's air forces, we needed to be.

However, by 1990, the European geopolitical scene was undergoing rapid change. The German reunification process and the accelerating democratisation of Central Europe was starting to erode our raison d'être as a standing force on the continent. For example, by mid-1990, the German government, feeling unable to continue the imposition of aircraft noise on its population, had introduced severe restrictions on low flying, which had started to have a major impact on our training. On the other hand, it was becoming considerably less obvious who our potential adversaries might be and what, indeed, we were training for.

Thus, with the so-called 'peace dividend' up for grabs throughout Europe, it was something of a shock when, in August 1990, Saddam Hussein invaded Kuwait and 'the Iron Lady', fortuitously in Washington at the time, started to corral world reaction against Iraq. It was a far greater shock to me, however, when the UK government decided to deploy Germany-based Tornado squadrons to help counter this aggression and secure Saudi Arabia.

In retrospect, this all seems entirely logical; however, until then, RAF responses to events outside the NATO area had usually been mounted by UK-based units. That said, moving a Tornado detachment from a main operating base in Germany to a relatively bare base in the Middle East is easier said than done. At the time, the Germany-based Tornado Force had no mobility commitment, no deployment plans to draw on and, most importantly, no 'fly away pack' or mobile infrastructure to support such a move. Nevertheless, 'flexibility being the key to air power' and all that, the job was soon done and a highly experienced detachment drawn from the Brüggen Wing was soon in place at Bahrain and, thus, incidentally, under the overall command of our chairman today, for Sir 'Sandy' had by then become Commander British Forces Middle East. I say that the initial detachment was highly experienced because, given the urgency of the situation, the RAF had been unable to resist the temptation to send the most experienced crews, including most of the Qualified Weapons Instructors. Although an understandable reaction, this was to have considerable

ramifications later. However, it had no immediate impact on my own squadron because, as these events unfolded, we sat at Goose Bay, having just completed another low flying detachment, stranded for want of air transport which had all been diverted to Middle Eastern tasks.

When we eventually returned to Brüggen, somewhat miffed to have missed the action, there were few indications of how long the Bahrain detachment might be expected to last, or whether we might be expected to contribute to it in due course. That, of course, would largely depend on Saddam's response to the demands of the growing international coalition set against him. However, I made no secret of my own view that my squadron was pretty well equipped to take over, given that we had just returned from our Canadian training, we had completed a RED FLAG earlier in the year, and, not having had many postings of late, we had a very settled, reasonably experienced set of crews.

Nevertheless, such feedback as there was from Bahrain indicated that, if we were ever required to deploy, there were a few prerequisite skills that would be needed. First amongst these was air-to-air refuelling, or AAR. Although, all our Tornados were equipped for AAR, given our low-level-only role there was no requirement for Germany-based crews to be AAR trained. In fact, that isn't quite true because, only a few months earlier, we had been given permission for four crews to qualify to relieve pressure on UK-based squadrons who, otherwise, had to carry out all the Tornado Trans-Atlantic ferry flights that supported our North American training programme. Nevertheless, we would clearly need to considerably increase our AAR expertise.

There was also talk from Bahrain about medium level and high angle dive-bombing. Again these were not unheard of techniques in the Tornado Force but, until then, they were almost novelty events carried out at our annual armament practice camps at Decimommanu in Sardinia, rather than part of our day-to-day repertoire of attack profiles.

Here, I should stress that, in September 1990, I was under no official instruction to prepare any of my crews for possible deployment to the Gulf, however, given the slow yet seemingly inevitable international shift towards offensive action to resolve the Kuwait issue, it seemed highly probable to me that we would eventually get involved. I therefore determined to do all that I could – within the rules – to get my team as well prepared as possible. Besides, the new skill requirements fitted in admirably with the hi-lo-hi training profiles to the UK that we were now

having to fly as a result of the German low flying restrictions.

In fairness, I should also point out here that the Federal German government did relax their low flying restrictions for those crews nominated to prepare for the Gulf. However, this did not, for the present, include us. Nor, for the moment, did the allocation of AAR tanker training hours, which meant that not a little deviousness and skulduggery was necessary to ensure that we bootlegged enough training.

As I have indicated, feedback from Bahrain was somewhat sparse. Brüggen and HQ RAF Germany were, of course, merely resource providers to Operation GRANBY which was being directed by the Joint HQ established at High Wycombe. There were plenty of rumours about what the deployed Tornados were training for, but precious little official feedback on new tactics or techniques that might be being developed. Amid this frustration, I was told in early September to select and prepare four of my crews to reinforce Bahrain. This dismayed me because, although I was pleased that my squadron was getting involved at last, the policy of taking penny packets of crews from all the squadrons seemed set to prevail. Moreover, sending out some of my best crews would do nothing for our residual ability to carry on training.

However, I welcomed the opportunity at about the same time to lead a non-stop delivery flight of modified replacement aircraft to Bahrain; this was a useful opportunity to experience a long range tanker trail for the first time and, of course, a chance to obtain some first hand news of what was going on.

In Bahrain, I had long discussions with OC 14 Squadron, Vaughan Morris, who was commanding the detachment. In the thick of a considerable training task, I found him anxious that a standardised Operation GRANBY training syllabus should be introduced for use by all the providing squadrons at home. He confirmed the need for day and night AAR expertise, as well as for level and dive-bombing from medium altitude because, while he was sure that JP233 would play its part in any offensive action, he felt that 1,000lb general purpose bombing would also be needed for some targets. He was confident that, with the amount of US electronic warfare capability being brought into theatre, in combination with Tornado's own self-defence capabilities, the threat posed by an estimated 7,000 Iraqi surface-to-air missiles could effectively be suppressed or avoided; however, he emphasised that the Iraqis had a prodigious amount of anti-aircraft artillery (AAA) – estimates ranged up to 10,000

pieces – which would always pose a threat at low-level.

At the end of September, another mixed squadron detachment, provided by Marham, deployed to Bahrain and then, in early October, moved on to Tabuk in NW Saudi Arabia. Further crews from Brüggen, including my nominated four, were duly sent to reinforce both locations and, later in October, it was announced that the Laarbruch Wing would provide the roulement for Bahrain. While, in my view, this increasing RAF presence made it certain that we would soon receive the call, the GRANBY training syllabus that had by now been introduced, along with access to the necessary resources, still applied only to those actually nominated to go. I'm afraid that I simply ignored this inconvenient fact and went ahead at full speed to ensure that all my crews received as much training as possible.

It was just as well that I did because, in the first few days of November, Brüggen was instructed to produce another 12-aircraft/24-crew detachment for deployment 'in due course'. With the least affected of the squadrons up to that point, I was appointed Detachment Commander and given four crews from each of the other Brüggen squadrons to add to my remaining twelve. It was now that the full impact of the penny packet aircrew deployment policy became only too clear. With a fully functioning squadron, I had been managing to get all my crews up to speed; however, in contrast, the other squadrons, through no fault of their own, had been surviving on a meagre diet of sporadic flying, just managing to retain currency but little else. Most of their QFIs and QWIs were deployed, so there was no one left to bring the remainder on. In consequence, my squadron had suddenly to become a mini OCU with my crews devoting all their efforts to bringing on the others. The only consolation was that, when asked when my own crews could be expected to be ready for deployment, I was able to reply rather smugly that they already were!

With the UN deadline for Iraq to quit Kuwait now set for the 15th of January, on the 20th December, ministerial approval was given for our deployment; however, we discovered that we would not be reinforcing Bahrain or Tabuk as we had expected but, instead, would be going to Dhahran in the Eastern Province of Saudi Arabia to start a completely new detachment. This brought a whole host of other problems, not least the fact that if we were to have a fully functioning operations support set up in place by the deadline, we would need to hit the ground sprinting when we deployed over the New Year period. Meanwhile, we had to stop training flying on Christmas Eve to give our engineers a chance to pack everything

in preparation.

Nevertheless by then, all 24 crews had completed their GRANBY work up training. Throughout this, I had deliberately retained a constituted four-ship formation structure and each of these was proficient, if not particularly experienced, at: day and night AAR; level and dive-bombing from medium altitude; ultra low-level flying by day; and parallel track night and IMC formation flying. They had all flown in the AR5 aircrew NBC equipment; played with chaff and flares and AIM-9L Sidewinder missiles; and everyone had revised the particular switchery and unique release symbology pertinent to the JP233; indeed a very few crews had had the opportunity to fly with a non-exclusive trials load of JP233. In addition, one or two had managed to fly against the *Luftwaffe*'s newly inherited MIG-29 – which was enough to tell us that it was one Iraqi aircraft that we certainly did not want to meet for real. On top of this came a host of intelligence studies, electronic warfare revision, NBC training and pistol shooting, as well as all the usual tedious but essential medical, dental and administrative rigmarole.

In retrospect, this had all gone surprisingly smoothly, although the peacetime rule book was wont to get in the way at times. For example, whilst we were permitted to fly at night in a loose tactical formation, close formation was specifically prohibited (a hangover from an early Tornado training accident). However, taking a formation of aircraft to a tanker at night, in cloud, without flying in close formation, is pretty difficult to achieve even in a canned training environment. If you transfer the problem to an operational scenario where you need to get fuel within very tight parameters of time and space or abort the mission, the need for close formation becomes absolutely critical. The only solution was to bend the rules somewhat. However, it would have been nice to have had official sanction to make our training as operationally realistic as possible.

Nevertheless, in sum, I believe that the aircrew were as well trained for Gulf operations as we could make them without, of course, knowing what precisely they were going to be asked to do if conflict came. Call me old fashioned, but I felt that this last point was important, for not once was I as the Detachment Commander ever informed exactly why I was taking 12 Tornados, 48 aircrew and some 300 support personnel all the way to Saudi Arabia – the question might now seem naive; however, it was one I was asked often enough by those I was privileged to command.

Actually arriving at Dharan was something of a relief. The deployment

went very smoothly and we started in-theatre training immediately. Our new bosses – Air HQ in Riyadh under Air Marshal Bill Wratten – had decreed that each crew should complete a four-sortie work-up programme, comprising day and night hi-lo-hi trips with tanker support. So, with a total of some 400 flying hours to produce in about 10 days, we had our work cut out from the start.

Our arrival also meant that we were now, at last, included in the information loop. Suddenly, a welter of paperwork arrived although, predictably, much of it comprised refinements to previous work that we were still not privy to. We had about five months of hard won experience to catch up on and so I dispatched people to Bahrain to try to ensure that we had as complete a picture as possible. A meeting with the Air Commander and the other Detachment Commanders in Riyadh the day after our arrival also helped to fill in some gaps. From this, and a visit to the now famous US 'Black Hole' air planning cell in Riyadh, it was clear that we had been concentrating on the right things, namely low-level JP233 attacks; however, there was little comfort forthcoming with regard to the amount of AAA and SAM defences that we should expect to face. It was also decided that 6 Recce aircraft and 9 crews would join my detachment, starting on January 14th.

After a couple of days, we received a number of airfield targets to pre-plan, which constituted the first 48 hours of our tasking if war came. Other goodies also started to appear out of the woodwork, for example, four sets of night vision goggles (NVG). Our front cockpits had NVG compatible lighting but the limiting factor was not the number of goggles but the number of flying helmets available with the necessary mountings. No one in the detachment had ever used NVGs before but I authorised the formation lead and deputy lead pilots to try them out. There was no time to exploit their potential fully, but they were a useful addition.

Just before the UN deadline passed; I was able to declare our in-theatre training completed. On what turned out to be the eve of war, we were told to cease all training flying, save for a couple of sorties for our late arriving recce aircraft, and load for operations. At the same time, somewhat belatedly I thought, we received clearance to fly to the war-only limits that would expand the permissible aircraft envelope by roughly 10%; it would have been nice to have been able to explore this before people started shooting at us.

Anyway, as history now records, DESERT STORM started at midnight

GMT on the night of 16/17 January 1991. We were tasked to attack key Iraqi airfields armed with JP233 airfield denial weapons. The aim being to 'limit the number of launched Iraqi fighters to quantities the coalition fighters could readily handle'. Our training was borne out and, aside from the dramatic pyrotechnics laid on by our unwilling hosts, there were few surprises, except, for example, that it would have been nice to know before the first sortie that, when JP233 canisters are jettisoned, they can throw the autopilot out of control. At 180ft and 500+ knots that proved to be unnecessarily exciting. Nevertheless, subsequent analysis proved that the attacks were pretty accurate. Certainly, night formation and AAR came into their own and a typical sortie, usually about four hours in length, would involve at least two outbound refuellings and one on the way home. In fact, this remained the case throughout the war and, from Dhahran alone, we uplifted some two and a quarter million kilograms of fuel by this method.

After a few days it became clear that the Iraqi Air Force either could not or would not take any meaningful part in the war; however, why so many of them subsequently departed for an extended vacation in Iran remains a mystery. As you might expect, the Iraqi inactivity was not lost on the front line and we soon began to question the need to continue such attacks. However, in due course, we began to be tasked as eight-ship formations at medium level, still against the airfields but in what seemed to be a much more benign environment. We might discuss the timing and impetus behind the change of tactics later but, for the moment I will confine myself to the relevance of our training.

In fact, the switch to night medium level (which for the Tornado meant altitudes around 25,000 feet) went surprisingly smoothly. In effect, we transported our low-level parallel track IMC formation techniques lock, stock and barrel into the upper air, with a bit of height separation thrown in for safety and to confuse the enemy defences. Of course, JP233 was no longer of any use, but we could each carry up to eight 1,000lb free fall bombs and 64 of these on any target ought to make a useful contribution. Furthermore, although we were still very wary of the SAM threat, our move into the airspace routinely used by our American allies took us above most of the AAA and gave us access to closer protection from EF-111 Ravens, EA-6Bs and the ubiquitous Wild Weasels, who more than once proved their worth in suppressing enemy defences on our behalf. And just for good measure, our missions usually attracted fighter sweep and escort from F-14s and F-15s. This seemed to be an altogether less hair-raising

method of waging war; however, it soon became clear that one important ingredient was missing – accuracy! Not surprisingly, the Tornado GR1 had been optimised for low-level and battle damage assessment indicated that we were now imitating Lancasters in more than just profile. Yes, we might have left the odd oil refinery burning, but stick bombing was no antidote to the inherent inaccuracy caused by lack of an accurate height sensor for medium level bombing. The old V-Force lags among us wracked our brains to remember how to apply 'D' factors and the like but there was little else that we could do to improve things in the dark.

Recognising this, we started to fly medium level attacks by day while 'The System' worked frantically to introduce laser designation from the Buccaneer/Pavespike combination and, at Tabuk, from the thermal imaging and laser designation (TIALD) pod. In the interim, however, we developed a technique, in daylight, of diving towards our targets to bring a forward ranging sensor to bear [AGR] and then, when the aircraft computers had sufficient data to reach a solution, levelling the aircraft or even climbing through weapon release. Accuracy did improve but not to anything like the standard we might have expected at lower levels. Our masters made their dissatisfaction clear and a return to low-level was threatened which, I cheerfully admit, was the last thing that I, for one, wanted to do. We were also encouraged to try steep angle dive-bombing as a more accurate option. Great in theory, but as I found out almost to my cost, it puts you on a predictable flight path right in the heart of the AAA envelope. We achieved a direct hit but I'm still buying my navigator beers because of it!

The debate raged for a while and it was not until the Buccaneers became available in early February and we could start laser guided bombing that things really got going. Even then there was a steep learning curve to get the necessary co-ordination sorted out. I was fortunate in that I had some experience of operating with Pavespike from my Buccaneer days; however, you can imagine the difficulties for crews learning on the job over enemy territory. Moreover, attempting to arrange the split second co-ordination of designator and bombers, with the one at Bahrain and the others in Saudi Arabia, over a secure fax link that went only via the MOD in London, was somewhat fraught. Eventually, we developed some robust SOPs but, certainly, every sortie was a learning trip. However, we now had the capability to go bridge busting and to start surgically demolishing the Iraqi Air Force infrastructure.

In due course, after 42 eventful and action packed days, hostilities were

terminated. For the statisticians, by the end, the Tornado GR1 Force of, on average, 46 aircraft had flown over 1,600 operational sorties for the loss of seven aircraft. We had dropped 106 JP233, some 4,400 free fall 1,0001b bombs, and 1,100 LGBs, as well as launching 104 Alarm missiles.

Whether the correct tactics were used, I leave others to judge. Was our pre-employment training adequate? I believe the overwhelming answer must be 'Yes'. But perhaps a better question is, 'in retrospect, would you have changed anything?' To this, with all the benefits of hindsight, I would answer emphatically 'Yes': we should not have been so focused on low-level operations that we ignored our few but important inadequacies at higher altitudes; we should have known more about our weapons and had the opportunity to drop them all; and we should have known more about our potential to turn our hands to other roles or techniques; most of all, I would have ensured that the Air Force was organised in peace to reflect the way it intended to fight in war, or vice versa. However, I am left with the view that it was not specific training events that counted in the end but rather the all-round experience level that had been built up over time and which enabled us to learn AAR virtually overnight, to mount deployed operations 3,000 miles from home for the first time, to switch from low-level to medium level and thence to laser operations while still in action and, above all, to remain flexible and adapt to changing circumstances.

Most if not all the points in my 'wish list' have been addressed since 1991; however, for the future, we must continue to be wary that our shorter and shorter, and no doubt more cost effective, aircrew training programmes do not become over specialised or too prescriptive. 'No plan survives contact with the enemy' and whatever we expect and train for now will not be what happens when the shooting starts. Thus, it seems to me that the continued development of an all round aircrew skill base remains essential to ensuring that we retain the flexibility to adapt when it counts and the means to continue to apply air power effectively in all its forms.

HARRIER – CONTEMPORARY AIR POWER

Wing Commander Andy Golledge

Joining the RAF from Birmingham University Air Squadron in 1979; Andy Golledge flew with 4 Squadron at Gütersloh, then back to the OCU at Wittering before returning to Germany as a Flight Commander on 3 Squadron. He then spent three years on ground postings which included the Spanish Air Force College and involvement with the Eurofighter project. He was the first pilot to display the Harrier at the Paris Air Show and currently commands No 1 Squadron.

It is my pleasure to talk to you about how we are training Harrier pilots on the front-line today. To judge whether we are achieving our training objectives the question we must answer is, 'does our training allow us to meet our operational obligations?'

I've divided my presentation into three parts. Firstly, I will start with a quick look at the Harrier Concept of Operations. Then I will consider, in a little more detail, the tactical training that we carry out on a day-to-day basis. And finally, I will combine these two themes and seek to answer the question I have posed. At the end, I have a short video to illustrate our capabilities.

Concept of Operations

Starting with our Concept of Operations. The Harrier is able to undertake a variety of missions, but its primary roles are Close Air Support and Air Interdiction.

For Close Air Support, the Harrier can carry seven cluster bombs optimised to penetrate armour. However, this weapon, which is a little long in the tooth now, is being replaced over the next couple of years with the precision guided Brimstone missile which will give a much greater punch.

For Air Interdiction the Harriers' primary weapon is the laser guided 1,000lb bomb which can be used against a wide range of targets.

Our secondary roles include: Reconnaissance, Offensive Counter Air, Support of Maritime Operations and Visual Air Defence.

As well as by day, the Harrier can conduct all of these missions by night using the aircraft's Forward Looking Infra Red sensor (or FLIR) and pilot

Night Vision Goggles (or NVGs). Here you can see the FLIR mounted on top of the aircraft's nose, and the FLIR image on the cockpit 'Head Up' Display and the 'Head Down' Display. This image enables the pilot to see straight ahead of the aircraft. NVGs complement the FLIR by allowing the pilot to see left and right of the aircraft's nose.

Overall, the Harrier is an extremely capable aircraft equipped with the latest technology. It can rapidly react, deploy over long distances using air-to-air refuelling, and deliver precision strikes using guided and non-guided weapons from low-level or medium level attack profiles.

But perhaps its greatest asset is its flexibility of basing options. With its unique VSTOL characteristics, it can operate from: a well-found base equipped with all support facilities; a bare base, by deploying support elements such as Ground and Air Defence; a small aircraft carrier, where we have spent the last four months in the Mediterranean and the Gulf on Operation BOLTON; and even on an emergency landing strip such as a road or 'tin strip' as in the Falklands War of 1982.

Tactical Training

Moving on to my second theme: our day-to-day tactical training. Our flying training is governed by two directives issued by HQ 1 Group: the Annual Training Syllabus and the Exercises and Operations Programme. Firstly, the Annual Training Syllabus which details work-ups for pilot qualifications and the type and quantity of flying to be carried out. For example: so many low-level sorties, so many weapons sorties, so many electronic warfare sorties, and so on. To give you a feel for the way we train pilots on the front-line today, you can see here a simplified three-year training programme for a typical Harrier pilot joining the squadron from the Operational Conversion Unit.

During his first year on the squadron, his priority is to become Combat Ready by day followed quickly by 'pairs leader' status. The next year, he is likely to become qualified as an 'air combat leader' and gain proficiency in low-flying down to 100ft. He will then follow a night combat ready syllabus using the electro-optical sensors on the aircraft and finally, by the end of the three-year period, he will be ready to undergo a 'fours leader' work-up. Throughout the training programme the pilot may be selected to attend other courses which provide specific expertise and instructional technique. These courses include Flight Safety, Electronic Warfare, weaponeering, and flying supervision.

Turning now to the Exercise and Operations Programme which involves deployments and training opportunities with other forces. Here you can see the provisional 1(F) Squadron programme for 1998-99 which begins next month.

Over the coming three months the squadron needs to re-group from its time in the Gulf, and become accustomed once again to the daily rhythm of life at RAF Wittering. For a short while the Harrier Standards team from the Operational Conversion Unit (OCU) will come and fly with us to assess our pure flying and tactical skills. In July we intend to drop some heavy weapons on the UK's air-to-ground weapons ranges before deploying to Goose Bay in Canada in September where there are opportunities to night fly and to conduct low flying down to 100ft. Following this, we hope to move on to Nellis Air Force Base in the USA for a much needed tactical exercise. We conclude the year with a short deployment to Norway where night low flying is again available to us. The squadron begins 1999 with a short training embarkation on a Royal Navy carrier off the eastern seaboard. We then anticipate a three-month stint on Operation WARDEN at Incirlik, Turkey which aims to protect the Kurds in Northern Iraq.

When we are home based at Wittering, we can of course carry out a wide range of flying training in the UK. This includes low-level navigation and attack, day and night, reconnaissance, delivery of practice and live weapons on a number of weapons ranges, electronic warfare at Spadeadam and air combat manoeuvring. The detachments throughout the year provide other training opportunities such as the preparation and execution of the deployment itself and associated air-to-air refuelling, operating from a variety of bases providing differing amounts of support, and flying with other nations in unfamiliar terrain and climatic conditions. This mixture of home based training and deployment is a good balance and generally provides excellent training through all of our flying disciplines.

I'd now like to briefly mention our operational flying. The post-Cold War scenario has seen RAF fast-jet aircraft deployed on long periods of operations unlike anything we have experienced in the recent past. Of course, operational flying is our raison d'être, but paradoxically being on operations creates a training penalty. For example: since last November while embarked on HMS *Invincible* during Operation BOLTON, No 1 Squadron has had little time for low level training and no opportunity whatsoever to train new pilots in the night flying role with FLIR and NVGs. There has undoubtedly been skill fade in certain areas of our flying

and the squadron will take a considerable amount of time to recover all of our qualifications. Nevertheless, ship capability for the Harrier GR7 has now been proved and this has added an attractive offensive capability to Royal Navy carriers. This concept will surely evolve, and I foresee regular embarkations for RAF Harriers in the future amongst all our other commitments. However, I firmly believe that GR7s should not be at sea for months on end, restricting training opportunities and inducing skill fade. Rather, the aircraft should be embarked in the theatre of operations after a rapid deployment from the UK and then disembarked at the earliest opportunity having completed its task.

Is our Tactical Training realistic to fulfil our concept of operations?

I'm now going to return to my original question – 'Is our tactical training realistic enough to enable us to fulfil our Concept of Operations?' Today's front line fast-jet pilot has to be ever more flexible and capable of a wide variety of flying skills. We must expect the unexpected and be ready to react quickly whenever and wherever the need arises. It could be by day or night, operating from a military or civilian base or an aircraft carrier or an emergency landing strip. This is a challenging regime but the Harrier GR7 is uniquely equipped for the task.

In order to achieve and maintain all of our skills, our flying training must be relevant, realistic and balanced, and we must get the maximum out of each sortie. However, I do believe that, for the most part, our tactical training programme is just about right and that we can fulfil our Concept of Operations. Nevertheless, operational flying day in and day out over long periods of time does have a training penalty and may lead to skill fade in some areas throughout the Squadron, and a suitable recovery period is inevitable.

I'm now going to show you a short clip of video taken recently from our flying on Operation BOLTON from HMS *Invincible*, to give you a flavour of what the end product of our training looks like from the sharp end. You will see a carrier take-off at night and then two simulated attacks on shipping using the aircraft's electro-optical sensors. In addition, I have tagged on two approaches and landings to the carrier, one night and one day, which I hope you will find interesting.

AFTERNOON DISCUSSION

Peter Skinner: It would appear that the JP233 was much wanted in its brochure days and then did not work as advertised during the Gulf War. Were there any particular reasons for that, other than the opposition from the enemy, and has the weapon now had something of a demise?

Gp Capt Jerry Witts: Well that's a very loaded question. I'll try and deal with all those points. First, the weapon did operate as advertised. The weapon was built and optimised to work against Warsaw Pact airfields. Not only in terms of their geological sub-structures and the way their runways are put together – the thickness of the concrete and all of that sort of thing – but also their size. We were dealing with a totally different problem – the ratio of concrete to sand in Iraq is rather different to the ratio of concrete or asphalt to grass that you've got on a Warsaw Pact airfield. I'm not clever enough to explain all the geological and explosive factors. And the other thing is that the average Iraqi airfield is about the size of Heathrow. You need an awful lot more JP233s. It comes back to 'Jeff's point about the number of Vulcans you need to put a hole in Port Stanley. All of those factors come into it.

Moving on to the defences. Yes, the defences were awe-inspiring. It wasn't much fun. The fact is though, we didn't lose many aircraft actually being shot down by Triple A, if indeed we lost any to Triple A. There may be other reasons and I'm not privy to them all yet. So it wasn't the defences that stopped us, or stopped the JP233 operations; it was the fact that we didn't need to use them, because why bomb an airfield that's not being used as an airfield, unless you want to destroy the infrastructure long term, in which case, a much better bomb is a laser guided bomb, to which we eventually turned.

The demise of the weapon? well, as is widely known, and you can see an example out in the museum there, part of the weapon has got minelets involved, albeit that they are time-delayed and will explode after a period, self destruct that is. They have been declared by the Government to be outwith the current interest on banning mines around the world and that, I believe, is the strongest influence towards the demise of the weapon.

Michael Robinson: Could I ask Andy, more from his experience and possibly Jerry's from the Gulf, about their awareness of the translation of battle management experiences developed by Nigel and others in NATO. Was

it apparent in the management of those other operations?

Wg Cdr Andy Golledge: I think we are much more aware now because people are actually being sent on courses to learn about battle management. That's the short answer, but again we are still isolated if you like, down at squadron level, doing our own thing, working as much as we need to every day, we just don't get time to appreciate other things which are going on, but generally I think that more people are being sent on courses and there is a greater awareness.

Jerry Witts: Absolutely. A number of them, there are a huge number of initiatives over the last ten years within the air force for that sort of thing. I mean, the establishment of the Air Warfare Centre is perhaps the prime one amongst them, but the Air Battle Managers' Course and a number of other courses are now there. Also, the nature of the wars we probably will fight has changed. The Gulf War is different to Bosnia. If you're in Bosnia, air is as much a political weapon as it is a military one and when you're making a political statement, then perhaps that needs to be planned and managed in a different way than, for example, a limited war in Iraq when you're set on reducing a target-set of some variety or other. And again, that would be different to the old Cold War and each of those require different forms of battle management and greater or less involvement by higher levels. Ultimately, I think all aviators would like to have the last word on planning the last few minutes of their attack but that may not be possible in the Bosnian type situation when it's actually critical that you make the right statements and apply the right force.

Kevin Dearman: What operational affect do you think operating at 100 feet has compared with say 200 feet or 250 feet?

Air Cdre Graham Pitchfork: Initially we were quite cynical about the need to train at 100 feet when we spent all our lives flying around at 200 feet. Particularly when we spent most of our time over the sea at 100 feet and, as I said in my presentation, it irked us to some extent We thought the staff were meddling. But I have to confess that there is a big difference between 200 feet and 100 feet. We used to say that it was the coming down from a 1,000 to 200 feet and you did the same kind of quantum jump from 200 to 100. Your reactions have got to be quicker; your peripheral vision is less; you're still having to concentrate on your leader or your wing man; you're still looking out for threats and, in our day of course, we had very little in-cockpit

activity and we didn't have the aids. So 100 feet was very demanding and there's no doubt that when we came back from the work-ups and then subsequently the FLAGs, we were far better at our business. We quickly lost that capability, and hence I made the point in my talk that it was crucially important that we were able to continue, albeit not as often, but to some extent at 100 feet because you lost the edge very quickly.

Jerry Witts: I totally agree with what Graham's just said. There's one important point though – we must not be so in love with low flying that we forget about the rest of the atmosphere. However, low flying is the hardest thing to do and it's right that we should put the proper weight of training upon that, but we shouldn't do so and be so blinkered that we don't practise other forms of flying.

The corollary is that, in the contest to fly lowest, the ground will always win so we won't be able to go any lower and we're going to have to start spending money on technology that will allow us to get round some of the defences.

John Herrington: Chairman, coming back to a subject we were discussing this morning which has relevance I think, particularly to the Gulf operations and maybe future operations, and that is the American view and the RAF view about very low or medium altitude air operations. I remember having some conversations in the MOD with the Americans in 1973, and they couldn't see how we could possible (a), find our targets at 100 feet and (b), survive. Their experience of Vietnam of course was based on the fact that their losses at low-level were being caused essentially in the early days by Triple A, and so they went up. There was no significant air opposition and they were able to spot the SAM 2's fairly easily and avoid them by going to medium altitudes. The situation might, of course, have been rather different over central Europe with a large scale Russian Air Force opposed to them. But I remember a second set of discussions with some American electronic warfare experts, just after the start of the Yom Kippur War. The Americans had given the Israeli Air Force the very latest in all their equipment to fight that war once it started, and became very worried when the Israeli Air Force started being shot out of the sky in large numbers and they were worried lest the Soviets had devised some new anti-aircraft missiles and ECM systems, which they hadn't known about. When they went out there, of course, what they found was, that in order to stop the Syrian tanks on the Golan Heights, the Israeli Air Force was having to

go in at low-level to knock those tanks out and once again, they were suffering the losses, not from missiles but from Triple A. So I think perhaps there's a little message there, vis-a-vis the start of the Gulf War and any wars which the air force might have to fight again in the near future.

Jerry Witts: I think what I draw from that, and just as an aside I'm probably wrong, I'm no historian, but I'm sure I read somewhere recently that the US Air Force lost over 680 aircraft to SAMs at medium level in the Vietnam War. So, medium level isn't the panacea. However, what we're really talking about here is being forced to fly low-level by the weapons we carry and for as long as we have weapons that restrict our flight envelope, that will be the case. I would be interested, not to put you on the spot Sir but, why was the Royal Air Force contracted to go in at low-level against the Iraqi airfields? Was that because the Americans had no capability to do so?

ACM Sir 'Sandy' Wilson: Yes I'm happy to answer that question and the answer was that when I got into Riyadh in early August and was taken into the 'Black Hole' with Buster Glosson, who was the architect of the air campaign, and sat down and saw the targets that they were looking at, airfields were right at the top of the list and they had no weapon. They freely admitted they had no weapon that could take on these airfields and JP233 as advertised, appeared to them, and to us at that time, to be the only weapon that we could possibly use and assist with the whole rationale for getting Tornado deployed out there in the first instance. The reason it was pulled out later, Jerry has already alluded to, but that's the only reason we were taken in there, it was '233 and the airfields. When we looked at the size of the Iraqi airfields, we realised that you'd have to put in squadrons and squadrons of JP233 equipped aircraft to close them. But the initial raids that we planned in such great detail and were flown with such bravery and excellence, as Jerry said, and if anybody has seen some of those aerial or satellite photographs of those first raids, they were remarkably accurate and they did have an amazing impact on the psychology and the morale of the Iraqi Air Force, of that there's no doubt.

Andy Golledge: Yes, can I just come in here? I believe that today and in the future, we have to be flexible. We have to be flexible and be able to operate in any part of the spectrum, low-level or medium level. It depends on all sorts of things, threat, weather, support. And the Americans going in

at medium level? – that's fine, because they've got so much support in the American Air Force that they can do it. We don't, and certainly for my money, your best defence against any threat is at low-level; that's your best defence – in the terrain – and we can do that, and we have to do that, because sometimes we don't have the support. It is also the most demanding flying environment and my experience is that, if the boys can fly at low-level in all the bad weather, in all the bad threats, etc, without support – then we can do it at medium level as well.

Jerry Witts: Can I very quickly make a point now, I discussed this with Nigel Walpole earlier on, because we used to talk a lot about low-level and Buccaneer in the Central Region, and the point is, on any one of those Gulf War sorties that we flew at medium level, we had more electronic warfare and fighter support on one of those sorties, for four or eight of my aeroplanes, than the whole of the Central Region of NATO would have had in one day in the Cold War scenario. Let's not lose sight of the massive amount of investment it would take if we're all going to go to medium level.

Bernard Johnson: I'd like to ask how the Buccaneer, an aircraft that I thought was designed for the Fleet Air Arm, found its way into RAF squadron service.

Graham Pitchfork: They're so good, that's why. We touched on it briefly, indirectly, when TSR2 disappeared and F-111 came along, and I actually followed this route in my own career. I was on Canberras and I was sent to the Fleet Air Arm as the first exchange officer to get some experience of the new fast-jets, in order to go and be an instructor on the TSR2 OCU. I'd only been with the Navy a short time when I was told the TSR2 had been cancelled and I was going to go to Fort Worth to be the navigator to help bring the F-111 into RAF service. That didn't happen. I eventually ended up at Coningsby on the first Phantom course. I'd only been there three months when I was told, 'Don't unpack your bags, the Royal Air Force is going to inherit the Buccaneer from the Navy because the fixed wing carrier is going to go and we now have this Buccaneer available and the air force has got to take it into service.'

But the aeroplane was so good, it soldiered on for a long time and it was developed significantly, of course, by the RAF to be fair to the Navy, and we added things to it which made it a very potent aircraft. And I remember

saying once to Sir Michael Beetham who came to the crew room of my squadron, when we were asking what we were going to do with the Buccaneer when the Tornado came in and one wag on my squadron said, 'It's quite simple Sir, it'll be a low-level tanker, it will tank the Tornados and it will go on with them and drop our bombs as well.'

Michael Robinson: I think the end of that story is that it didn't go down terribly well.

Graham Pitchfork: I remained a wing commander two years longer than I had expected.

Michael Robinson: I had a little to do with this because I was a desk officer in Ops Offensive at the time when everybody came back from the Houses of Parliament, tearing their hair out at the announcement that we weren't going to get the F-111 – or anything. It was with Roy Boot at a series of meetings (he was the chief designer of Blackburn) that I said, 'Look, I'm not attracted by these enormous 450 gallon underwing tanks, because underwing stations should be for armament and the extra range is cancelled by the tanks' drag and I don't want the rocket' – the rocket motor at the back end which the South African model had, which was as modern a Buccaneer as was available for their hot and high airfields. And Boot said, 'Well you're posing tremendous problems of CofG and how the aircraft would behave, but I'll think about it.' At the next meeting he came back and said, 'I think I've got an answer. There's a gap between the inner and outer skins of the bomb bay, if we fill that with fuel, it will give you nearly the same increment of range.' But I think it's fair to say that there was potential from the early days of the Buccaneer to improve its nav attack system which was resisted. It wasn't an interim aeroplane, it was much more than that.

SEMINAR CHAIRMAN'S RETROSPECTIVE

Sir Andrew Wilson

As you will all know it is not customary for the Chairman to attempt to summarise the day's proceedings but before closing I would like to make a few general points.

The first is that I find it significant that the words 'Operational Training' appear to have been missing totally from the pre-war lexicon. In the early post-war years the emphasis was on the achievement of Basic Training Requirements (BTRs) and it appeared that the front line training was influenced more by the Central Flying School than by operational needs and doctrine. It was not until the introduction and development of a number of significant initiatives in the early 1970s that the Royal Air Force began to align operational training directly with war tasks.

The second point is that sound operational training stems, in part, from a proper understanding of the operational art by all those in the command chain. Some of what we have heard today would suggest that in past times operational training was left too much to chance and to individual squadrons and not driven from the more senior levels of command. The presentation on Battle Management underlined the critical importance of Commanders at all levels having a proper understanding of operational doctrine and of how to apply air power effectively.

Third, there is no doubt that the USAF's experience in Vietnam had a profound effect on the development of operational doctrine and training resulting in, amongst other things, the development of Exercise RED FLAG in the Nevada desert. It was the RAF's experience in this and other Flag Exercises that focused attention on the critical importance of realistic operational training. Apart from operating against real Soviet target systems and in a testing ECM environment, these exercises provided crews with the opportunity to deliver live weapons. As such, the aircrew built both expertise and confidence in their aircraft and in their own ability. However, and perhaps of even greater significance, this 'Flag experience' created a fundamental culture change in the RAF's approach to operational training. This paid handsome dividends when we were called upon to conduct real operations in both the Falklands and the Gulf.

Fourth, the development of the TACEVAL concept by RAF Germany in the 1970s, which was subsequently adopted ACE-wide, provided the essential vehicle to exercise and test the complete battle management

machinery at station level. Thus for the first time we had an integrated approach to operational training.

What lessons can we draw from all of this for the future? Apart from realistic operational training of the Flag variety, the Falklands and Gulf conflicts were timely reminders of the overriding need for flexibility in both our doctrine and our training to cope with the unexpected. It goes without saying, of course, that we will continue to need high quality, well motivated aircrew together with good aircraft and equipment.

We have had a fascinating day and it only remains for me to thank Dr Fopp and his staff for allowing us to use the RAF Museum for this Seminar and to Air Vice-Marshal Robinson and all the presenters for giving us all such stimulating food for thought.

MEMORIAL ADDRESS FOR AIR CHIEF MARSHAL SIR FREDERICK ROSIER GCB CBE DSO

Air Chief Marshal Sir Michael Graydon GCB CBE

I first became acquainted with Sir Frederick Rosier in 1967. As a colleague and I landed in a Lightning T5 at Coltishall, the undercarriage collapsed, much to the surprise of the AOCinC Fighter Command who was in Air Traffic at the time, and not without surprise to the occupants of the Lightning. The then Station Commander Gp Capt Mike Hobson is here today. I hope he has forgiven me. After enquiring as to the health, or words to that effect of the pilots, the AOCinC, before winging his way back to London, expressed his interest in the outcome of the Board of Inquiry, which no doubt, he said, he would be seeing before long.

A few months later, the AOCinC took the farewell parade for No 56 Sqn at Wattisham before it departed for its new home in the Near East Air Force. I was present on that occasion. So, too, I learnt later was the youngest member of the Rosier family. John, aged five, watched the march past with all the solemnity of youth, and as the ranks disappeared from the hangar in which the parade was being held, turned to his mother and enquired whether the squadron was going to walk all the way to Cyprus.

I next met the Air Marshal in Cyprus when he was the Permanent Military Representative to CENTO and then, in 1971, I went to Brunssum in the Netherlands as the PSO to the Deputy Commander-in-Chief Allied Forces Central Europe, one Air Chief Marshal Sir Frederick Rosier.

This was a privilege, and one of the most interesting periods of my life because, to my generation, he was one of the icons of World War II, a man whose reputation as an airman and Commander spoke for itself and indeed had been enhanced as he brought his skill and experience to bear on the different challenges of the Cold War. Not only was I given the chance to serve such a man towards the end of his service career, but in the process would get to know him and his family, and begin a friendship that has meant much to my wife and me ever since. I am deeply honoured to have been asked to give this Memorial address today having, as it were, auditioned at the funeral service in September.

We are here today in this Church of the Royal Air Force to remember Sir Frederick Rosier. Some of us are friends from his Air Force days; some are those who knew him later in his life; some are representatives of the many organisations who benefited from his wisdom and support. And then

there is his family. We, the friends and acquaintances who knew him, who, sometime, somewhere, experienced that special brand of Rosier magic, can recall a remarkable man, but for Het, and Lis, David, Nick and John and their families this is an occasion that will bring back the memories of a lifetime and one part of our being here today is to support them with our understanding for all that they have lost.

But I do not intend to dwell on loss; Fred would not wish us here today to grieve. He had such a zest for life, such an infectious enthusiasm for everything, such a wonderful sense of humour, and it is on the positive things he would want me to concentrate. 'Keep it simple; keep it short and don't flannel,' he used to tell me. I will try Sir.

Frederick Ernest Rosier was born in Wrexham in North Wales on 13 October 1915. He was educated at Grove Park School. He no doubt learned a good deal from this experience but all I could unearth from those who should know was that the violin and a certain talent for acting were features of that period; that he played Rugby rather well, and sang in the choir. No great surprises here. He joined the RAF in 1935 and did his flying training at Filton near Bristol where, I gather, he added to the number of those who have flown under the Clifton suspension bridge. He then joined No 43 Sqn at Tangmere and began an association that continued to this year. Two members of that fighter squadron are ushers today; the OC is present, and the Association is represented by Sir Fred's successor as President, Sir Peter Bairsto.

After a brief flirtation with an engineering course and night fighters, in May 1940, he took a flight of 229 Sqn, together with a flight of 56 Sqn, to France. The next day, on the Friday, a handful of old Hurricanes – no armour plating, no self-sealing tanks – took to the skies against wave after wave of Messerschmitts. Five sorties that day – six aircraft pitted against 40 or so Me 109s on one occasion – and on the Saturday, again vastly outnumbered, tasked to escort some bombers, he was hit whilst in the climb and with the aircraft on fire had no choice but to bale out. He couldn't. The hood was jammed; he was stuck in the cockpit. In his taped reminiscences, he recalled thinking – 'Well, that was that.' Others felt he might have expressed himself more forcibly. But either way, on one of those amazing turns of fate, suddenly everything cleared and he found himself falling clear. He pulled his chute and remembered nothing more until waking up in hospital.

He was badly burned, about the face in particular, and as soon as

possible was returned to hospital in England, when Het visited him. They had married in 1939. He told her that she must tell the authorities that the training pre-war had been wrong and that they must learn the lessons quickly. Proper peacetime training was always thereafter close to his heart, and I can remember in 1972 when there was a debate in the NATO Alliance about low-level flying he made his views known: 'Anything less than training as if for war is downright dishonest.'

Fred recovered to lead 229 Sqn at Northolt in the last days of the Battle of Britain, and in 1941 became a Wing Commander in the Desert Air Force. Here his imagination and skill as a fighter leader, enabled him to unite with other talented airmen in visualising how the Army and Air Forces operating alongside each other in partnership could turn what had been a pretty disappointing campaign into success. The rest, as they say, is history, but the Eighth Army and the Desert Air Forces set the model for joint operations that still stands. He had a few adventures in the desert; the famous silver tankard episode was well covered in the obituaries in the *Times* and *Telegraph*. Fred was awarded the DSO for his leadership in the desert theatre in 1942, and this belief in joint operations was to be a guiding influence on him ever afterwards.

He returned to be Station Commander at the OTU at Aston Down where Pete Brothers, later a great family friend, had his initial experience of Fred Rosier. Tannoyed on his first morning to report to the Station Commander in the ante-room of the Officers Mess, and with visions of damage and mayhem to explain, he found Fred standing in forbidding fashion at one end of the room. He viewed Pete in silence for a moment and then said, 'I've got the keys to the bar, let's have a drink.'

Then to Northolt again, this time as Station Commander, and the beginning of a relationship with the Poles that would take him to Warsaw for the 50th anniversary of the 1944 uprising as an honoured guest, and where the award of the Polish Order of Merit was added to his other Polish medals. He had a great devotion to the Poles, bred of his respect for their fighting qualities at Northolt. Then, finally as Group Captain Ops with 84 Group under Teddy Huddleston, where he was able to give full rein to his enthusiasm for joint operations.

After the war, following his third tour as a Station Commander, this time at Horsham St Faith, during which period he carried the Standard at the service to dedicate the Battle of Britain Memorial Window at Westminster Abbey. In 1948, family – Fred, Het and new daughter Lis

went to America. Two years, and much travelling, later, they returned to Latimer on the DS. It was some DS, 'Splinters' Smallwood, Nebbie Wheeler and Donald Evans. I don't know what the students learnt but it must have been fun. David was born at Latimer when Fred was a wing commander; Lis had been born when he was a group cptain. You can make what you like of that.

He became Gp Capt Ops at the Central Fighter Establishment at West Raynham. I mention this period because I know many who served with him at that time who have commented that, whereas some were unable to cope with the demands of the jet age and the great changes of the Cold War, Fred Rosier took it all in his stride. He had an instinctive feel for what was right; he commanded respect from old and young alike. He was a great 'operator' – that is the ultimate accolade from a bunch of hardened fighter pilots. I remember Peter Brothers telling me once that Fred Rosier could write the best Operations Orders he had ever seen. CFE in those days was a real centre of excellence – some fourteen wing commanders of great wartime experience and skill. And that was where Nick was born.

Then to Fighter Command as Gp Capt Plans where his reputation was further enhanced; IDC and a tour as one of the three senior planners for Lord Louis Mountbatten in the new central staff. The others were to become Lord Carver and Admiral Sir William O'Brien. Promotion to AVM and AOC under Sam Elworthy in Aden and where his beloved 43 Sqn joined the AFME ranks. Here John was born. And so through Transport Command as SASO, to Fighter in 1966.

Fred was the last Commander-in-Chief of Fighter Command. He was faced with fighting to preserve, as he saw it, the flexibility inherent in Fighter Operations that he feared would be lost in a larger centralised organisation which was in prospect. This was the formation of Strike Command. He told me later that what he visualised was an organisation which could dispatch packets of mainly tactical aircraft from all the roles at short notice; a mixed force to go to trouble spots. Curiously this was broadly in line with what the USAF put together in its reorganisation earlier this decade; they called it the composite wing. As was his nature, he stuck to his principles, he presented his arguments frankly and fearlessly, and without thought for any personal consequences. His affection for Bentley Priory, the HQ from where the Battle of Britain was commanded by Dowding, and where Fred oversaw the last days of Fighter Command endured – he was a regular attendee at the annual dinner of the Battle of

Britain Fighter Pilots' Association.

I mentioned previously his final tour as DCINCENT. Here his genuine enthusiasm for joint and international co-operation was given full reign. His clear mind, and his unpompous style was deeply respected. Simplicity was the key. His love of the English language; his choice of the most telling words, and his delivery were legendary. 'Timing matters,' he would say. I would go further – for him, with that talent for the theatre, timing was all, and he was a master of it. The pause, the look from over the glasses, and then precisely the right line whether in seriousness or humour. Who can ever forget his after-dinner speeches. There was no side to Fred Rosier. Here was a man who could look the part of a great leader, as he indeed was. The same man could remove the shirt from his ADC without removing his jacket. He did the same trick on 'Micky' Martin on the aircraft taking the Air Chiefs to America, but someone stole the shirt. Air Marshal Sir Harold Martin had to pass through the Guard of Honour on arrival at Andrews with his coat buttoned to the neck. It was not surprising that he was both admired and liked by all the nations; he had the knack of dealing with the highest and the lowest. He had humour and he had style. The award of the GCB was surely a tribute to his skilful handling of some complex issues such as that over Central Region Air Forces reorganisation, and a recognition of his leadership at a critical time in the Cold War.

He retired in 1973. In a letter written by Lord Mountbatten in response to a request for him to act as a referee, Mountbatten said, 'You can quote me as a referee for any job in the world...' he went on, 'there are not many people like you about.' Fred carved another very successful career with the British Aircraft Corporation, including a period in Saudi Arabia where once again his instinctive feel for complex situations and his powers of leadership left their mark, not least in the contribution he made towards the signing of the MoU between the British and Saudi Governments which led to the Al Yamamah programme. His deftness of touch was widely admired; he earned the respect of the Saudi leadership. Nine years after he had left, the head of the Saudi AF could find time to telephone him from Saudi to see how he was.

After that more time for the myriad interests that he had. **More time** for:-

Travel. Het and he were great travellers; all over the continent, not least in pursuit of the elusive Chateau Rosier in the hope that the family might be related. In America, where that earlier tour had given him a fondness for

America and Americans; they liked him, his openness and lack of stuffiness – just as well because his daughter married one. Immensely proud of the fact that one of Lis' boys is in the USAF today.

Time for Polish Airmen. As I have said, command of the Polish Wing at Northolt had left its mark. He took on Chairmanship of the Polish Benevolent Fund. I remember his moving and eloquent appeal for the Fund on the BBC; he made visits to Poland; he supported the Air Bridge appeal. He was at the dedication of the memorial to Polish airmen in this Church and at the marvellous memorial ceremony at Northolt.

Wales. Returning to his roots. Land of his fathers; where many of his friends resided, friends from the earliest days – many are here or are represented here today. Time for his music. Singing, the familiar descant sung with gusto at the Church Services he so much enjoyed. Did the famous violin come out of its case? It is there in Wrexham nestling in the Welsh hills, close to the river and the railway on which his father had worked, that he now rests.

More time for 43 Squadron. He was President of the 43 Squadron Association. A regular presence at Reunions.

For woodwork. Skilled carpenter and DIY. He built the family's first TV set; he built loudspeakers, and he could take the BMW to bits and put most of it back.

For the RAF and the Services generally. Victory Services Club – on the Council – Chairman for three years, President for nine years and Vice-President thereafter – always involved and active in moving the Club forward. For the Air Force more widely, a lively interest, discerning comments and, for me, the priceless asset of listening objectively and then, and only then, giving his thoughts with great understanding for the challenges of recent years.

And time for his family. The children and grandchildren. Fred was very proud of his children just as they were so very proud of him. Lis who has been such a tower of strength over the long periods of his illness – given so much of her time away from her family in America. David, who becomes more like his father every day, and whose achievements have, much to Fred's approval, left him unchanged. Nick and his family who have been magnificent in bringing Fred through crises; indeed the daily telephone calls were almost pioneering in their detail and success. John, whose career and prowess on the rugby field gave Fred so much pleasure and who attended the 43 Sqn reunion this year with his father as his

minder.

Over recent years, Fred Rosier faced illness, many ups and downs, but tackled with courage and resilience, and with the magnificent love and support of all the family. Despite her own problems, Het was at his side. Theirs was a lifetime association, from the youngest days in Wrexham, from marriage in 1939 through the war and a long separation, through countless homes and postings. Through the bringing up of four talented and delightful children, each of whom is a tribute to their success in the difficult art of parenthood. As a pair they were formidable, a partnership of much style. Unforgettable in so many ways. Fred Rosier's achievements were those of Het too; they complemented each other. Not that life was without its moments. Last year when Fred had been so ill, driving had been an impossibility; perhaps to Het's relief – Fred was always a forthright driver. But after his amazing recovery, he suddenly announced that he would drive again. Het was not impressed, and as they stood outside the house remonstrating over the issue, she said, 'You are not driving.' Fred said, 'I am.' 'You are not,' said Het, 'because I've just thrown the car keys away.' 'No you haven't,' said Fred, 'I've got the car keys, you've just thrown the house keys away.'

This last year was a good year. He had set himself the challenge of attending the GCB ceremony. And he did. It was my privilege to have been there too, and we had our photographs taken together. He made the 43 Sqn reunion. Sadly he was not strong enough to make Poland nor did he quite make his beloved Battle of Britain service at Westminster Abbey.

There is so much more one could say about such a rich life, about a man of such diverse and rich talents. Keep it simple, keep it short was his maxim. I hope I have followed his decree to some extent. As for flannel – the other piece of advice; if I say that we are here, this marvellous congregation, family, friends, the Air Force Board, to remember a man with unique qualities, a superb leader, a man one could trust and as the tributes that flowed in said, a man of integrity, a truly great man; then this is not flannel, it is the truth. Fred might have been embarrassed; he was essentially modest, at home with any community but happiest surrounded by unpretentious and natural people. There are so many memories that we share, I remember – battles on the tennis court, travelling in the Pembroke all over Europe, music outrageously loud, the stories, the laughter. There was the shirt trick; the violin; a man who could drink a glass of water placed on the ground without using his hands; a man who could hold a

roomful of tough nuts in his hands with the power of his words, and his matchless sense of humour and timing.

'Be Bold' was the inscription on his armorial shield; how apt. This was a man who loved life, who grasped it with both hands, with zest, with relish. Who can ever forget those striking features, that shock of white hair, that quizzical glance and then that all-embracing infectious grin. Air Chief Marshal Sir Frederick Rosier. Fred. A life to remember. A man to revere.

Note: This Memorial Address was presented on 14 December 1998.

THE WORKING-UP TRIP

Joe Owen-King

I imagine many people share with me the lay person's mental image of a crash-diving submarine; the urgent blaring of a klaxon and the subsequent dash to get below before submerging. But to find myself one day in the van of such a rush for the conning tower hatchway was not something I had envisaged when joining the RAFVR! It was a precipitous descent down a vertical ladder, the gathering speed dictated by a pair of sea boots poised just above my head.

Starting just two or three rungs away, by the time I had negotiated a tricky break where the conning tower joined the main hull, the leading boot was on the rung immediately above my knuckles. Near panic ensued. I skipped the last two rungs and jumped – to land with a thud on the deck of the control room of the Super S Class submarine HMS *Strongbow*. This somewhat undignified performance by an airman guest of the Royal Navy took place in the middle of the Irish Sea in February 1944. What was it all about?

It was the result of one of the more imaginative moves made by the combined Admiralty and RAF Coastal Command hierarchy – the establishment of a Joint Anti-U-boat Warfare School at the Royal Naval Air Station, Maydown near Londonderry. It brought together, on fortnightly courses, representatives of the Royal Navy, both surface and submarine, Fleet Air Arm, RAF Coastal Command and the Merchant Navy. So it was at this station, originally a Fighter Command emergency airfield constructed during the invasion scare, that I found myself, together with my crew and a VLR Leigh Light Liberator on detachment from 224 Squadron, St Eval, for combined exercises with these other Services, leading to a general enlightenment for us all.

Indeed, how the other half lived would soon become all too apparent. There was no doubt about the change of occupancy of this airfield. Navy rituals required the constant piping on the Tannoy of strange demands. What were RAF ears to make of 'Hands muster for punishment' as a prelude to the day's events?

Maydown was too small to receive our Liberator so, together with a Coastal Command Fortress and crew, we parked and flew from Ballykelly, being bussed from Maydown and back for the flying exercises. The latter involved, inter alia, radar homing with the submarine HMS *Vox* and

various convoy escort duties. These trips varied between 2½ and 3½ hour's duration and were shared with six selected passengers from the seagoing members of the course. This gave our comrades-in-arms a bird's-eye view of events and, we hoped, a reassurance as to what we were all about up in the air.

In exchange for this pleasant enough duty we were rewarded with, in my view, the highlight of the course. We were to join, for one day, a working-up trip in a newly commissioned submarine! Yes, the whole of our crew – Captain, 2nd Pilot, 1st and 2nd Navigators, Flight Engineer and four W/Op/AG radar operators one of whom was qualified and operated as a WEM (Wireless Electrical Mechanic). Nine in all, of whom four were RAAF. So from the eastern seaboard of Ulster we embarked on board HMS *Strongbow* to set off on what was for me an absorbing experience.

I was now privileged to observe the modus operandi of a wartime submarine and the conduct and bearing of the crew, not least that of my opposite number, who was at this stage still a Lieutenant RN. He was, I judged, in his late twenties (as I was) and had earlier won a DSC while serving on HMS *Turbulent* with Commander J W Linton who was awarded a VC in addition to his DSO and DSC. The Captain displayed on occasions a slight facial tic, perhaps a result of his earlier tenancy – who knows,? – but it was gradually made clear to me that he had a lot on his plate during the proceedings. These were comprehensive and included being hunted by aircraft – hence the crash diving, – communicating with, and carrying out some exercises with another submarine whilst submerged and, on the surface, practising anti-aircraft fire on a drogue towed by a Fleet Air Arm aircraft.

Apart from a brief tour around, most of my time was spent in the control room, but I was able to chat with a Chief Petty Officer in the engine room – at the tops of our voices! The din from a mass of exposed tappets chattering away on the rows of diesel engines was ear-splitting. Nevertheless he was able to convey to me his opinion of the crew now being trained. 'All crews,' he said, 'were being diluted by wartime intake, and were not as good as the old regular volunteer crews.' A not surprising sentiment. Back to the control room, and the skipper allowed me to handle the periscope. This was fascinating, with its twistgrip action to increase magnification, bringing for me a detailed close-up of a section of the shoreline.

At one juncture, at periscope depth in a choppy sea, when being hunted by FAA aircraft, he asked whether I thought we had been spotted. My

previous experience of hunting for U-boats in a Hudson, with similar sea conditions, prompted me to tell him it was highly unlikely. He accepted my verdict, but I don't think he was entirely convinced. As it happened, I was proved right, but there could never be 100% certainty.

The periscope was the centrepiece of the control room. The Number One, situated at one end, was navigating and poring over a chart. Along both sides various ratings were standing facing controls and apparatus mounted on the sides. Some of these reminded me of the fruit machines of the time, and I believe were called such in the Service.

Something went wrong. The skipper had been giving orders, calmly, then more tersely, until he suddenly exploded into an all-round dressing down with a particular rocket for his Number One. 'For Christ sake, Number One!' he bellowed, as a preface to his upbraiding. I was slightly stunned and embarrassed for his second-in-command – subjected to this outburst in front of half a dozen ratings who, I must say, remained markedly impassive. It all quietened down, but here was food for thought – the first hint of an essential difference between our operational modes as skippers.

Put into perspective, when it came to the manipulation of our respective crafts, a pilot as captain was in command with direct physical control, whereas the submarine captain was absolutely reliant on others for accurate response to his commands. This young naval officer, in charge of a warship and 40-50 crew, spared no one in his efforts to get this indirect control right. It was not posturing; but was it characteristic? Could it have been handled differently? I didn't pursue the question, but I understood his problem and by his not standing on ceremony I only hope he got it right.

At last back to port, and three of us were introduced to the wardroom for a meal. The six sergeants messed with the petty officers – probably outnumbering them! The wardroom I would compare to an outsize railway compartment on a corridor train. It was entered from a passageway running along one side of the vessel. There was a long table in the middle with fixed bench seats on either side and racks above, I believe they could double up as bunks. The rating who was cook for the occasion had made a special effort for the guests and produced a fancy salad. It was a brave effort and perfectly edible. 'What's this?' asked the skipper, eyeing it suspiciously. The cook explained. 'No thank you,' said the skipper, pushing it away – evidently more a something and chips fancier. I can't remember how the sergeants fared for food, but they did report a consensus among

their hosts. They would far prefer the submariner's life to that of the aviator. Flying was too risky, but I doubt that their grass looked any greener from our viewpoint.

However, when all is said and done, there was one sure thing I had in common with my naval opposite number – access to orange juice! Lest we forget, the government restricted the issue of that rare and strictly rationed commodity (in our case small tins from the USA) to nursing mothers and young children, operational aircrew and submariners.

Between August 1944 and May 1945 HMS *Strongbow* survived five operational patrols in the Far East. She was subjected to attack from the air, shore gunfire and depth charges, including a devastating total of eighteen charges from four Japanese anti-submarine vessels. These severely damaged her, including the hull. In return she attacked and sank several vessels by either torpedo, gunfire or demolition charges. She survived her war service without casualties. I hesitate to put this down to orange juice! – and prefer to think that with the occasional display of strict leadership, as witnessed, the skipper got it right. He received a bar to his DSC.

Too damaged to warrant a refit, HMS *Strongbow* was scrapped in 1946.

BOOK REVIEWS

Merlin Power – The Growl behind Air Power in World War II by Victor Bingham. Drawings by Lyndon Jones. Airlife Publishing Ltd 1998. Price £24.95

This book examines the development of arguably the most famous aircraft engines of World War II from beginnings to final form, followed by in-depth examinations of twenty-two Merlin powered aircraft which includes all the household names of that period.

The author is at ease with his subject and his clear presentation is well supported by the design drawings of Lyndon Jones and very good illustrations. A very well produced book.

RW

Berlin Airlift by Arthur Pearcy. Airlife Publishing Ltd 1997. Price £19.95

The Berlin Airlift was the greatest air transport operation of all time. Operation PLAINFARE started at midnight on 23 June 1948 and lasted until 12 May 1949, when, early that morning, the first train ending the blockade reached Berlin-Charlottenberg. Airlift sorties continued until the autumn. Between these two dates an air bridge of unprecedented concentration, executed with professional determination and skill by the Allies, won the battle for the hearts and bellies of 2.5 million Berliners.

In this book Arthur Pearcy has assembled a vast amount of detail and photographs of an operation, logistically and politically unique. The statistics of the Airlift are impressive in their sheer volume and in the intensity of aircraft flown from the Allied airfields to the main Berlin airports; the city required 38 tons of salt per day. Names like Tempelhof, Gatow and Tegel in Berlin, and the former Allied bases at Fassberg, Wunstorf, Celle and Buckeburg will evoke their own special memories for those who took part as aircrew, groundcrew, or in the crucial role of air operations and air traffic controllers. Coverage includes the important contribution of No 24 Squadron crews with their York C Mk Is, Dakota C Mk IVs and the Lancastrian Mk II. The capacious USAF C-54 Skymasters and Stratocruisers, and the key airlift provided by Commonwealth Air Forces and British civil operators are described in lively narrative with comprehensive illustration.

Vital to the entire enterprise was the initiative of Air Commodore R N Waite, then Director of the Air Branch of the British Control Commission

in Berlin, without which the Airlift would not have started. Statistics in all their impressive complexity are not for this review, but are thoroughly presented in ten appendices to this handsome volume, together with a Diary of Events; perhaps, surprisingly, there is no index. Sadly, Arthur Pearcy died before he could relish the success of his meticulous and loving research into a major operation of the Cold War.

I commend this book to all – from those who took part 50 years ago, to current air operators of the Truckie persuasion, and to students of recent history.

RDB

The Distinguished Flying Cross and How It Was Won 1918-95 by Nick and Carol Carter. Savannah Publications 1998. 90 Dartmouth Rd, Forest Hill, London SE23 3HZ. Price £140 plus UK p&p £8

This two volume casebound work of almost 2,000 pages is the product of eleven years of research by a husband and wife team; their outstanding efforts have resulted in a definitive standard work of reference of exceptionally high integrity which fills a long outstanding gap in the historiography of gallantry awards.

The publication provides a complete alphabetical listing of airmen from Britain and the Commonwealth who were awarded the DFC from its institution in 1918 to 1995; in round figures 22,000 Crosses and 2,000 Bars. The entries include name, rank, Service number, squadron or unit, and the date and page number in the *London Gazette*. Detailed citations published in the *London Gazette* are reproduced in full.

Additionally, there is a substantial section which lists, within each country, the many foreign nationals who received Honorary awards of the DFC. This information did not generally appear in the *London Gazette,* one reason being that many had relatives in enemy occupied territory. One appendix catalogues those who received multiple awards of three or more DFC/DFM combinations.

Inevitably, a book of this scale must be expensive and this automatically results in a comparatively short print run. Nevertheless, the price is far from unreasonable given the scope of the book and members will wish to know that this excellent work is now available.

RW

Bases of Air Strategy by Robin Higham. Airlife Publishing Ltd 1998.

Price £ 24.95

The building of airfields for the RAF from 1934 to 1945 was the largest civil engineering project in the United Kingdom since the construction of the railways in the 19th century. It was an immense enterprise that consumed vast resources and required a massive planning and management effort. Professor Higham provides a comprehensive picture of this vitally important programme and the political, economic and historical context that underpinned it. Given the obvious importance of the subject, it is surprising that this is the first serious study to be published.

Writing in 1934, Sir Basil Liddell Hart commented that the large ground organisation of a modern air force was its Achilles' heel. This was written before rearmament saw RAF expenditure reach some 36 per cent of total defence spending (much of it on infrastructure) and an expansion programme that demanded the lion's share of the available manpower – by 1942, 750,000 personnel were allocated to the RAF and Ministry of Aircraft Production combined – as great as the Navy, the shipbuilding industry, the Army and the Ministry of Supply put together. However, without increasingly complex, sophisticated and expensive aerodromes, airfields and landing strips, the air war could simply not have been waged. The result was the construction of 740 new airfields in the United Kingdom alone and the building of about 1,000 more overseas. These were literally the *Bases of Air Strategy.*

Professor Higham observes in his preface that his is a work of synthesis rather than original research – but it is none the less valuable for this disclaimer. It is also very much a personal perspective and clearly a labour of love. The style is discursive with numerous anecdotes – those seeking a detailed gazetteer of airfields will be disappointed (although a comprehensive listing is provided). Nevertheless, a great deal of ground is covered in some 280 pages, addressing subjects as varied as construction and materials, rations, disease and fuel as well as tactical and strategic requirements. While the focus is on the critical expansion and wartime years, the First World War and inter-war periods are not neglected. If there is a criticism to make, it would be that the Editor's pen appears largely absent in shaping the mass of material that has been assembled. On the other hand one is presented with invaluable coverage of every possible aspect of the airfield programme that will, one hopes, provide the catalyst for further research.

The undoubted value of the book lies in the author's determination both to understand the subject and to place it in the context of wider events. Given the neglect of this important subject, without which there could have been no air strategy, the book is commended to members.
PJD

High Cold War – Strategic Air Reconnaissance and the Electronic Intelligence War by Robert Jackson. Patrick Stephens Ltd, Haynes Publishing, Sparkford, nr Yeovil, Somerset BA22 7JJ. Price 17.99

Nowhere in this book does Mr Jackson acknowledge any sources, either documentary or published, but some of them are discernible. In his account of the RB-45C Tornado flights made by RAF crews over the USSR in 1952 and 1954, he follows closely the contribution by Sqn Ldr John Crampton (who led them) to the RAF Historical Society's *Air Intelligence Symposium* at Bracknell on March 22, 1996. But he is wrong in saying that in April 1954, 'the first leg of Sqn Ldr Crampton's flight took him towards Kiev'. It was after they had taken nearly all their photographs that they headed south towards Kiev at 36,000 ft and encountered 'a veritable flarepath' of anti-aircraft fire, so turned smartly westward towards their emergency airfield, Fürstenfeldbruck, to bring back their aircraft – and its pictures – safely.

Mr Jackson's conclusions – that the Intelligence material gathered was 'far less than had been hoped' and that 'at best, the flights had given a small number of RAF crews experience of high-altitude reconnaissance operations over hostile territory' are not only a gratuitous slur on the aircrew concerned, but inaccurate.

In fact, while the 1952 results were less than satisfactory because in two of the aircraft the 35 mm cameras – which were to photograph the radar display – had been (unknown to the navigators) incorrectly focused; in 1954 all three RB-45Cs brought back satisfactory radar photographs taken along the routes they had been assigned to fly. These operations reflected great credit on the RAF crews of the Sculthorpe-based Special Duty Flight.

Mr Jackson also curiously omits the contribution made by the Mk 1 Victors to the strategic reconnaissance role. He seems unaware that in March 1958 the Radar Reconnaissance Flight at Wyton (where the SR Valiants of No 543 Sqn were based) became the first unit to be equipped with the Victor Mk 1 in an operational role.

This account of high-level Cold War reconnaissance is wide-ranging and readable, but, because of his reticence as to sources of information,

cannot be regarded as authoritative history.

This review by Mr Humphrey Wynn first appeared in the February 1999 edition of Air Pictorial *and is reproduced here with the kind permission of both those parties, and at the suggestion of Sqn Ldr Crampton, who also had been asked to review the book.*

Brian Trubshaw – Test Pilot by Brian Trubshaw with Sally Edmondson. Foreword by HRH The Duke of Edinburgh. Sutton Publishing Ltd 1998. Price £19.99

Assisted by his step-daughter, Mr Trubshaw has produced a well written and fascinating book about his successful life both in the RAF and as a test pilot.

His childhood and school years are covered, through to his wartime RAF service and selection for the King's Flight with whom he flew in the early post-war years. In 1950 he retired from the Service and joined Vickers-Armstrong where his career in experimental test flying first developed and where, among other aircraft, he was much involved with the Valiant V-bomber and later the Vickers Vanguard.

The background to the formation of BAC/BAe is dealt with. In 1965 he became their Chief Test Pilot with major involvement in the flight testing of Concorde, which he later piloted on its maiden flight in 1969. His name will always be associated with that aircraft. His final appointment with BAe was Director and General Manager at Filton.

Well illustrated, this attractive book is also complemented by some very useful appendices and line drawings.

RW

Tail Gunner – 98 Raids in World War II by E B 'Chan' Chandler DFC* USSR Medal of Valour. Airlife Publishing Ltd 1999. Price £19.95

In some ways the title of this book conveys the flavour of what is bound to be a remarkable story of skill, resilience and survival in face of the bleakest odds. Few log books contain over 500 hours of operational flying in Bomber Command.

His operational career commenced in April 1941 on Hampdens with 49 Squadron where, only three months later, returning from Düsseldorf his aircraft had to ditch in the North Sea – they were finally rescued on the ninth day! Shortly after commencing his second tour, again with 49 Sqn, he suffered a badly broken leg in a ground accident with Guy Gibson's car

which ensured 'rest and rehabilitation' for seven months.

He then completed two further tours with Bomber Command on Lancasters, yet again with 49 Squadron at Fiskerton and then 28 operations with 617 Squadron at Coningsby and Woodhall Spa. Written with innate modesty this book is packed with incidents.

Sadly the author did not survive to see his book in print, and it must have involved considerable efforts on the part of Mrs Constance Chandler, his widow, to word process the manuscript and see it through to publication. The book concludes with her touching epilogue.

I hope this book does well; it deserves to.

RW

War Memoirs of an Engineer Officer in Bomber Command by Bernard Martin. J & KH Publishing, Freepost SEA6558, Hailsham, East Sussex BN27 4BR. Published 1998, price to members £11.95 inc p & p.

As a young graduate from Bristol University, aged 21 and in a reserved occupation, the author volunteered and joined the RAF in 1942 as an Engineer Officer. After training he spent the whole of his wartime service with Bomber Command; firstly with 57 Squadron at Scampton, then a period with 1678 HCU at Foulsham, and for the last 18 months of the war as Daily Servicing Officer with 514 Squadron at Waterbeach where he, at a young age, had responsibility for over 200 technical tradesman.

A host of books have been published about Bomber Command, but very few by non-aircrew; this makes the book especially welcome since it captures the spirit and the trials of the period from a different viewpoint. The pressures on operational squadrons are well covered and explained, but it also brings out those at the training units who were usually equipped with aircraft 'traded down' from the front-line.

This is a very readable book, concisely yet fluently written. Recommended.

RW

We Band of Brothers by Sqn Ldr Bill Grierson. J *&* KH Publishing, PO Box 13, Hailsham, East Sussex BN27 3XQ. Price £14.95

Although there are some good factual accounts of their experiences by Bomber Command aircrew none seem to convey the joyous comradeship that made us a 'band of brothers', rather than some doomed battalion fixedly contemplating the near certainty of being shot down. 'God give me

the wit to convey the comradeship, the poetry and the laughter that made it possible to face the odds unflinchingly.' Thus Bill Grierson sets out his intention in writing this book and he certainly succeeds.

A Canadian university graduate, he joined the RCAF, trained as a navigator and flew his first operations on Whitleys with 51 Squadron in late 1941. He then switched over to Halifaxes and served with 35 Squadron, one of the first to join the Pathfinder Force in mid-1942, under one of Bomber Command's finest COs, Wing Commander Jimmy Marks. By the time he returned to Canada in mid-1943 he had completed two operational tours and become the senior navigation officer in the PFF. The rest of his war was spent mainly as Chief Ground Instructor at Boundary Bay Operational Training Unit near Vancouver, where aircrew were being prepared to fly Liberators in the war against the Japanese.

Armed with a remarkable memory, a great sense of humour, and a racy style of writing, Grierson not only describes in considerable detail what happened to him when engaged in the King's business but also recreates with the aid of many anecdotes the wartime atmosphere. At times there is perhaps too much of the general chat but rarely in his 331 pages does he fail to hold the reader's attention. In so doing he describes several of his operational sorties and touches perceptively on many of the important questions of the bomber war, especially relating to the PFF, to LMF and to leadership. He writes about his CO: 'The roles of an individual leader can be extraordinarily important, although it can be impossible to put one's finger on any tangible explanation of how it works. Under Jimmy Marks, we expected to come home. That's what Jimmy's crews did. It was as simple as that.' Sadly as Grierson records, Marks himself failed one day to come home.

On a lighter note Grierson happily recounts a variety of the bureaucratic 'nonsenses' he encountered, not least when trying to run his OTU in British Columbia, and many of his stories will bring smiles to the faces of those who experienced the wartime years – and a goodly number of those who did not. Unfortunately the book is not as well bound as it deserves to be – mine fell apart in the reviewing process – but it still merits a place on the bookshelves of all who enjoy a good and thought-provoking read about the bomber war.

HAP

RAF Fighter Command Losses of the Second World War – Volume 2

1942-1943 by Norman L R Franks. Midland Publishing Ltd 1998. Price £12.95

This series of books is immediately recognisable as a valuable reference source and is being published in a format similar to Midland's much acclaimed *Bomber Command Losses* series.

Recorded on a day-by-day basis, over 1,800 losses are identified in the two years, a period when Fighter Command progressively switched from the predominantly air defensive role of 1940-41 to the offensive mode with more and more operations against German-held territory; either escorting medium bombers, attacking targets of opportunity, or sweeps designed to engage and wear down the *Luftwaffe* fighter units.

Unlike Bomber Command there are no aircraft Loss Cards for Fighter Command, thus making the information in the squadrons' Operations Records Books even more important and where, inevitably, there were shortcomings and inconsistencies.

There are some very useful and interesting appendices, and the book is complemented by over 50 illustrations.

RW

CORRESPONDENCE

From Dr John Ray FRHistS, Tonbridge, Kent.

May I reply to Jack Dixon's attack on my book, *The Battle of Britain – New Perspectives,* which appeared in Journal 18. His lengthy letter was no surprise. Dixon contacted me in 1989, claiming to be writing 'a dramatic representation of Dowding', although he admitted to receiving an adverse report on his dramatic talents. He asked to see some of my research into the Battle of Britain which, when sent, he dismissed as 'old hat'. Dixon, unfortunately, is stuck in the Conspiracy Theory web woven inaccurately in Robert Wright's book (1969). If no plot can be discovered, then invent one. His letter certainly shows more dramatic ability than historical perception.

This tunnel vision is exemplified when expressing incredulity at my contention that the Air Ministry finally saw seven cumulative reasons why Dowding should go. There *were* seven. Dixon's outlook is simplistic, like a man believing that the assassination at Sarajevo was the sole cause of the Great War.

The immediate reason for Dowding's removal was his attitude to the Night Blitz. To judge whether or not this treatment was deserved, the historian has to examine the opinions of the time. I concur with the article on the subject written by the late Group Captain Teddy Haslam. Referring to that article, Dixon wrote to me that 'it is nothing other than an Air Ministry attempt to belittle Dowding'. It's rather difficult to reason with someone so dismissive of evidence, who wants to destroy both message and messenger.

As for Churchill's attitude, had Dixon read my book perceptively he would have recognised how the Prime Minister's unstinting support during the daylight battle changed with the onset of the Night Blitz. Dixon failed to mention that Churchill met Dowding on 14 November 1940, telling him that he was to be replaced and posted to America in the public interest, 'of which I was the judge'.

The reason I did not deal at length with Dowding's later service in 1941-42 was that the book is not a biography, but an account of events in the Battle of Britain.

Dixon's inaccuracies can be tolerated; the untruths are harder to bear. It is totally wrong to claim that I do 'not even attempt to examine the questions of who put forward what arguments to sway Churchill against Dowding'. He must read pp 156-64 and also appreciate that Churchill was

quite capable of making his own decisions.

In a moment of unusual clarity, Dixon mentions that the book has 'mastery of sources and clarity of presentation'. I should welcome the opportunity of raining similar accolades on his work, if only I could find some. Where are his books or articles, buttressed by real evidence of a political plot?; I know of none.

I am no 'Air Ministry apologist', but merely report their opinions and actions. I can only say that my findings have been well received by a number of historians and former airmen. But perhaps they got it all wrong.

In summary, I believe that Dowding was a truly great Englishman, worthy to stand beside Nelson and Drake in the nation's pantheon. The Air Ministry later treated him shabbily and never properly rewarded his achievements. He should have been promoted to MRAF and given an Earldom. This does not obscure the fact that by late 1940 a number of the nation's senior servicemen, scientists and politicians genuinely believed that it was time for him to be replaced. That is historical fact.

Incidentally, I hope that Dixon's letter to you will persuade more people to read the book and judge for themselves. So does my publisher!

Editorial Note: This correspondence is closed.

ROYAL AIR FORCE HISTORICAL SOCIETY

The Royal Air Force has been in existence for over 80 years; the study of its history is deepening, and continues to be the subject of published works of consequence. Fresh attention is being given to the strategic assumptions under which military air power was first created and which largely determined policy and operations in both World Wars, the inter-war period, and in the era of Cold War tension. Material dealing with post-war history is now becoming available under the 30-year rule. These studies are important to academic historians and to the present and future members of the RAF.

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

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

Membership of the Society costs £15 per annum and further details may be obtained from the Membership Secretary, Dr Jack Dunham, Silverhill House, Coombe, Wotton-under-Edge, Gloucestershire. GLI2 7ND. (Tel 01453-843362)

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