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RAF FIGHTER UNITS EUROPE 1939-42

BRYAN PHILPOTT

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PRELUDE

That Great Britain had any effective system of air defence in 1940 was largely due to the foresight and tenacity of one man: Air Marshal Sir Hugh Trenchard (later Marshal of the RAF Viscount Trenchard), appointed Chief of the Air Staff in 1919. The huge air force built up during the First World War was slashed from 22,000 machines and 293,000 men to just 371 machines and 31,500 men within a year of the Armistice. The all-pervading mood of revulsion against war, which governed public life for twenty years after the First World War, ensured that any kind of preparation against future dangers was achieved only in the teeth of furious and ill-informed opposition both inside and outside Parliament.

Trenchard's plans for the organisation of an efficient air force were painfully slow to come to fruition. The extraordinary 'Ten Year Rule' – an arbitrary policy based on a unilateral declaration that there would be no major war for ten years after any given date – lulled successive administrations into complacency, and the development of modern equipment was stifled. Trenchard fought back by instituting various programmes of training which would allow the rapid expansion of the embryo force in the event of war by providing a pool of trained manpower. The RAF College at Cranwell, the Technical Colleges at Cranwell and Halton, the Central Flying School, and later the Auxiliary Air Force were all monuments to Trenchard's foresight and determination.

By the early 1930s even the British Government was unable to maintain the fiction that the other major powers were committed to disarmament. In 1933 the announcement by the Air Staff of the requirement for a multi-gun high-performance fighter aircraft opened the way for the development of the Hurricane and Spitfire. In 1934 the collapse of the Disarmament Conference underlined the belated wisdom of this decision; but rearmament still enjoyed a very low priority, and 'offensive' weapons such as bomber aircraft were still forbidden. While Hitler built a modern air force in Germany, the RAF soldiered on with a tiny fleet composed very largely of obsolescent biplanes not far removed in technical conception from the aircraft of the First World War. At last, in July 1934, the Government announced its intention of increasing the RAF's strength by 41 squadrons. This five-year expansion programme would see home defence fighter squadrons increased to 75 – a programme predictably resisted in Parliament, to the extent of a motion of censure by certain elements.

The expansion programme fully vindicated Trenchard's precautions, and his training schemes prevented its being hampered by serious manpower shortages. In 1936 the RAF was split into distinct commands, each with its own air officer commanding; and the first AOC-in-C of Fighter Command, which came into existence on 6 July 1936, was Air Marshal Sir Hugh Dowding. The Command was divided into two Groups; No.11 took control of operational and administrative areas in the South, and No.12 in the North. (Upon the outbreak of war these two groups were increased to six with the formation of Nos.9, 10, 13 and 14 in the South-West, North and North-East.)

Hard planning and frequent air exercises contributed to the perfection of an air defence system incorporating the embryo radar network and close ground control of fighters – a task made no easier by the imbalance of equipment produced by twenty years of official apathy, since it was found that the new Blenheim monoplane bomber could outrun the best RAF (biplane) fighters! The new generation of fighters began to reach the squadrons in 1938; but had the Munich Crisis ended in immediate hostilities the RAF could have put only 759 fighters into the air, of which only 93 were monoplanes, to combat Germany's 1,200 modern bombers.

By September 1939, although still eighteen squadrons short of the 53 he felt necessary to defend the United Kingdom, Dowding had 22 Hurricane and Spitfire squadrons. When Hitler invaded Poland full mobilisation was announced in Britain; Britain's demands for his withdrawal went unanswered, and on 3 September 1939 the United Kingdom declared war.

FRANCE

The radio broadcast in which Prime Minister Neville Chamberlain announced to the public that Britain was at war with Germany had hardly finished before air-raid sirens wailed a warning across the south of England. A great assault by the Luftwaffe had been expected; and, mindful of the destruction caused by the *Legion Condor* in Spain, the public wasted no time in taking shelter. Precautions which had seen the evacuation of mother and children from cities to the country, the enforcement of the blackout, and the universal issu of gas-masks must have been uppermost in people' minds as the baleful wail drifted across Londo But it was an innocent French aircraft *en route* t Croydon that had caused this false alarm, the firs of many that were to disturb the uneasy calm of th first six months of the war.

The radar chain was soon to receive its mos stringent test. Although the effectiveness of th early warning given by Sir Robert Watson-Watt' invention had been tested in air exercises, ther were still some shortcomings, and the early days o September 1939 revealed the most serious of thes

Three days after the declaration of war a rada station reported an unidentified plot over th North Sea. Fighter Command immediatel 'scrambled' a section of fighters to investigate. Th

1 H.M. King George VI inspects personnel and Gladiators of No.615 Sqn., Auxiliary Air Force in France during the 'Phoney War', early 1940. A Blenheim Mk IV is visible in the background. (Imperial War Museum)

size of the approaching force seemed to increase, so a whole squadron was sent to aid their colleagues. As more and more 'hostile' aircraft appeared on the radar screens so more fighter squadrons were called into action; but despite all efforts by the ground controllers, and impassioned pleas from airborne fighter leaders for more information, no one was able to find any trace of the approaching enemy. With fuel low, some of the first squadrons to be scrambled returned to base – and as they did so, the size of the 'hostile' force decreased. Gradually, as each group of fighters landed and the plot reduced, the embarrassing truth was realised: for nearly an hour Fighter Command had been chasing their own tails.

The explanation was simple. The radar aerials transmitted their beams simultaneously in opposite directions, then picked up the return signals, thus giving the impression of two formations very close to each other when there was in fact only one, and what can be described as an echo. On this occasion every 'hostile' signal was in fact a reciprocal of a friendly formation. As more and more fighters were sent to intercept, so the size of the 'enemy' formation increased. The remedy was to screen the inland side of the fixed radar aerials so that the beam was only directed outwards in the direction from which an attack was expected.

It was fortunate that this weakness in the defence was discovered so early, but it was not without loss, for during what came to be known as the Battle of Barking Creek, two Hurricanes were shot down by Spitfires of No.74 Squadron. This incident also served to highlight the poor standard of aircraft recognition during the early days of the war, which was to cause the loss of over 600 aircraft and nearly 1,000 personnel at the hands of their own countrymen before the end of 1941. Happily, standards improved, but not before considerable pressure had been brought to bear by the authorities.*

Much of the planning for the defence of the British Isles had been based on the premise of air attacks from across the North Sea, for it was hardly

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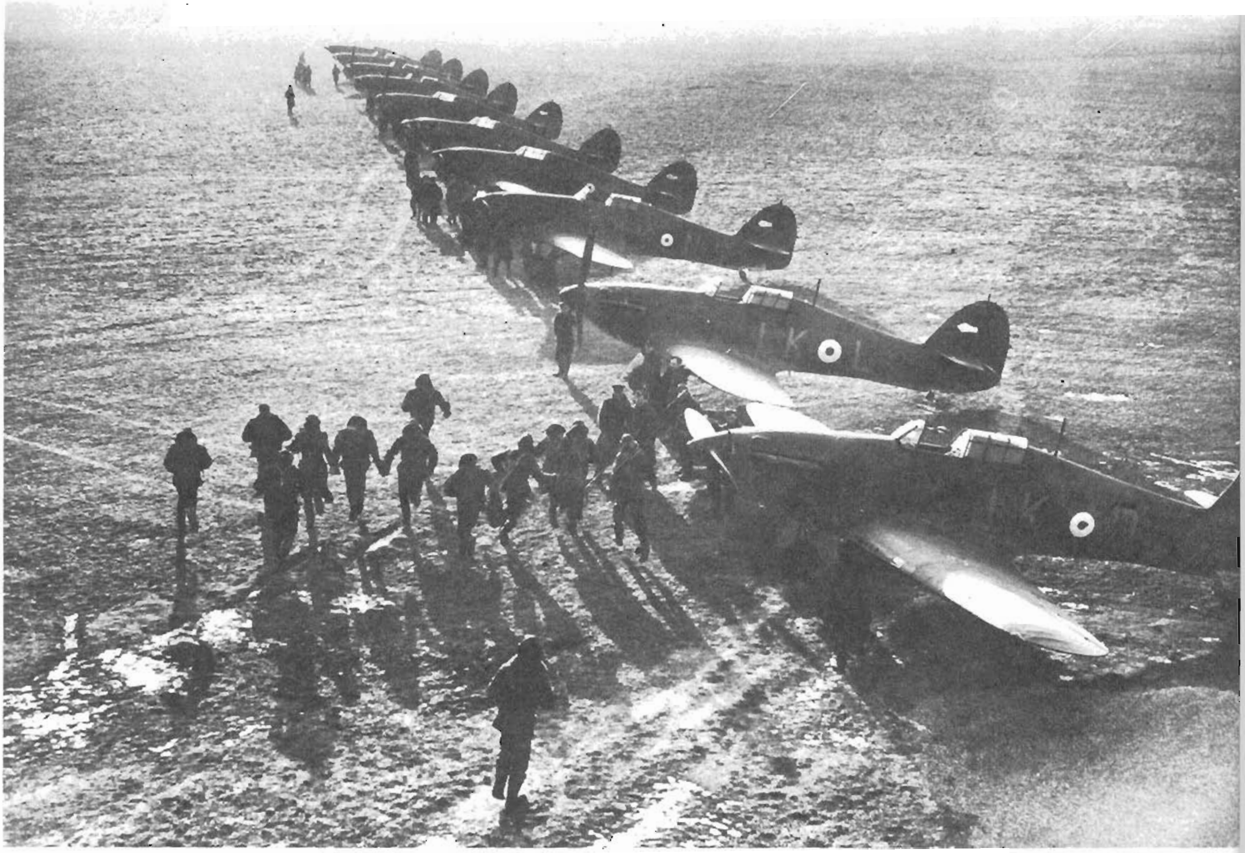
* There was a reduction of errors of 50% in 1942. By 1945 the appalling figures of 1941 had been reduced by 90%.



2 Pilots of No.87 Sqn. run to their Hurricanes; Vassincourt, France, early 1940. The aircraft carry the squadron badge on the fin in the place later occupied by the red-white-blue flash. All but three of the aircraft have the Watts two-bladed propeller. The atrocious ground conditions reflect the appalling weather that the RAF faced during the early days in France. (Imperial War Museum

conceivable that the Germans could smash the Maginot Line and take France. Dowding always believed in anticipating the unexpected, however; he therefore did not neglect the southern aspect of his defensive perimeter which was well guarded by radar and by the squadrons based at Tangmere, Northolt, Hornchurch, Kenley and Middle Wallop. The flexibility of fighter aircraft operating over their own country, with the choice of landing fields where they could be re-fuelled and re-armed, meant that almost any RAF station in the south and south-east could become an effective operational base to meet any threat irrespective of the direction from which it came. But in September 1939 the prospect was not of fighting over England, but over France, in co-operation with the French Air Force and the British Expeditionary Force.

Initially four squadrons of Hurricanes – Nos.1 73, 85 and 87 Squadrons – were ordered to France to give air cover to the BEF. The RAF Command in France comprised the Air Component of the BEF and the Advanced Air Striking Force. The latter consisted of ten squadrons of light bombers mainly Blenheims and Battles. The Air Component element, which was intended to provide support for the Army, had five squadrons of Lysanders and four of Hurricanes at the disposal of its commander, Air Vice-Marshal C. H. Blount. The whole of the British air force in France was commanded by Air Marshal A. S. Barratt. Dowding was far from happy at the loss of four Hurricane squadrons and did not subscribe to the view held by some that aircraft could be mobile enough to defend the BEF one day, then fly back across the channel to intercept hostile raiders over England the next

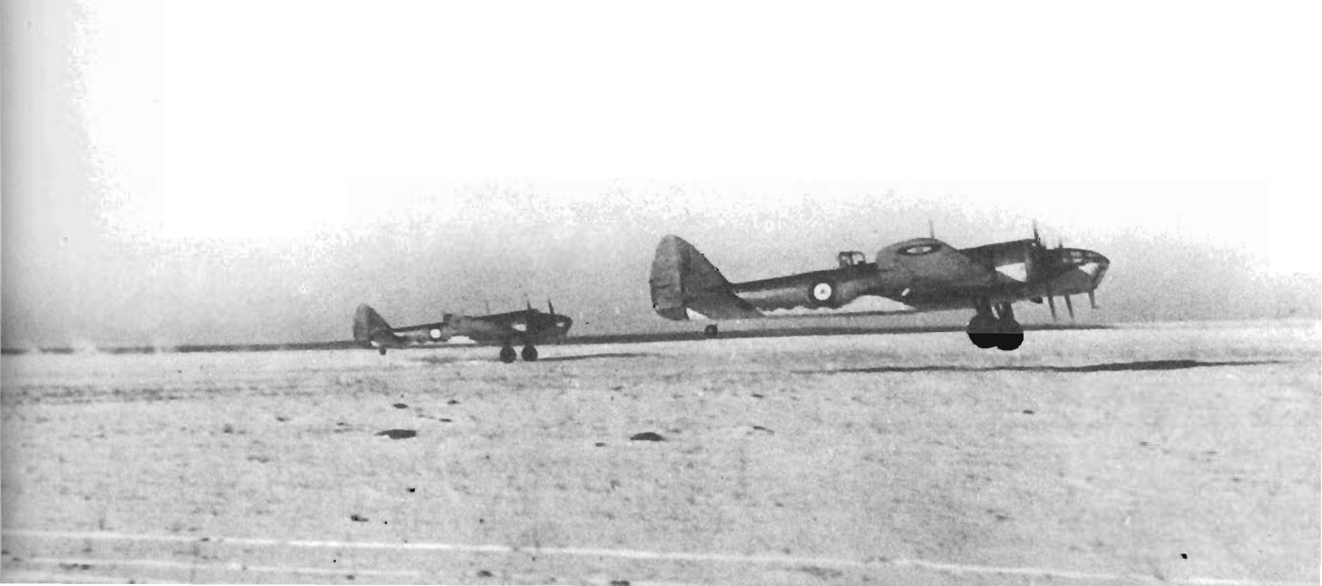
He considered that every squadron sent to France was as good as lost, and future events were to prove his philosophy correct.

Of the four Hurricane squadrons ordered to France the first to leave was, appropriately enough, No.1 which left its base at Tangmere on Friday 8 September and headed across the channel to the airfield at Octeville near Le Havre. The following day pilots worked alongside groundcrews in digging slit trenches and preparing the airfield's defences. Octeville was a large airfield with a nearly-completed hangar on one side and a convent on the other. The hangar provided familiar surroundings for the squadron's Hurricanes while the convent – evacuated by the nuns – gave the pilots accommodation far more acceptable than the tents many of them had been anticipating. Air tests, gun firing practice, formation flying and simulated combat, as well as uneventful patrols, kept the squadron busy until 25 September, when they moved to Norrent-Fontes, near St. Omer in the Pas-de-Calais.

During this period there came another example of poor aircraft recognition when Plt. Off. Ritchey, on a solo patrol, went to investigate what he thought might be an enemy formation only to find it was composed of French Air Force Morane fighters. The French pilots' aircraft recognition was not in the same class as Ritchey's; they attacked the Hurricane, which had to use its superior speed to escape. In the chase between the friendly aircraft, the Hurricane pilot became lost and had to force-land near the town of Joinville; his aircraft was not damaged but one of the Moranes, which had also run short of fuel, had to make a forced landing and broke its propeller.

Fighter cover for the AASF Battle squadrons was provided by the French; this was often inadequate or failed to materialise, and after a section of Battles had been badly mauled by Messerschmitt Bf 109s, Air Marshal Barratt was forced to transfer two of his Hurricane squadrons to the AASF. One of these was No.1 Squadron, who after a very brief stay at Norrent-Fontes were soon on the move again, this time to Vassincourt. No.73 Squadron had also been moved eastwards and were now situated at Rouvres, only 70 miles from the Maginot Line. The two squadrons formed part of 67 Wing, and No.1 Squadron often used Rouvres as a forward operating base. It was from here on 15 October that 12 Hurricanes of No.1 Squadron led by their C.O., Sqn. Ldr. P. Halahan, penetrated over 40 miles into Germany. At Saarbrücken they encountered heavy anti-aircraft fire, but at no time during the hour's flight did they see any enemy aircraft.

The precise duties of No.67 Wing were to escort bombing raids when Hitler's expected invasion of France materialised, and while waiting for this, to fly standing patrols in the hope of destroying



3 Blenheim Mk IVs of the Advanced Air Striking Force take off from a French airfield, winter 1939–40. (Imperial War Museum)

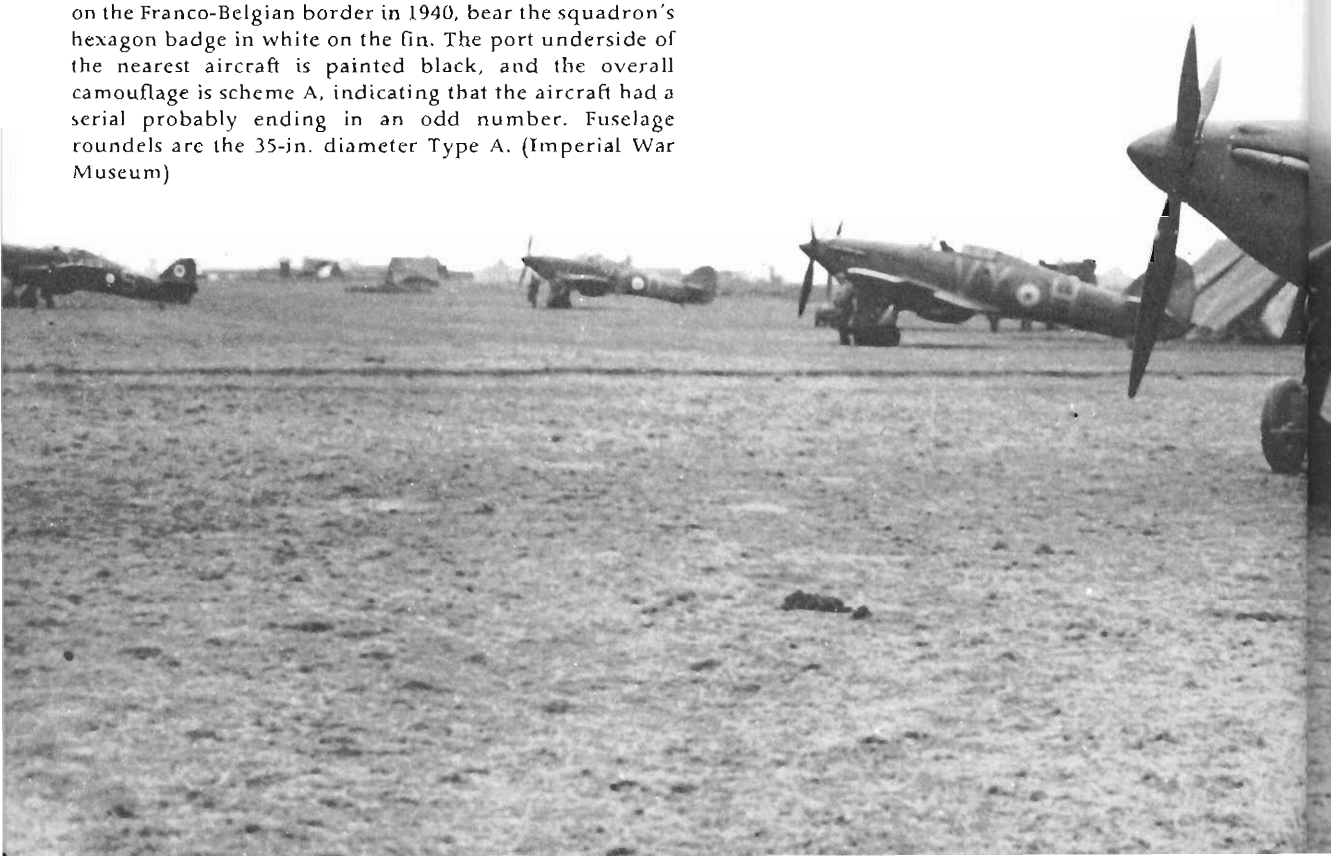
reconnaissance aircraft. No.1 Squadron was responsible for the area between Nancy and Metz and No.73 looked after the area between Thionville and Verdun. Both squadrons were flexible enough to assist in each others' areas, as well as looking after the middle sector, which had not been assigned to any unit. To protect their airfields the squadrons kept one section at cockpit readiness; and it was such a section from No.1 Squadron that was called into action on 31 October.

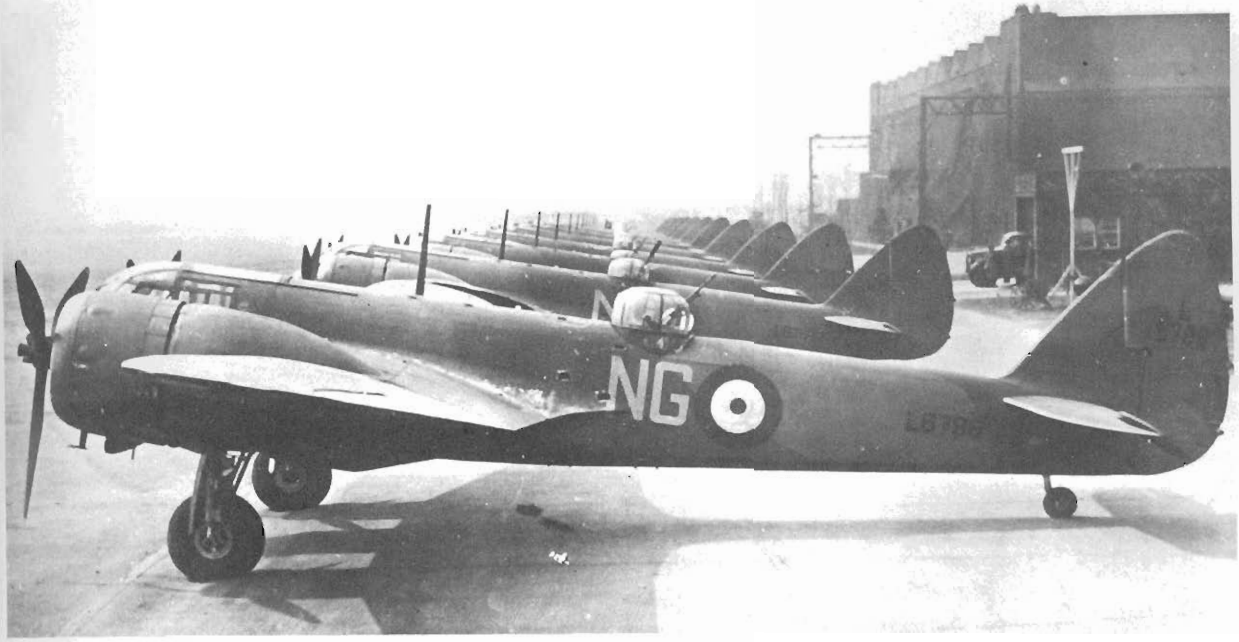
Three unidentified aircraft were spotted near Vassincourt flying at an altitude of approximately 20,000 feet. The section of Hurricanes on 'standby' were scrambled and climbed under full boost to intercept. Plt. Off. P. Mould was the only pilot to reach the enemy formation, which by now had split up; identifying his target as a Dornier Do17, he attacked from astern. A long raking burst from Mould's eight Browning machine-guns tore into the German aircraft, which caught fire and fell from 18,000 feet to crash near Toul. This was the first German aircraft to be brought down by the RAF in France since 1918, and consequently brought much publicity to the squadron as well as a morale-boosting news item for those at home.

This spasm of action did not herald any intense activity, but the pilots of the two squadrons were kept on their toes by flying exercises with No.15 and No.78 Squadrons' Fairey Battles, practising dog-fighting among themselves, and training new arrivals. The four squadrons originally despatched to France in September 1939 were supplemented in November by the arrival of two Auxiliary Air Force squadrons, Nos.607 and 615, both equipped with obsolescent Gladiator biplanes. These two squadrons were added to the Air Component of the BEF to replace Nos.1 and 73, who for some time had been with the AASF.

November saw a slight increase in aerial activity, probably due to a marked improvement in the weather, which also pleased the RAF personnel, who were becoming a little tired of the seemingly endless rain and consequent quagmires in which they had to work, sleep and relax. Nos.1 and 73 Squadrons were still foremost in the action, with the latter's Flg. Off. E. Kain accounting for a Dornier Do17 on 8 November, the first of three brought down by the squadron in that month; and No.1's C.O. and his wingman downing a similar aircraft on the 23rd of the month. Earlier the same day Flt. Lt. Pinston and two other aircraft

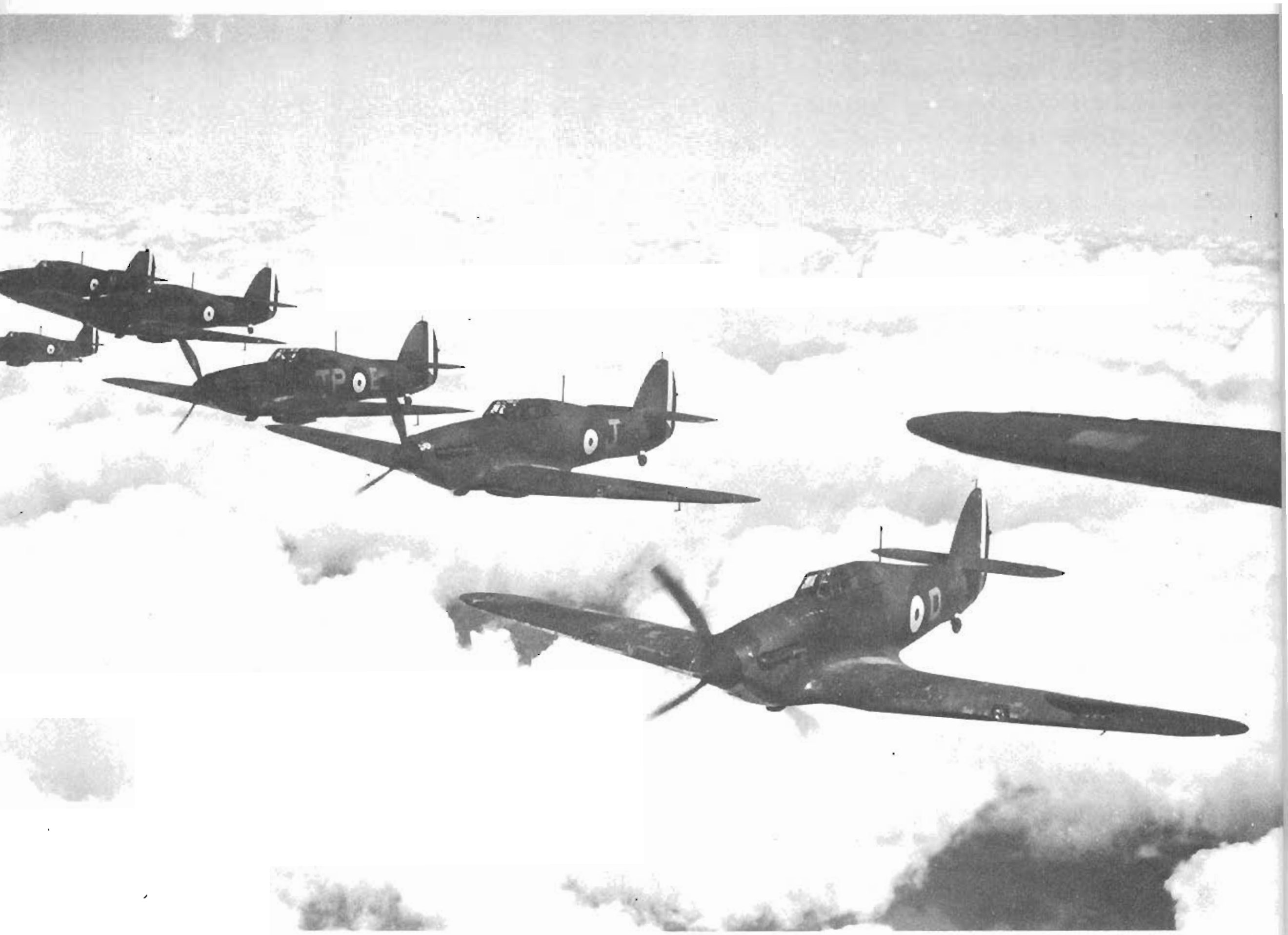
4 These No.85 Sqn. Hurricane Is, photographed at Sellin on the Franco-Belgian border in 1940, bear the squadron's hexagon badge in white on the fin. The port underside of the nearest aircraft is painted black, and the overall camouflage is scheme A, indicating that the aircraft had a serial probably ending in an odd number. Fuselage roundels are the 35-in. diameter Type A. (Imperial War Museum)





5 Blenheim Mk IFs of No.604 Sqn., Aux AF; Northolt, 6 April 1940. Note gun-pack under fuselage of nearest aircraft, which has the port underside painted black. (Imperial War Museum)

of 'B' Flight chased a Heinkel He 111 back into Germany, eventually shooting it down near Saarbrücken. During this running fight, six French fighters joined in and one of these, desperate to get to grips with the enemy, collided with Sgt. A. Clowes' Hurricane. Despite losing one elevator and most of his rudder, the sergeant coaxed his crippled aircraft back to Vassincourt. This incident highlighted the unexpected dangers of aerial combat; and another No.1 Squadron pilot had a more unusual lesson later the same day.



6 An 'echelon to starboard' of No.73 Sqn. Hurricanes over France, 1940; this unit formed part of the AASF. Tricolour stripes are carried on the rudder, mainly for identification by French fighters. The third aircraft from the right retains squadron code letters TP, painted over on the others. (Imperial War Museum)

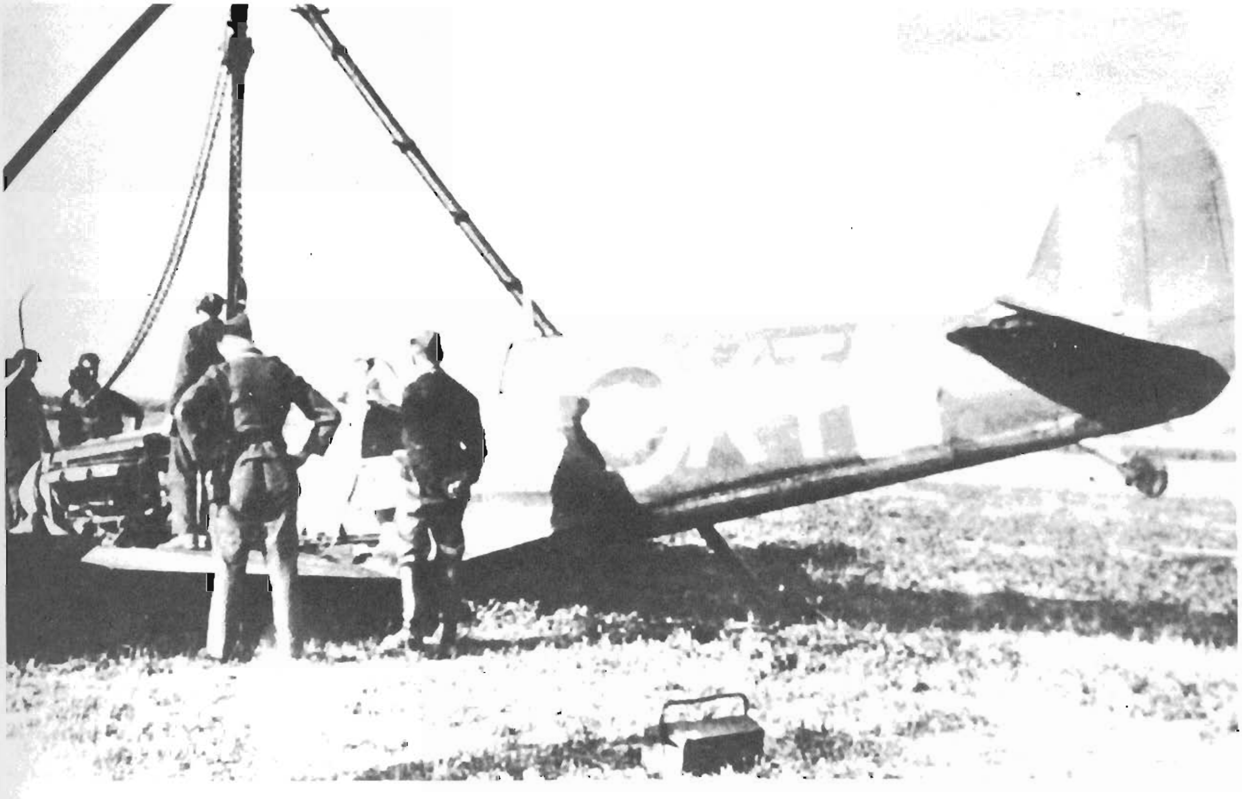
Flg. Off. C. Palmer, leading a section from 'A' Flight, intercepted yet another Dornier Do17 that had been seen passing over Vassincourt at 20,000 feet. The Dornier turned away from its original flight path when it spotted the three Hurricanes, but it was far too slow to escape their attention. Leading a classic attack from astern, Palmer set one of the enemy aircraft's engines on fire and saw two of the crew take to their parachutes. The Dornier continued to weave about the sky, and Palmer decided to take a closer look to assess the armament and markings, both of which would be of interest to British intelligence. Flying alongside the crippled Dornier Palmer noticed the pilot slumped over the controls; then, to his horror, the recumbent figure came to life, throttled back the power causing the Hurricane to overshoot, and fired a burst from the nose gun at the startled British pilot. Bullets whistled around Palmer's ears piercing his headrest, windscreen and glycol tank and causing the Merlin engine of his Hurricane to stop. While the two other Hurricanes forced the Dornier to belly-land in a field, Palmer had another battle on his hands with the dead-engined Hurricane. He force-landed it in a field close to where the bullet-riddled Dornier came to rest. The pilot of the Dornier, Unteroffizier Arno Frankenberger, was entertained to dinner by the pilots of No.1 Squadron before being returned to the custody of the French police. They found his background and training very similar to their own; any doubt about the effectiveness of Luftwaffe aircrews was quickly dispelled. One of the results of Palmer's encounter with the Dornier was that Sqn. Ldr.

7 Spitfire Mk I or II fighters being refuelled, early 1940. Background aircraft has port underside painted black and individual letter 'O' painted below the spinner. (via R. L. Ward)

Halahan borrowed some armour plate from a Fairey Battle and had this fitted behind the pilot's head in the Hurricane. Officialdom produced various arguments to support the view that this would affect the aircraft's performance; but after a convincing display of aerobatics by Flg. Off. Brown at Farnborough in a modified Hurricane, they were able to see the folly of their objections, and armour was fitted throughout Fighter Command.

The following months saw the arrival of winter with a vengeance. Deteriorating weather curtailed almost all air operations, although patrols were still flown when possible. It was during this bad weather that many Hurricane pilots, caught in low cloud and poor visibility, found the lack of suitable maps a serious handicap. Pressure had been exerted at all levels but the promised maps of the French countryside never materialised. The hard winter curtailed nearly all aerial activity; but as February turned to March, the pilots' thoughts turned to the question of when the long-awaited Luftwaffe assault would begin. Although few in number, the morale of the RAF squadrons was high and the pilots knew that in courage, skill and

8 A Spitfire Mk. IIa of No.603 Sqn. being recovered by a Luftwaffe salvage crew after coming to grief over France. (via R. L. Ward)

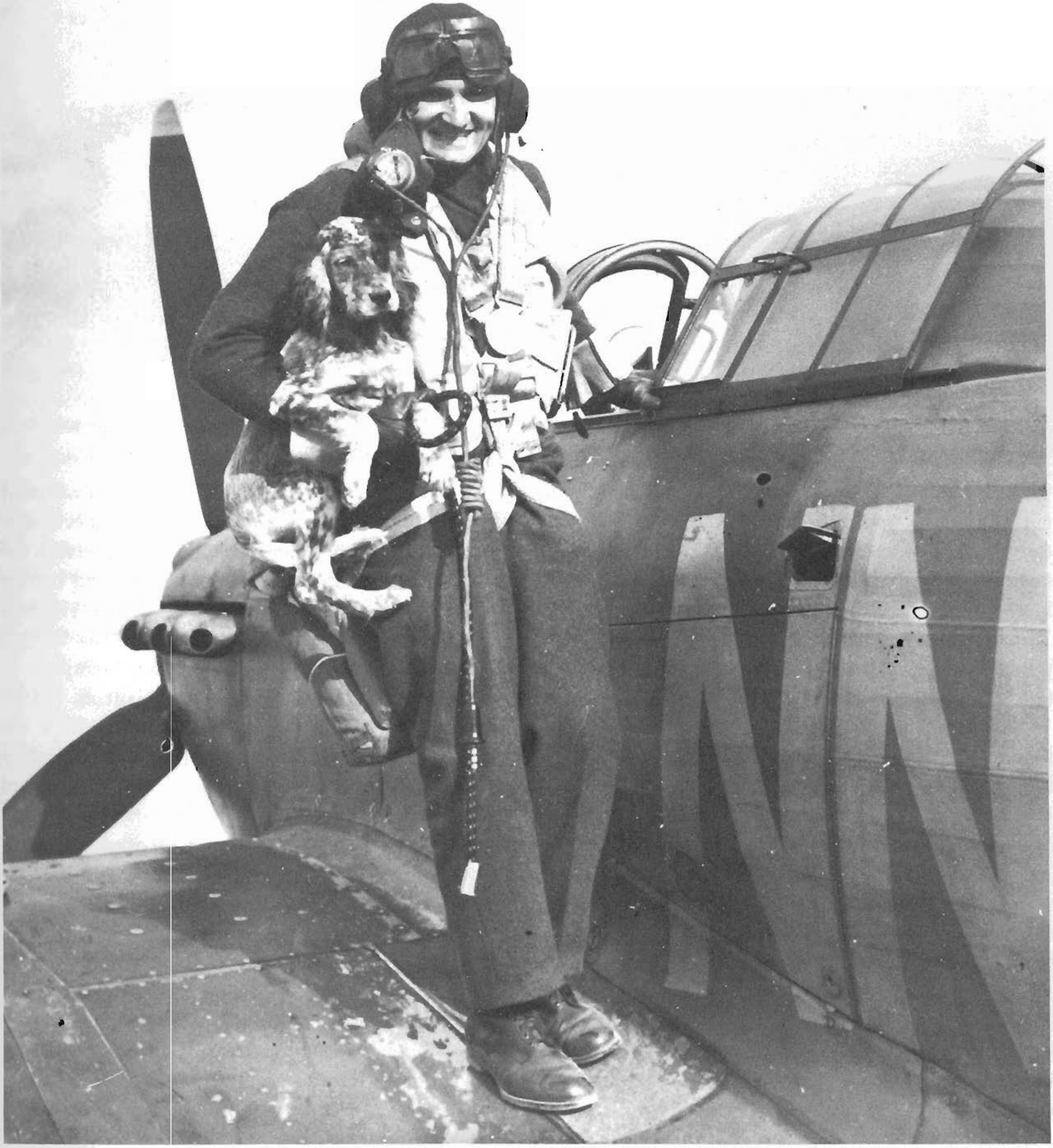


9 Aircraft unable to fly back to England due to unserviceability or lack of fuel were broken up to prevent them falling intact into German hands. A Blenheim Mk I of No.53 Sqn. shares some corner of a foreign field with wrecked Hurricanes, under the rueful gaze of a Luftwaffe officer. (via R. L. Ward)

determination they would be a match for the enemy. The two squadrons forming the fighter element of the AASF were anxious to try their Hurricanes in combat against the much-vaunted Bf109 and Bf110.

The first opportunity to match the Hurricane and Bf109 came on 29 March, when three aircraft of No.1 Squadron were attracted to anti-aircraft fire near Metz. They discovered that the attention of the French gunners was being directed at a pair of Bf109s, which they immediately tried to engage. Plt. Off. Matthews saw three more enemy aircraft closing on Flg. Off. Palmer and frantically called to his leader to break to starboard. Palmer threw the Hurricane into a diving turn so enthusiastically that he momentarily lost control and spun 10,000 feet before regaining control. Meanwhile Flg. Off. Ritchey out-manoeuvred one of the 109s and hit it with a long burst which sent it spinning down apparently out of control. The aircraft was not seen to strike the ground so Ritchey was only credited with a probable, but Luftwaffe records show that a Bf109 of III/JG53 was lost that day in the area of combat.

The twin-engined Bf110 still eluded the RAF, although 73 Squadron had grappled with it early in March without achieving any conclusive evidence as to its performance. But on the same afternoon as the destruction of the 109, Flg. Offs. Walker and Stratton and Sgt. Clowes met nine 110s at 25,000 feet over Metz. In the following combat the German 'twins' formed a defensive circle; the British pilots noticed that the rear gunners rarely fired their weapons, and this was attributed to the high 'G' forces being pulled by the turning aircraft. All three pilots claimed hits on the German formation, and a concerted effort by Walker and Stratton sent the leader down. The wreckage of the aircraft was found near Bouzanville, and this proved to be a 'meal ticket' for the three pilots, whose commanding officer wasted little time in claiming the prize of a dinner offered by Air



10 A pilot of No.310 (Czech) Sqn. greeting his dog after an operational patrol, 1940. He wears early pattern flying helmet and oxygen mask, and has apparently used an old pullover as flying dress. (Imperial War Museum)

Marshal Barratt to the first pilot to shoot down a Bf110!

The flourish of activity at the end of March heralded a busy April which brought increased intervention from German fighters, which up until now had made only sporadic appearances. But the days of quiet were drawing to an end, and on 10 May 1940 what had been until then the 'Phoney War' erupted into bloody action. On that day the Germans invaded Holland and Belgium

11 Hurricane Mk I of No.85 Sqn. on patrol during the Battle of Britain, finished in camouflage scheme B and with an AI-type fuselage roundel with yellow surround. (Imperial War Museum)

without making any formal declaration of war, their bombers attacking aerodromes, cities, communication centres and troop concentrations as soon as dawn broke. 10 May also brought more RAF squadrons to France with the arrival of Nos.3, 79 and 504 Squadrons to reinforce the Air Component of the BEF, and Nos.17, 242 and 501 Squadrons to the Advanced Air Striking Force.

Near Rheims, No.501 Squadron underwent an immediate baptism of fire. On arrival at their airfield, Betheinville, one of the Bombay transports carrying spare pilots and groundcrew crashed on landing, killing nine of those on board. Two hours later a Dornier strafed the airfield while airmen were erecting the administrative and accommodation tents. No casualties resulted, but following this early encounter with the enemy no one needed urging to dig his slit-trench. Later the same day the balance was redressed, when Flg. Off. A. Pickup intercepted a Dornier near Vouziers and shot it down, giving No.501 Squadron's morale a necessary boost.

During the following days action was fast and furious along the whole front, with the hard-pressed fighter squadrons giving good accounts of themselves whenever the enemy was met. The advancing Germans swept everything before them as they put into action their plan to cut through the Ardennes and up behind the Maginot Line and the BEF. The speed of the German advance caught the Allies by surprise, and as airfields were evacuated ground installations, equipment and unserviceable aircraft had to be destroyed. At some places the advance was so fast that those left behind had no time to carry out any form of destruction. This was the case at Maastricht, where the Maas bridges were now in the hands of the German Army.

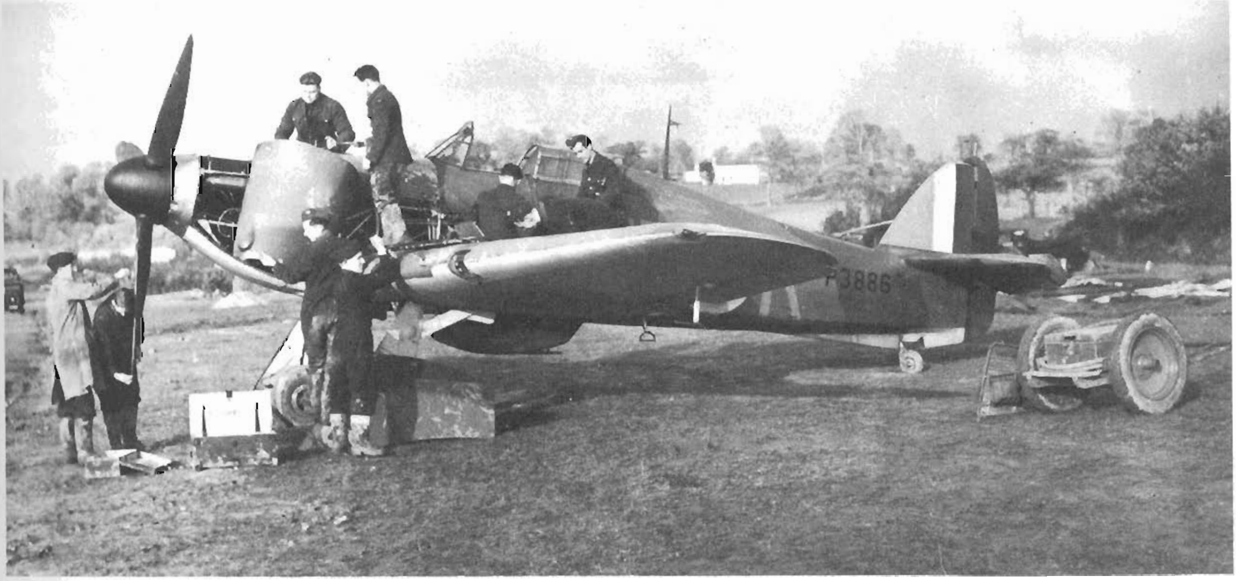
The Fairey Battles of No.12 Squadron, led by Flg. Off. D. Garland, were detailed to attack the bridges while No.1 Squadron provided fighter cover. Completely outnumbered, the Hurricanes tried desperately to draw the Bf109s away from the Battles; but although they destroyed seventeen they could not prevent the annihilation of the bombers, of which only one returned to its base. For their leadership and determination Garland and his navigator, Sgt. T. Gray, were both posthumously awarded the Victoria Cross. These were the first two to be awarded to the Royal Air Force in the Second World War, and it is interesting to note that Sgt. Gray was an ex-Halton apprentice who entered the service under one of the schemes adopted during Trenchard's period of building a nucleus of dedicated professionals. A few miles away another ex-Halton apprentice, Sgt. S. Allard, was flying a Hurricane of No.85 Squadron; he, too, acquitted himself well, claiming ten aircraft destroyed in a period of one week.

The futile struggle in France continued, with the heavily outnumbered fighter squadrons trying desperately to hold up the advancing Germans; but it was a lost cause, and gradually squadrons became separated from the command structure, having to make their own way back towards the Channel coasts. Orders were given to destroy aircraft that were unable to fly as well as fuel and equipment. On one occasion five pilots of No.501 Squadron found, on returning from a patrol, that their airfield at Betheinville had been abandoned in face of the advancing enemy and all that was left was a cadre of groundcrew with instructions to destroy all that was left. A corporal was determined to carry out his orders to destroy the fuel dump and the five pilots, although admiring his devotion to duty, had to take a very firm line with him before they could re-fuel their Hurricanes.

As more of the country fell into enemy hands the problem of anti-aircraft fire from the ground increased, as the Germans moved mobile anti-aircraft guns into the front line. Ground fire could be deadly accurate; so, added to the fighter pilot's task of searching the skies for enemy aircraft, came the necessity of looking out for the tell-tale flash and puff of anti-aircraft shells. Strapped into the confines of his cockpit with oxygen mask and headset encasing his head, the pilot would be unaware of any noise apart from the crackle of his radio and the roar from his engine. The first knowledge he had of anti-aircraft fire was a billow of smoke from the bursting shell, a thud as metal struck the aircraft, or the dropping of a wing as the air became turbulent from a succession of exploding shells. Such turbulence could be enough to make a pilot lose control; on one occasion Flt. Sgt. Payne of No.501 Squadron had his Hurricane torn from his grasp and thrown into a half-roll, and lost over 200 feet before he regained control.

Dowding could see that to pour more help into France could only lead to a serious dilution of defences in England. So on 16 May he wrote his now-famous letter to the Chief of the Air Staff in which he pointed out that he needed at least 52 squadrons to defend the British Isles, and that this number had already been depleted to 36 by the reinforcement of France. As a result of this submission no further fighter squadrons were despatched, and every attempt was made to recover as many aircraft as possible from across the Channel.

Air Vice-Marshal Keith Park, the commander of No.11 Group, was instructed to provide air cover for the withdrawal of the BEF from Dunkirk by



12 Tangmere, 1940; Hurricane Mk. I, P3886, UF-K of No.601 (County of London) Sqn., Aux AF, undergoing servicing. Note the dress of the groundcrew, ranging from denims to service dress – the coat-type overall is of interest. Note also 'trolley acc' near the tail – the normal type of service accumulator used for starting. This aircraft has the type of fin flash applied at the Hawker factory, comprising two 9-in. stripes of white and blue, the forward part of the fin being painted red overall. (Imperial War Museum)

using home-based units, which in turn would be supported by those squadrons still able to operate from French bases. On 20 May the 2nd Panzer Division – part of General Heinz Guderian's Panzer Corps – reached Abbeville, thus effectively trapping the remains of BEF, three French Armies and what was left of the Belgian Army, in the small port of Dunkirk. For four days German armour supported by fighter cover and dive bombers steamrollered through the French countryside, capturing Bolougne and isolating Calais; then, miraculously – as far as the trapped armies were concerned – the advance halted. This respite gave time to despatch the armada of small boats which had been waiting to carry out the evacuation. Bad weather helped restrict Luftwaffe activity, but on 1 June Göring ordered an all-out attack on the beaches which broke through the defensive ring of British fighters.

Many aerial battles had been fought well behind the perimeter of the beaches, as the Hurricane, Spitfire, Blenheim and Defiant pilots considered that to attack the enemy before they arrived at the beachhead was better than engaging them over the beleaguered troops. This, and the fact that the heavy attacks on 1 June occurred when the beaches were at their most congested, led to a popular belief among the Army that the RAF had not given them the protection it might have done. Facts show otherwise, for on 1 June the RAF destroyed over 30 German aircraft, losing a similar number themselves. During the nine days of the evacuation the RAF flew 2,739 fighter sorties in direct support of the operation.

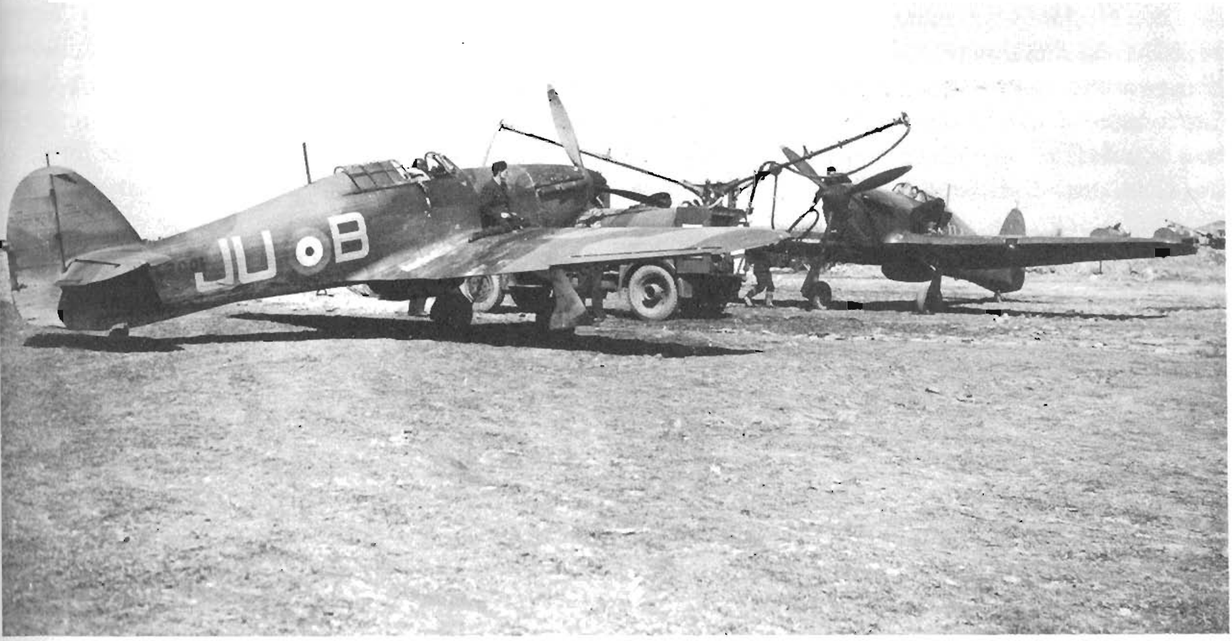
13 Petrol supplies being delivered into an airfield's main storage tanks from a delivery tanker. At left, the equipment officer, whose responsibilities included checking the quantities delivered. (Imperial War Museum)

The lessons of France and Dunkirk were ve costly, both in men and machines. When t evacuation of the RAF from France began on May only 66 of the 261 aircraft operating with t Air Component of the BEF could be flown back England. In ten days nearly 25% of the total R strength of modern fighters had been lost. Duri the operations in May and June, 432 of the total 959 RAF aircraft lost were Hurricanes and Sp fires. Although the Luftwaffe had lost 1,284 ai craft during this period, the scales were still tipp firmly in their favour as far as quantity of availab aircraft and aircrew were concerned. On 5 Ju Fighter Command had a total strength of 4 serviceable aircraft of which 331 were Hurrican and Spitfires, and just over 1,000 experience pilots; in the months to come production of ai craft was dramatically increased, but it was not easy to produce pilots, and this was where Dowdi was to encounter his biggest problem.

The lessons learned in France between 10 Ma and 3 June were to prove invaluable, but the o Spitfire and eight Hurricane squadrons that ha suffered most from the experience had been th élite of the service. Most of the pilots lost had bee regulars or reserve airmen trained in peacetim in the normal course of events they would hav been the leaders of the new squadrons now bein formed. Their loss was to be felt keenly th summer.

NORWAY

During the battle for France efforts were bein made in England to increase the strength of Fight Command as quickly as possible. In Septemb 1939 fewer than 100 Spitfires and Hurricanes month were leaving the production lines, and wit only 22 squadrons, two of which were to b despatched to France, Dowding was far short of th 62 he needed to defend the British Isles. He wa promised two squadrons equipped with the Blen heim IF – a 'fighter' version of the twin-engine bomber, which happily never met the Luftwaffe i any strength – but asked instead for four hal squadrons which he could expand to full strengt



14 Hurricanes of No.111 Sqn. refuelling from an Albion 350 Bowser at Wick, February 1940; at this time the squadron's role was to give air cover for shipping entering and leaving the Scapa Flow naval base. (Imperial War Museum)

later. Sir Cyril Newall, Chief of Air Staff, advised an Air Staff meeting on 17 October that Dowding must have 18 half-squadrons by the end of November. By December the 18 embryo squadrons had been formed, and although initially they were mainly equipped with Blenheims, by the time they were really needed in the following spring half of them were flying Hurricanes and Spitfires, giving Fighter Command 38 monoplane-equipped squadrons in their total strength of 47. It was not only France which made demands on the home-based squadrons, for the campaign in Norway, much shorter but equally bitter, led to the complete loss of two fighter squadrons.

On 9 April 1940 General Geiseler's Fliegerkorps X provided air cover for the German invasion of Denmark and Norway. By the end of the day Denmark had surrendered and the Norwegian airfields of Oslo-Fornebu, Oslo-Kjeller, and Stavanger-Sola were in German hands. The token resistance offered by the Gladiators of the Norwegian Air Force was soon brushed aside and the following day Bf109s occupied the fields from which they had been operating. At the time of the German invasion the British had been planning to occupy Narvik in an attempt to deny Germany the occupation of Norway. British forces landed unopposed on 15 April, with further landings at Namsos and Andalsnes during the following three days.

The force that landed at Andalsnes was accompanied by the Gladiators of No.263 Squadron, under the command of Sqn. Ldr. J. Donaldson, which took up a forward position flying from the frozen lake at Lesjaskog. The following morning the squadron drew first blood when an He115 seaplane was destroyed, but the glory was to be short-lived; at 0700hrs a large force of He111s bombed

15 Checking the controls on an Albion 350 Bowser as fuel is pumped into an aircraft. (Imperial War Museum)

the lake. Flt. Lt. Miller managed to get his Gladiator airborne and shot down one of the raiding Heinkels, but two more raids later in the day saw the destruction of ten Gladiators and the end of the lake as a base of operations. Within three days all the Gladiators had been destroyed, and the remains of No.263 Squadron were re-embarked for England on 26 April. However, they returned aboard the carrier *HMS Glorious* with eighteen new Gladiators on 14 May, and immediately began flying standing patrols. On 22 May the squadron flew 54 sorties, but once again they found it difficult to keep the Gladiators serviceable in the extreme cold, and the pilots in their open cockpits were soon suffering badly from the weather.

Although the Luftwaffe continued to destroy the Gladiators on the ground they did not have it all their own way, and on 26 May the squadron destroyed five enemy aircraft and damaged two others. In the meantime, on 24 May, the Gladiators had been supplemented by the arrival of 46 Squadron's Hurricanes (also aboard the *Glorious*). Four days after their arrival Flg. Off. Lydall opened the squadron's account when he shot down a Ju88, and by nightfall on the same day two more German aircraft had fallen to the guns of the Hurricanes.

Increasing German pressure, shortage of supplies, and the unfamiliar operating conditions gradually forced the British force to withdraw, and it came as no surprise when evacuation commenced on 3 June. The Gladiators and Hurricanes covered the withdrawal of the troops and at times even went onto the offensive, strafing any German transport they happened to encounter. On 7 June the two squadron commanders were ordered to destroy their aircraft, but they argued against this and eventually received permission to fly them aboard the *Glorious*. None of the pilots involved had ever made a deck landing, and in aircraft that were not equipped with arrestor gear the whole operation was fraught with danger. It says much for the training and fortitude of the pilots that not one aircraft was damaged. Tragically, this feat of airmanship was to no avail; the following day the *Glorious* encountered the *Scharnhorst* and *Gneisenau* and was sunk. It took with it the Gladiators and Hurricanes, as well as all but two of the pilots who had so skilfully flown them aboard.

THE BATTLE OF BRITAIN

During the early days of the war, while som squadrons in France and Norway tasted action o various intensity, those in England were forced t adopt a more passive role. The Luftwaffe confine their activities to sporadic raids on shipping an coastal ports. A great deal of the German effort wa at this time, being directed at watching and attacking the British Fleet. Although the Spitfire had t wait until May 1940 and Dunkirk before it me really tough fighter opposition, it had been activ prior to this and achieved the distinction of shooting down the first enemy aircraft to fall on Britis soil in the Second World War.

On 16 October 1939 two Scottish Auxiliary Ai Force squadrons, Nos.602 (City of Glasgow) an No.603 (City of Edinburgh), based at Grangemout and Turnhouse respectively, were alerted after high-flying reconnaissance aircraft had been see over the Firth and Rosyth naval base. The expecte bombing raid materialised and Red Section of 60 Squadron, led by their commanding officer Sqn Ldr. E. H. Stevens, made contact and chased th enemy formation out to sea. One of the raiders, Heinkel He111K, was shot down into the sea afte a regulation attack, which consisted of the aircraf forming line astern and each attacking in turn. Thi method of interception was the prescribed way bu

16 Gloster Gladiator Mk II, N2308, HP-B of No.247 Sqn. at Roborough in August 1940; this was the only squadro equipped with the biplane fighter during the Battle o Britain, during which period it operated from Plymout and St. Eval. (via R. L. Ward)

the squadrons soon found it dated and impractical – by the middle of 1940 it had been abandoned in favour of the loose pair system which was used by the Germans. This method consisted of a section flying in pairs, each leader having a wingman covering his tail. In the heat of combat this was found to be much more flexible and reliable than the 'follow-my-leader' system used by 603 on 16 October. However, on that occasion and again on 28 October, when the two squadrons shot down another Heinkel He111K into the heather of Lammermuir near the village of Humbie, it proved effective. (It must be remembered that the Heinkels concerned had no fighter escort, so the Spitfires had little to distract them while they formed up.)

The young but experienced pilots of the Auxiliary Air Force had justified the faith placed in them by Trenchard, and his insistence on forming a 'part-time' air force, much criticised by the cynics, was starting to pay dividends. In the months ahead it was to be completely vindicated.

On 30 June 1940 the German army was poised along the French coast; few gave the beleaguered British much chance of survival, and when the Channel Islands were occupied it seemed that it would be only a matter of time before the Germans crossed the few miles of water that separated them from England. The leaders of the German forces had a marked respect for the Royal Navy, however, and were reluctant to launch their troops across the Channel whilst it remained active. It was considered possible to undertake the invasion if the Luftwaffe could gain control of the skies over the Channel, thus helping to keep the Royal Navy occupied. So the first task was to neutralise the Royal Air Force, a task which many German leaders considered to be a mere formality, firmly believing as they did that the losses suffered in France and over Dunkirk had reduced the RAF to a token force.

In early June 1940 the RAF could muster a total of some 450 fighters, of which only 331 were Hurricanes and Spitfires, to face the three Air Fleets totalling 1,000 long-range bombers, a similar number of fighters and 250 dive bombers, assembled by the Germans in the Low Countries, France, Norway and Denmark. But under the dynamic leadership of the new Minister of Aircraft Production, Lord Beaverbrook, the whole aircraft industry was working flat-out to redress the balance. By the end of June it had delivered nearly 1,600 aircraft, and followed this staggering achievement with similar numbers in July and August, so that by August Dowding had 704 serviceable fighters at his disposal of which 620 were Spitfires and Hurricanes. More important, the reserves of these two types had been built up from a miserly 36 to a healthy 289.

The month of June brought gradually increasing air activity, with the enemy appearing almost every day and most nights. Interception during daylight presented few problems when compared with those attempted during the hours of darkness, for at this time there was no really effective night fighter in service. Some day fighter units received authority to try night interception but the danger involved in flying Hurricanes and Spitfires (especially the latter) at night far outweighed any damage that might be done to the enemy. Having to adjust his vision to the darkness, occasionally being blinded by searchlights, avoiding anti-aircraft fire, and searching for the intruders, proved far too much for the average day fighter pilot. An exception was the night of 19 June when Flt. Lt. A. G. Malan of No.74 Squadron, flying a Spitfire, destroyed two enemy raiders. Taking off just before midnight, Malan quickly adjusted to the darkness, striving to ignore the blue flames from his exhausts. Heading towards the coast and straining for height, he saw an enemy aircraft illuminated

17 Pilot Officer A. G. Lewis of No.85 Sqn. prepares to board his Hurricane Mk I at Croydon, September 1940. The mechanic has started the engine while Lewis adjusts his parachute harness; helmet and oxygen mask lie on the tailplane. (Life Magazine via R. L. Ward)

by searchlights at about 8,000 feet. Swinging the Spitfire behind his quarry Malan closed the range to 200 yards, then fired his eight Brownings into the unsuspecting bomber. One four-second burst, during which the range closed to 50 yards, was enough to send pieces spinning off the stricken bomber, and oil spattered across the Spitfire's windscreen; it flicked on its back and plummeted to earth. Climbing to 12,000 feet, Malan was soon attracted by another searchlight beam and again found an enemy bomber. This time he fired five two-second bursts, and saw smoke pour from one engine and some of the crew bale out before the bomber went into a spiral dive from which it never recovered. Landing the Spitfire with its narrow track undercarriage could be unnerving even to the expert, but Malan returned safely to base.

During his aerial combats Malan had flashed his downward identity lights at the searchlights before commencing his attack, and reported that he had not seen any anti-aircraft fire, so presumably his recognition signals had been identified. But Sgt. Lacey of No.501 Squadron was not so lucky when, on a similar night patrol – this time in a Hurricane – he found a Heinkel He111 coned in searchlights about two miles ahead of him. Climbing the Hurricane as fast as he could, he was horrified to see that some of the lights started to search for him; he quickly flashed the 'letters of the day' on his downward light and at the same time saw the Heinkel crew fire two flares from a Very pistol. Lacey assumed the bomber was trying to confuse the ground defences by firing what the crew hoped would be the 'colours of the day'. He quickly discovered that their ruse worked when the lights switched to his Hurricane and anti-aircraft shells started bursting around him. On landing he discovered that it was past midnight, so both the colours and letters of the day had been changed; he had flashed the incorrect identification while the Heinkel, by luck, had fired the correct colours, or colours close enough to fool the ground gunners.

Night-fighting in single-engined day fighters was very much a hit-or-miss affair, but there were already moves afoot to equip twin-engined fighters with airborne radar which would detect the enemy and enable the operator to vector his pilot into an interception position. One of the first aircraft so equipped was the Blenheim IF; and on 18 June such a machine of No.29 Squadron, operating from Debden and flown by Plt. Off. J. Humphreys with Sgt. E. Bee as his radar operator, was in action. The Blenheim located a Heinkel He111 near Bury St. Edmunds, and Sgt. Bee carefully positioned his aircraft below and to the rear of the intruder. Closing the range to 40 yards, Humphreys made visual contact and opened fire with the four 0·303 Brownings mounted in a pack under the fuselage. Immediately the Heinkel's port engine started to smoke, but its gunners returned the Blenheim's fire, hitting it in the starboard petrol tank and putting the hydraulics out of action. The British fighter was forced to withdraw from the action but the Heinkel was severely damaged and was last seen on fire, so it is doubtful that it reached the sanctuary of its own base. On the same evening the score was somewhat balanced when a Blenheim flown by Plt. Off. Barnwell failed to return from night operations. The Blenheim was far from the complete answer to the night-fighter problem but its successor the Beaufighter, with its more sophisticated radar and heavier armament, started to turn the tables Fighter Command's way later in the year. Long before that the Boulton Paul Defiant had also been introduced into the night-fighter rôle, in which it was more successful than it had been in daylight operations.

The Defiant was conceived as a two-seat fighter with a single-seat performance, and had its arma-

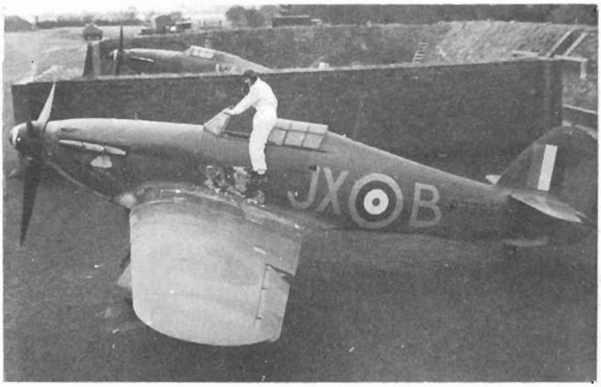
18 Lewis is helped into the cockpit of VY-R; the port shoulder strap of the Sutton harness is under the mechanic's right hand. The protruding plate forward of the cockpit was to shield the glare from the exhausts during night flying. (Life Magazine via R. L. Ward)

19 Archetypal street scene during the daylight blitz on London; a Cockney barrow-boy sells fruit under a defiant placard. (Imperial War Museum)

ment contained in a turret situated behind the pilot; it lacked any form of forward armament. It was ordered into quantity production during the pre-war expansion programme and in 1940 was ready for action with No.264 Squadron. On 12 May first blood went to the squadron when six of their aircraft, patrolling the Dutch coast in conjunction with No.66 Squadron's Spitfires, shot down a Ju88. The following day, while attacking troops, Defiants also accounted for four Ju87s, but they in turn lost five out of six when they were bounced by Bf109s. This early confirmation of the Defiant's vulnerability when faced with single-seat fighters was not digested, and it proved to be a costly error.

During operations over Dunkirk the Defiant proved a success. From certain angles it strongly resembled the Hurricane; when enemy aircraft saw a formation and closed in astern, they were often surprised to come under fire from the rearward-firing Brownings, and many of them realised too late that the 'Hurricanes' were Defiants. On 29 May No.264 Squadron claimed to have destroyed 37 enemy aircraft over Dunkirk, and although later research has shown that the number was probably nearer 14, the boost to the crews' morale was enormous. Six weeks later the Defiant crews faced grim reality. No.141 Squadron, hoping to achieve the success enjoyed by 264, were moved forward from their base at West Malling to Hawkinge, and at mid-day on 19 July were ordered to patrol off the coast near Folkestone. The squadron had only been in the south for one week and so far had not encountered the enemy.

Without any prior warning the Defiants were set upon by ten Bf109s of JG 2 *'Richthofen'*, and as they broke in disarray, with the gunners trying to bring their turrets to bear, another flight of Bf109s joined in. In under a minute four Defiants were shot down, and of the eight crewmen aboard only Plt. Off. J. Gard'ner survived. Flt. Lt. I. Donalds' aircraft was set ablaze, and he strove to control it while his gunner, Plt. Off. Hamilton, extricated himself from his turret. This was a difficult and dangerous task which very few Defiant gunners ever achieved; on this occasion Hamilton did escape from the aircraft, but he was never found. Donalds perished when his aircraft crashed near Dover, as by this time he was too low to take to his parachute. Of the nine Defiants only four returned to Hawkinge; one of these crashed when its engine cut out, and of the three that landed one was so badly damaged that it never flew again. Having lost twelve aircrew and seven aircraft in one day the squadron was finished as an efficient fighting unit. Within a few days it was withdrawn to the North, where it re-equipped and flew convoy patrols. Just one month later the other Defiant squadron, No.264, suffered a similar fate. As part of 11 Group, it was based at Hornchurch but operating out of Manston. The folly of leaving the squadron in the front line after the massacre of No.141 Squadron is hard to understand; similarly, placing the unit at a forward base where speed in getting airborne was essential also

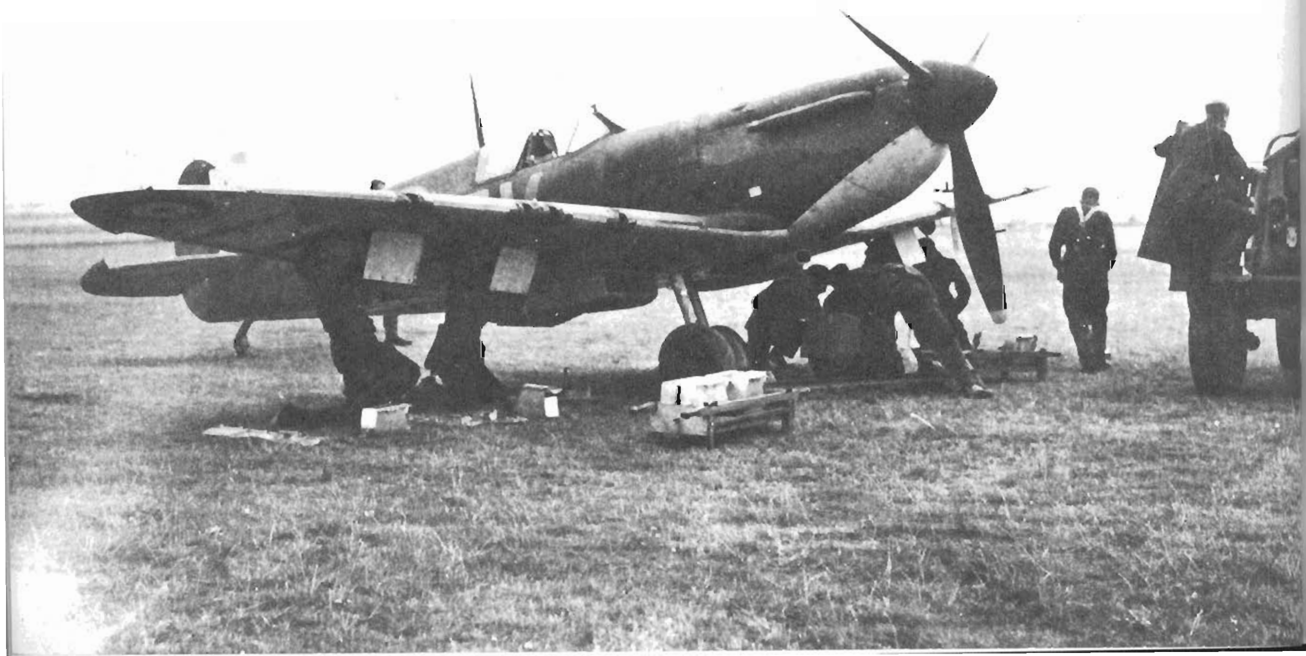


20 P3395, JX-B of No.1 Sqn. at Wittering, October 1940. This Hurricane Mk I, flown by Flg. Off. Arthur Clowes, DFM, is the subject of the five-view colour painting. Clowes, a veteran of the Battle of France, had stripes painted on the tail of his wasp insignia to indicate his victories. Note the dispersal pens. (Imperial War Museum)

21 Pilots and air gunners of No.264 Sqn. Defiant aircraft relax between sorties during the Battle of Britain. Early pattern 'Mae West' life jackets are worn over service dress, and a helmet with oxygen mask and radio microphone lies on the table. (Imperial War Museum)

seems illogical, for the procedure of getting aboard the Defiant and strapping in – especially as far as the gunner was concerned – was much more time-consuming than with a Hurricane or Spitfire. On 24 August three of No.264 Squadron's Defiants were shot down in the morning, two were written off when they collided whilst taxying, and late in the afternoon a sixth was destroyed in combat with Bf109s. All six crewmen, including the squadron C.O., Sqn. Ldr. Phillip Hunter, were killed in the morning combat, while the pilot was wounded and the gunner killed in the afternoon clash. Two days later the squadron was back in action, and although they lost three more aircraft they were able to strike back at the enemy. Flt. Lt. Banham destroyed a Do17 before being hit by an explosive shell; he and his gunner both baled out but although Banham was rescued after 1½ hours in the sea, his gunner was not found. In the same action two sergeants, E. Thorne and F. Barker, shot down two Do17s before breaking off further engagements when their aircraft developed an oil leak. On the way back to base they were attacked by a Bf109, and although the Defiant was set ablaze Sgt. Barker fired all his remaining ammunition at the enemy fighter and saw it crash a few hundred yards from the spot where his Defiant force-landed. The Defiants were engaged in only one more action: this occurred on 28 August, when four were shot down and only three of the squadron's twelve escaped any damage. The squadron was withdrawn from the unequal struggle, and after reforming turned to the night-fighter rôle. It soldiered on with Defiants until they were replaced by the Mosquito NF11 in 1942.

Dowding's Fighter Command had the task of forcing the Germans to delay or postpone indefinitely the invasion of England, by preventing the Luftwaffe from gaining air superiority over the Channel. Although numerically inferior to his opponent Dowding had several advantages which in the end were to prove decisive. The essence of



22 Spitfire Mk Ia of No.19 Sqn., Duxford, October 1940. The cradle in front of the starboard wheel is an ammunition carrier. (Imperial War Museum)

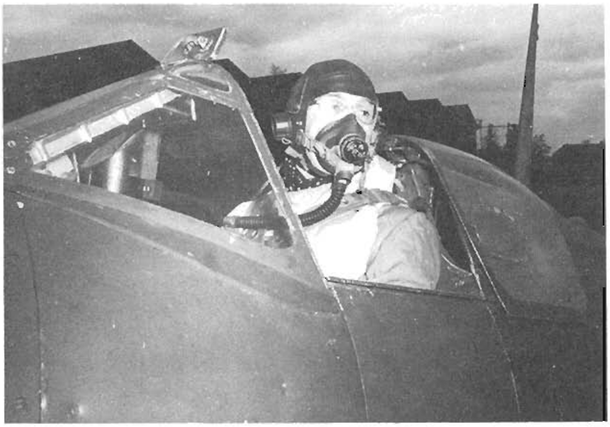
23 A Belgian pilot, Le Roy du Vivier, in the cockpit of his No.43 Sqn. Hurricane; the panel bears the RAF and Belgian flags above the traditional black and white chequers of No.43 Sqn. This pilot fought throughout the war in France, Britain and North Africa, and rose to command the squadron. (43 Sqn. via R. L. Ward)

Fighter Command's strategy was to prevent destruction of their own forces while inflicting as much loss as possible on the enemy. To do this it was necessary to conserve as much as possible while not abdicating the defence of the country. The tactics adopted were therefore based on maximum flexibility with minimum force, this being scaled to meet each threat as it arose. The early warning provided by radar and the ground control system gave Fighter Command a head start over the Luftwaffe, who none the less, on several occasions, managed to foil the defenders and deliver severe blows to the over-extended forces at Dowding's disposal.

The 'Battle of Britain' eventually developed into three distinct phases. The first of these was the attacks on coastal installations and the radar stations. If the Luftwaffe had been able to destroy all such stations Fighter Command would have been virtually 'blind', for although the sterling work carried out by the Observer Corps, which greatly complemented the early warning radar, would have been unaffected, there would have been insufficient warning to get fighters airborne and into attacking positions. Lack of reliable intelligence caused the Germans to believe that the damage they were causing to radar installations was not causing the havoc they had envisaged. They had no way of appreciating that it was the skill and fortitude of ground technicians in getting the equipment back into serviceable condition, as well as a supply of back-up equipment, that was keeping the stations operational. Aircrews reported that stations had been severely damaged – true enough claims in some cases – but the fact that interceptions were still carried out without any apparent disharmony caused the enemy to believe that damage had not been as severe as reports indicated. The true facts were that the coverage of the radar chain was greater than believed, and many stations brought their final reserve equipment into rapid operation. If the German attacks had persisted the end result might have been tragic. But a decision was made to change the point of attack to the fighter airfields, and this second phase opened at the beginning of August. The suspect weather during the month of July had prevented assaults on a large scale but the arrival of a settled period towards the end of the month saw the picture change.

Although the fighting in July had been fairly heavy, causing some squadrons to be moved out of the front line for a deserved rest, Fighter Command was by no means as depleted as the Luftwaffe commanders were led to believe. In fact less than 25% of the force available to Dowding had been seriously engaged at any one time, so completely fresh units were still available for introducing into the battle area of the South and South-East.

During the second phase the pressure of attacks gradually increased with a consequent drain on aircraft and aircrew. Pilots were flying sortie after sortie, and the strain of continual combat began to tell even on the hardiest veterans. The constant need to have aircraft ready to 'scramble'; the



24 Spitfire pilot wearing later issue flying helmet (note angular earphone housings) and oxygen mask. The seat is in the raised position used for take-off, and would be lowered to allow the canopy to be closed once the fighter was airborne. (Imperial War Museum)

damage to airfields, forcing aircraft low on fuel to search for other landing areas; the fear of trying to take off with the airfield under attack – all contributed to bring about a state of nervous exhaustion among some pilots which began to have noticeable effects. By the end of August the Luftwaffe was gaining the upper hand. Fighter Command losses for the month were the severest so far, with 390 Spitfires and Hurricanes destroyed and 197 badly damaged. This, compared with the Luftwaffe fighter losses of 231 and 81 damaged, produced an average of two to one in favour of the Germans. Both sides tended to overestimate the losses of the other; but Major Freiherr von Falkenstein of the Luftwaffe general staff was very close with his appraisal of the situation when he reported on 1 September that the British fighter arm had been severely mauled, and forecast that given favourable conditions during September, the Luftwaffe could so weaken the British defences that the German assault on production centres and harbour installations could be greatly increased without a corresponding increase in their own losses.

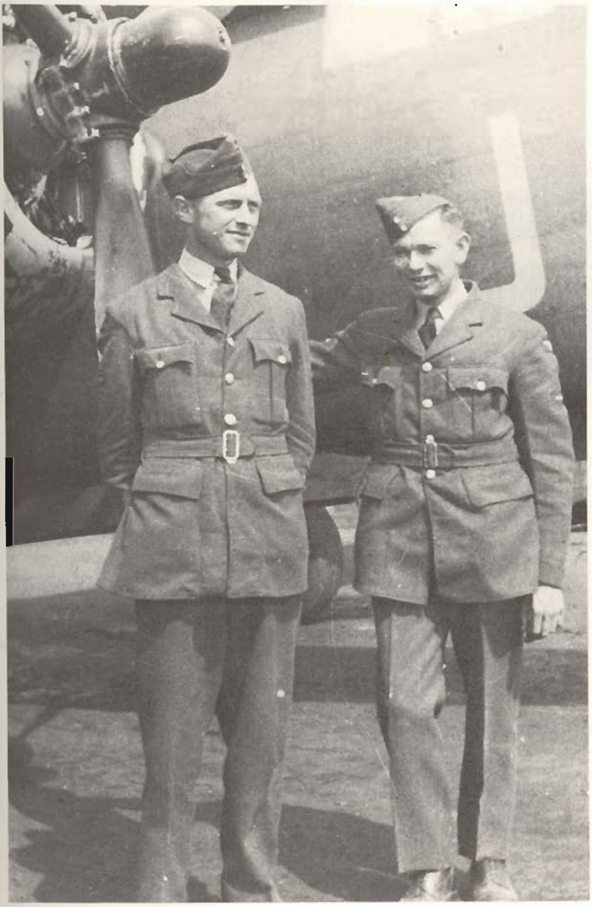
Combat reports from Luftwaffe bomber formations seemed to confirm that the British were weakening. After an attack on Tilbury on 1 September, 11/KG1 reported that only slight enemy fighter resistance had been encountered; and on 22 September Major Walter Grabmann, commander of ZG76, commented after escorting KG3 to bomb Eastchurch that 'even the twin-engined Bf110 could once again maintain its place in the English sky!' But a mistake in navigation on 24 August had caused London to be bombed, and this had far-reaching effects. Hitler had expressly forbidden the bombing of the capital and promptly took action against the crews concerned. The following night RAF Bomber Command attacked Berlin in a retaliatory raid, and this started a chain of events that turned the tide of the Battle of Fighter Command's favour.

Dowding employed tactics that gave No.11 Group the main burden of defence. Squadrons were used in conservative strength, as small striking forces vectored to intercept the enemy formations. Squadrons in other Groups, notably No.12, were kept in reserve and saw little action. The Commander of 12 Group favoured a policy of putting aircraft into the air in strength to await the arrival of the opposing forces. The arguments for and against using what has become known as 'The Big Wing' raged at all levels, with tempers becoming increasingly frayed. Well into August, 12 Group became more involved in the battle but were used primarily to defend 11 Group's airfields, which caused frustration to the pilots, who were anxious to get into the main arena. The change in tactics by the Luftwaffe in September gave more time for larger formations to be put into the air and marshalled into an effective force, and by the middle of the month 'The Big Wing' began to take a heavy toll of enemy bombers, although some of the interceptions occurred after the bombers had reached their targets and were returning home.

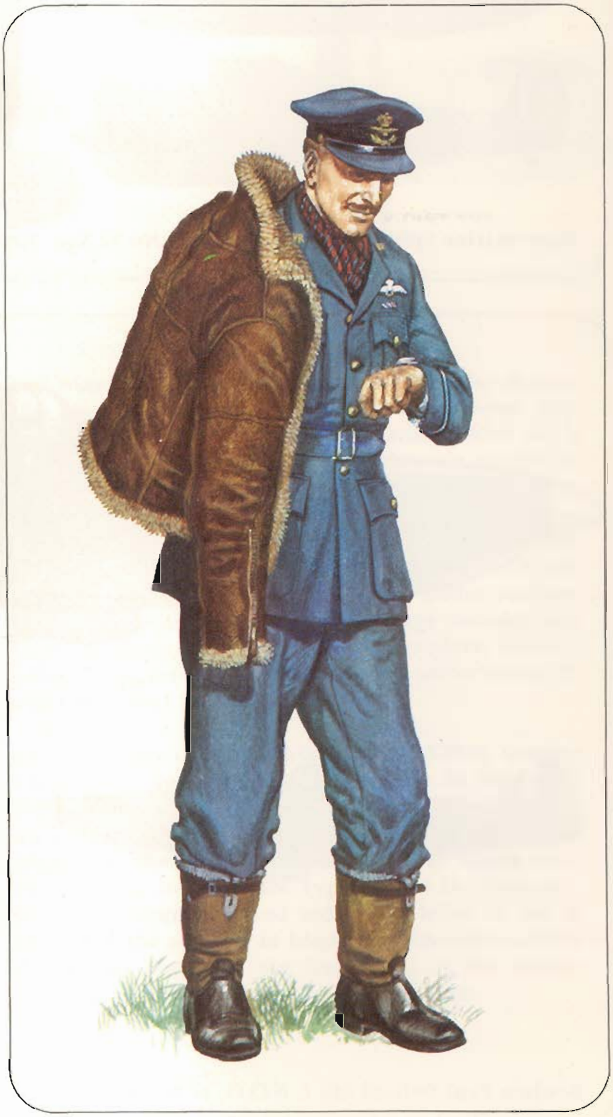
Although Fighter Command was outnumbered in the Battle of Britain, it must be remembered that the figures often quoted take into account the total of Luftwaffe bombers and fighters that were matched against RAF fighters. The Hurricane equipped 25 RAF squadrons and the Spitfire 19 when the opening exchanges of battle took place. Throughout the three months of activity there were always more Hurricanes involved than Spitfires, although the latter aircraft often gets the lion's share of the credit – partly, perhaps, because of its popularity and unique aesthetic appeal. A major advantage for Dowding was that all combats took place either over England or over coastal waters; his fighters therefore had more fuel to use in combat and could stay in the fighting area longer than their opposite numbers, who had to fly from bases in France and the Low Countries and had fuel for only ten minutes in combat by the time they arrived in the target area. The enemy fighters consisted entirely of Bf109s and Bf110s, but the latter soon proved no match for the Spitfires and Hurricanes and on many occasions the German single-seat fighter pilots were called upon to extract their two-seater colleagues from trouble when they should have been defending the bomber formation. Basically Fighter Command adopted a policy of using Spitfires to engage the enemy fighters while the Hurricanes took on the bombers; clearly this could not always be so, and on the occasions when the Hurricanes engaged fighters they were still able to give a good account of themselves.

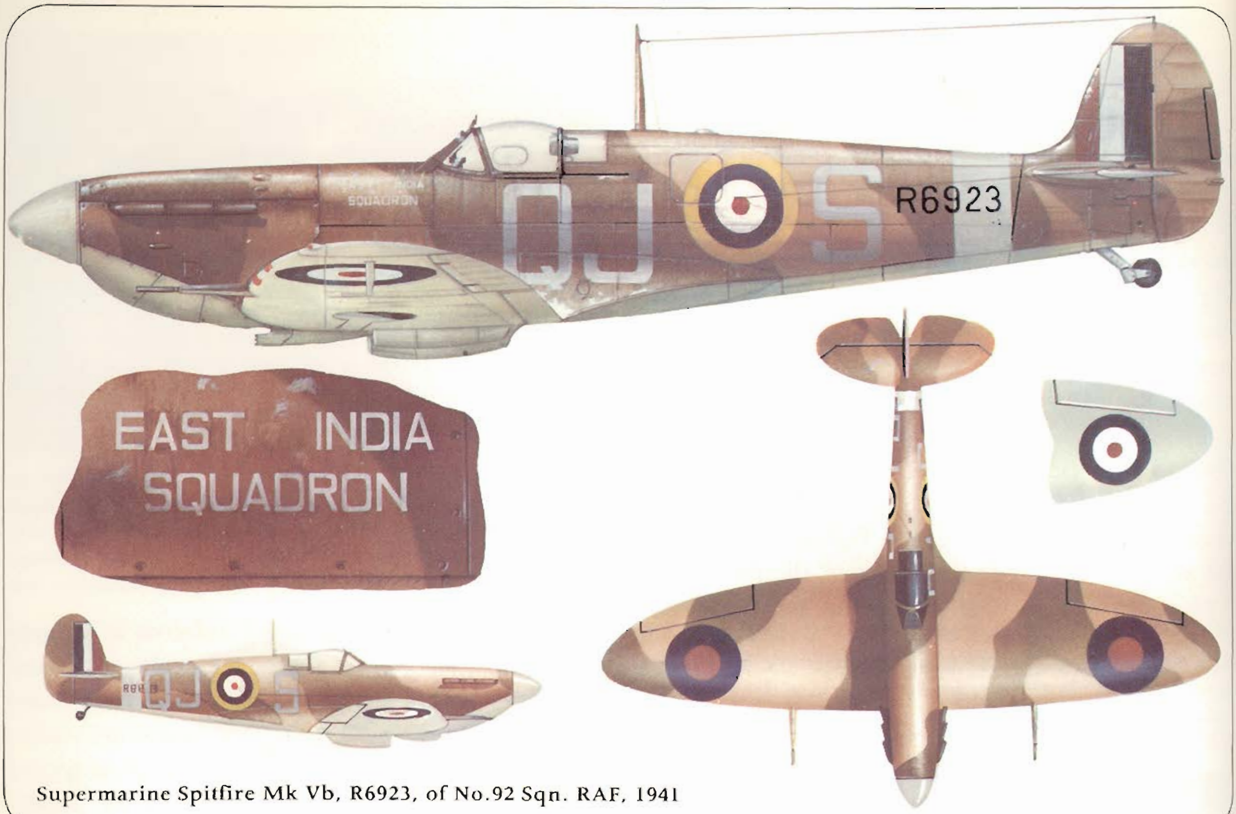
This strategy is well illustrated by the aerial

25 Groundcrew of No.532 Sqn. in front of a Turbinlite Havoc at Wittering; note details of service dress, which remained virtually unchanged until the late 1950s. (via R. L. Ward)



BELOW: Flying Officer, Royal Air Force Volunteer Reserve, 1940. He wears service dress with typical silk scarf, and the fighter pilot's well-known affectation – the top tunic button left unfastened. Rank is indicated by the pale-blue-on-dark-blue sleeve ring, and pilot status by the wings badge above the left breast pocket. Below the wings is the ribbon of the Distinguished Flying Cross – purple diagonals on white. Brass VR badges on both lapels identify the RAFVR. He wears flying boots with suede legs and leather uppers, and the excellent and much-prized Irvin flying jacket of tan-coloured reversed sheepskin.

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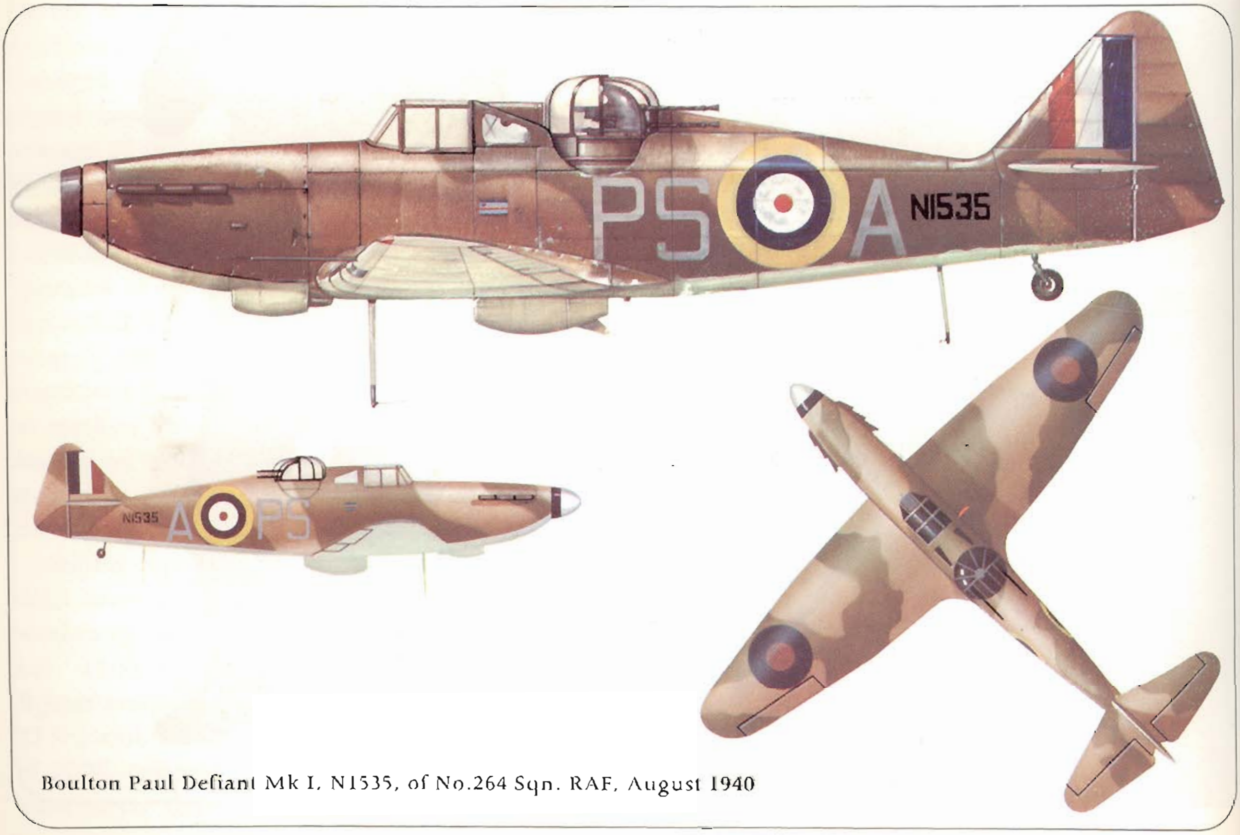
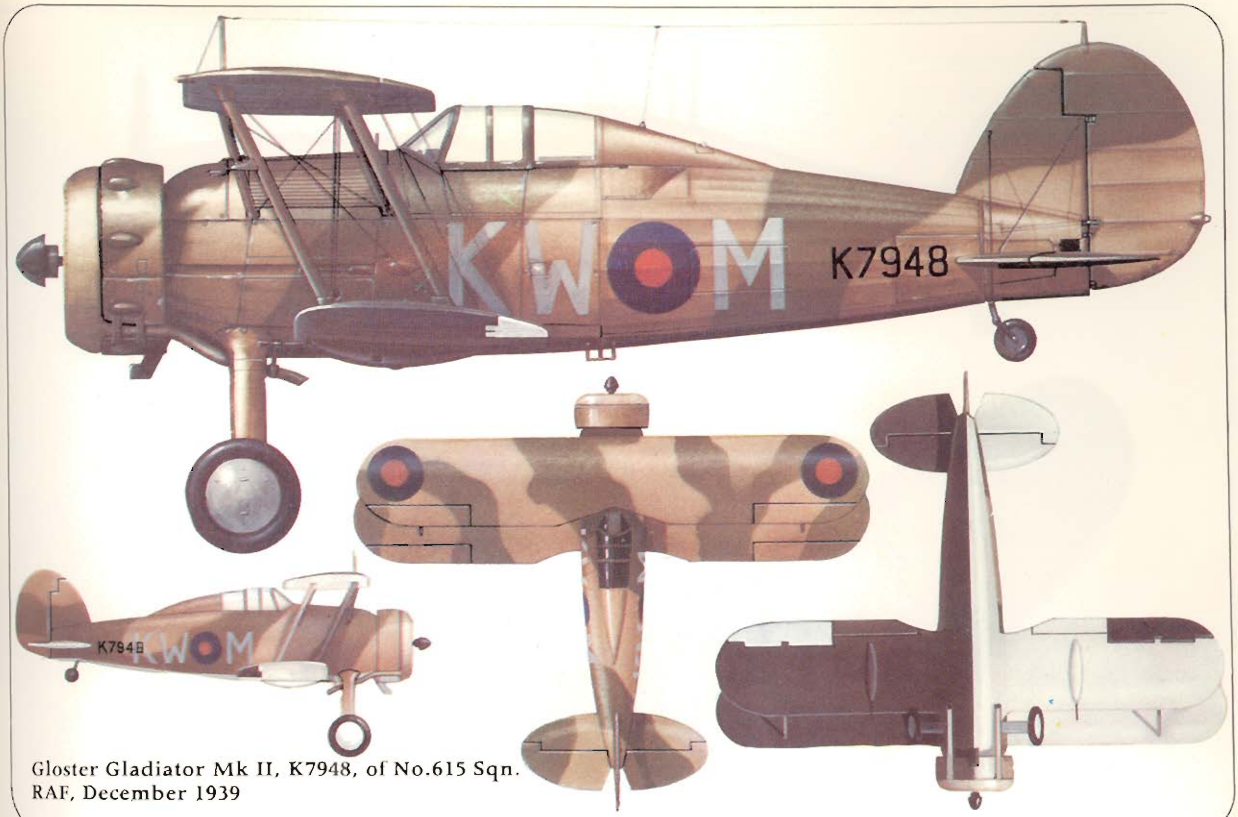
Supermarine Spitfire Mk Vb, R6923, of No.92 Sqn. RAF, 1941



Boulton Paul Defiant Mk I, N1535, of No.264 Sqn. RAF, August 1940

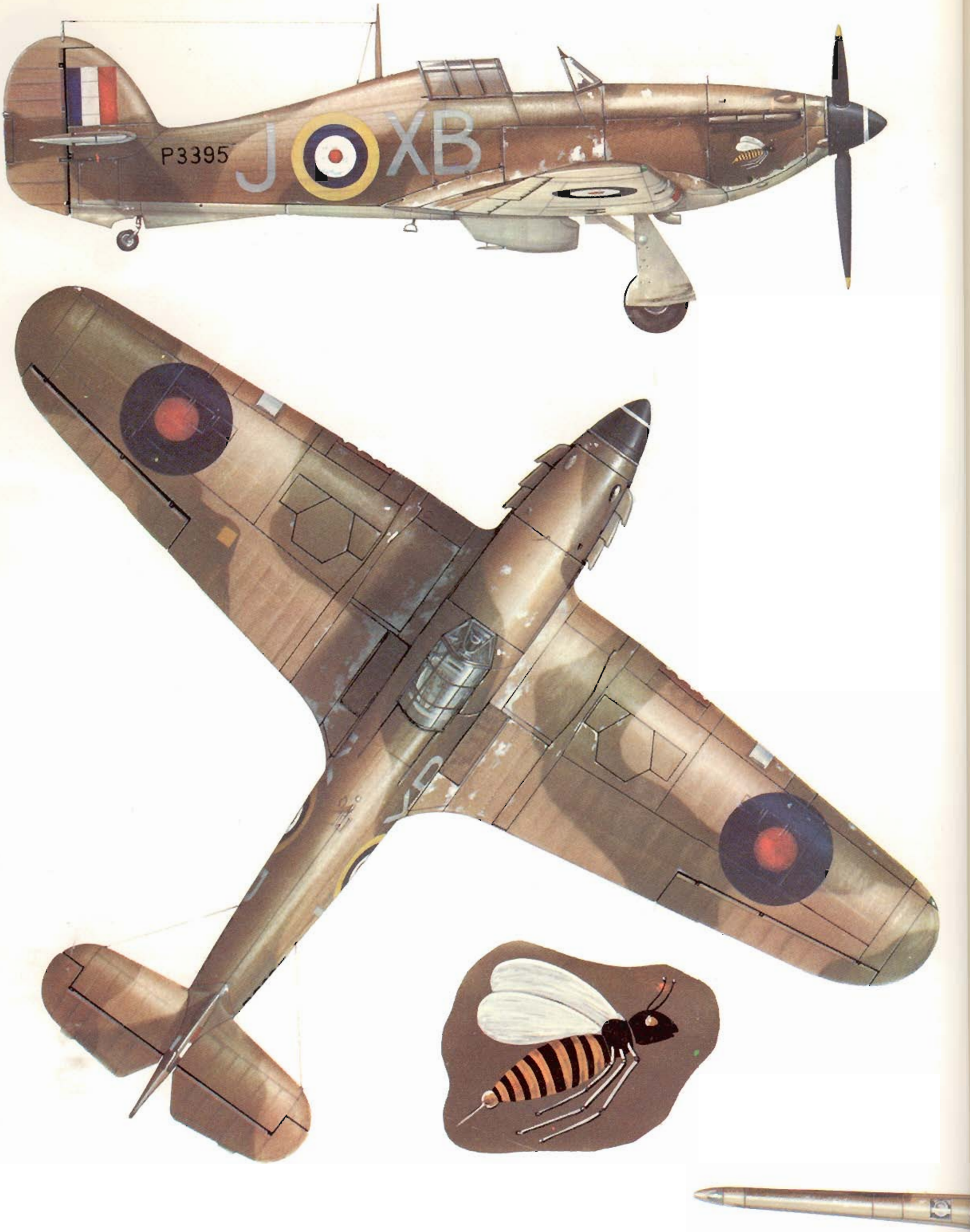


Gloster Gladiator Mk II, K7948, of No.615 Sqn. RAF, December 1939

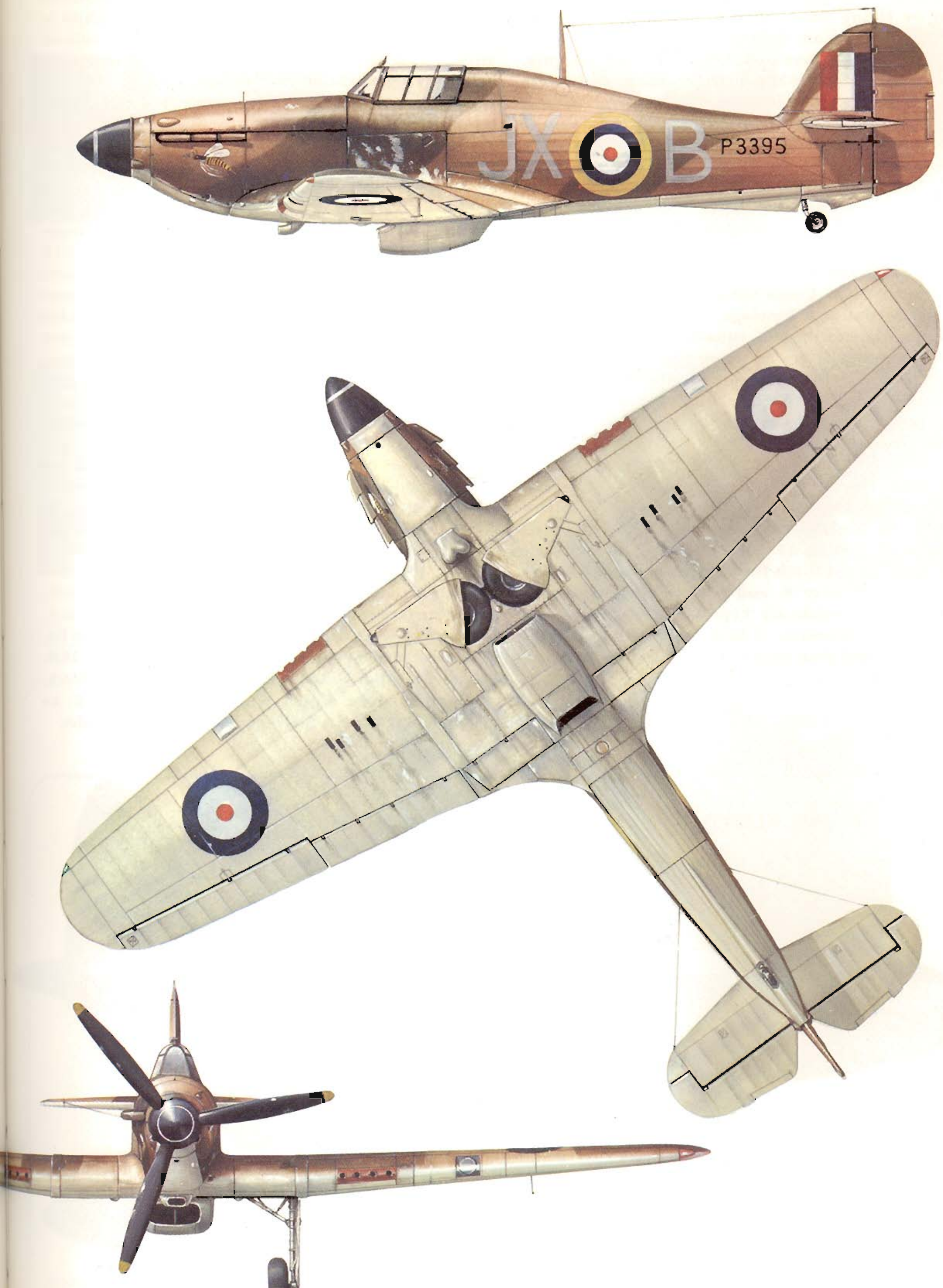
OPPOSITE, TOP: Supermarine Spitfire Mk Vb, serial R6923, in the markings carried during its service with No.92 ('East India') Sqn. in 1941. This machine fought through the Battle of Britain in its original Mk Ib configuration, as one of the twin-cannon Spitfires operated with varied success by No.19 Sqn.; at that time it was flown by Sergeant J. A. Potter, from RAF Duxford. (Potter was credited with two Messerschmitt Bf110s destroyed on 16 and 18 August 1940). After conversion to Mk Vb colours were unchanged, although a Sky rear fuselage band was added. The aircraft appears here in upper surface camouflage scheme B of Dark Earth and Dark Green, with 56 in. diameter Type B roundels. Under surfaces are in Sky, with 49 in. Type A roundels. Fuselage roundels are Type A1, of 35 in. diameter; the presentation inscription appeared on the port side only. Squadron letters QJ and individual letter S are in grey.

OPPOSITE, BOTTOM: Boulton Paul Defiant Mk I, serial N1535, flown by Squadron Leader P. A. Hunter, officer commanding No.264 Sqn., from Hornchurch and Manston, August 1940. Squadron Leader Hunter and his air-gunner, Pilot Officer King, were shot down and killed on 24 August, during which day's fighting the squadron lost no less than six aircraft in combats following raids on Manston by Junkers Ju88s of II/KG 76. Whether Hunter was shot down by a Ju88 or by escorting Bf109Es is not known. Upper surfaces are in camouflage scheme B, Dark Earth and Dark Green, with Type B roundels. Under surfaces are in Sky, without markings. Fuselage roundels are 42 in. diameter Type A1; and the squadron leader's pennant appeared on both sides. Squadron letters PS and individual letter A are in grey.

ABOVE: Gloster Gladiator Mk II, serial K7948, serving with No.615 Squadron at Vitry, France, in December 1939. Note particularly the black and white halved under surfaces, without wing roundels, and with ailerons of the opposite colour on lower wings only. The fuselage roundels are Type B of 25 in. diameter; squadron letters KW and individual letter M are in grey, and the serial is in black 8 in. characters. Note the bronze finish of the front ring of the engine cowling, and the natural metal wheel discs.



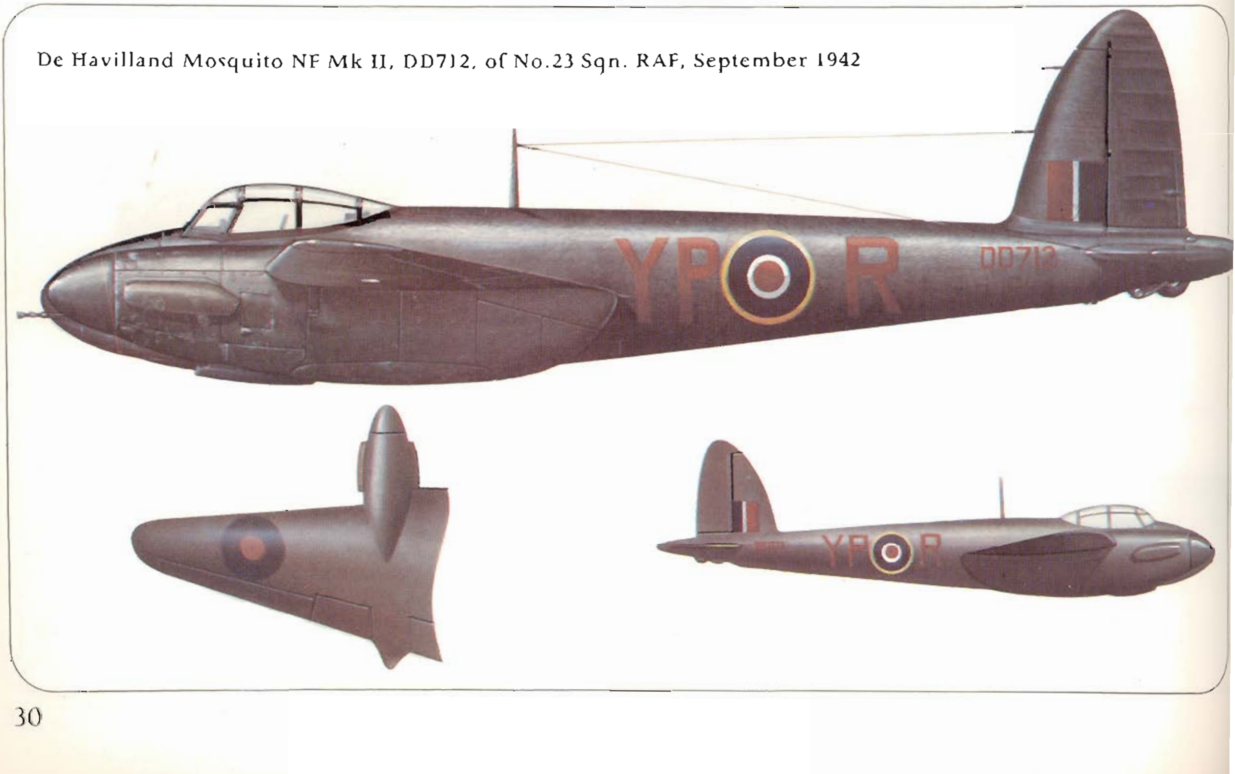
Hawker Hurricane Mk I, P3395, of No.1 Sqn. RAF, October 1940


JX B
P3395

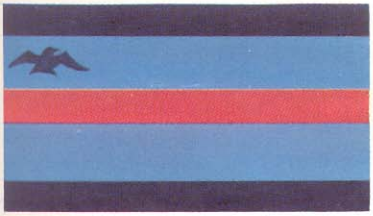
PAGES 28-29: Hawker Hurricane Mk I, serial P3395, flown by Flying Officer Arthur V. Clowes, DFM, of No.1 Squadron from Wittering, Sussex, in October 1940. The wasp emblem was Clowes' personal insignia. It is suggested that the black stripes on the body were a tally of this pilot's victories, but no correlation is possible with his confirmed kills during the Battle of Britain, which amounted to $3\frac{1}{2}$: a Heinkel He111 and a Junkers Ju88 on 16 August, and a Messerschmitt Bf110 on 7th September, with a half share in a Dornier Do17 on 24th October. Clowes lost his life later in the war. The upper surfaces of this characteristically weathered aircraft are finished in camouflage scheme A, Dark Earth and Dark Green, with Type B roundels of 49 in. diameter. Under surfaces are in Sky, with 35 in. Type A roundels. Fuselage roundels are Type A1, of 35 in. diameter; and squadron letters JX and individual letter B are in grey. The serial is in the normal 8 in. black characters; the fin flash is 27 in. high by 24 in. wide. Note the 18 in.-square 'gas panel' on the port upper wing surface, 9 ft. 6 in. out from the aircraft centre line.

BELOW: De Havilland Mosquito NF Mk II, serial DD712, of No.23 Sqn., flying from Manston in September 1942 on night intruder missions over occupied France: note that no AI radar is carried. The aircraft is in overall night black finish, with squadron letters YP, individual letter R, and 8 in. serial in dull red. Upper wing roundels are Type B, fuselage roundels Type C1 with a diameter of 36 in., and fin flash 24 ins. square – red and blue stripes of 11 in. and white stripe of 2 in. width.

OPPOSITE, TOP. Selection of individual aircraft and squadron insignia: (1) The Squadron Leader's pennant, usually carried on the port side below the cockpit or the exhaust stacks; occasionally observed without albatross emblem. (2) Badge of No.306 'Torun' (Polish) Sqn., carried behind and below exhaust stacks of squadron a/c, e.g. Hurricane Mk I serial V7118, Northolt, December 1940. (3) Marking of Polish national insignia on port rear fuselage of Hurricane Mk I serial V7118, VU-Z of No.306 Sqn. (4) Marking of national insignia on starboard rear fuselage of V7118. Aircraft had Sky band round rear fuselage, with black serial superimposed, and 7 in. wide fin stripes extending to top of fin. (5) Personal marking of Fl. Lt. A. L. Deere on Spitfire Mk Ia of No.54 Sqn., Hornchurch, 1940. Aircraft finished in camouflage scheme A, Sky under surfaces, black spinner; Type B roundels on top surfaces, Type A1 with oversize red centre 2/7ths of diameter on fuselage, none on under surfaces. Fin flash 3×7 in. stripes; black serial P9398; grey codes KL-B. Background of insignia, aluminium paint. (6) Badge of No.601 Sqn., painted in red on white stripe of fin flash, sword leaning forward at 45° angle. On squadron commander's Hurricane the sword was also painted on front port cowling forward and below windscreen. (7) Personal marking of Sqn. Ldr. I. R. Gleed of No.87 Sqn., painted starboard side below cockpit canopy on Hurricane Mk I, P2798, LK-A in August 1940. Camouflage scheme B, under surfaces pale blue, codes dark grey, spinner black, serial black. Upper surface roundels Type B, under surfaces Type A, fuselage Type A1; fin stripes 3×8 in. wide, to top of fin. (8) Badge, port, Spitfire Mk I, PR-O, No.609 Sqn., 1939. Scheme A; Stbd. wing undersurface white, port black, remainder silver. Upper wing roundels Type B; no under-wing; Type A fuselage; no flash; grey codes.



De Havilland Mosquito NF Mk II, DD712, of No.23 Sqn. RAF, September 1942



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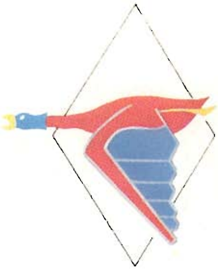

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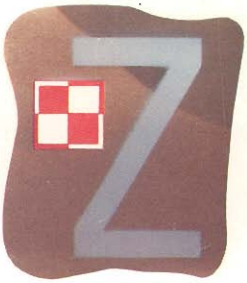

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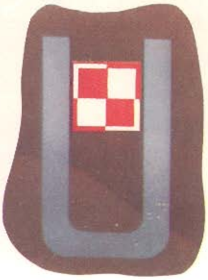

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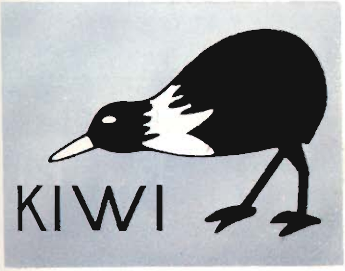

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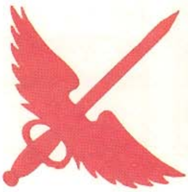

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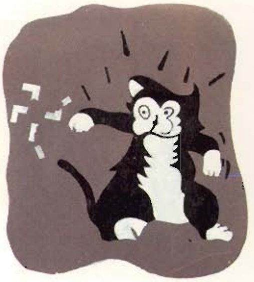

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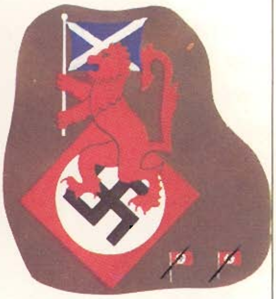

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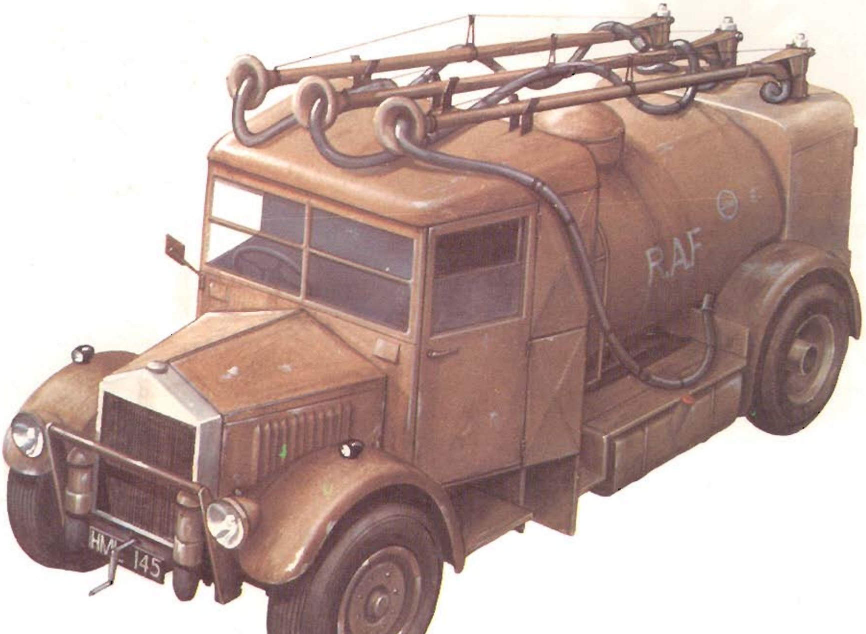
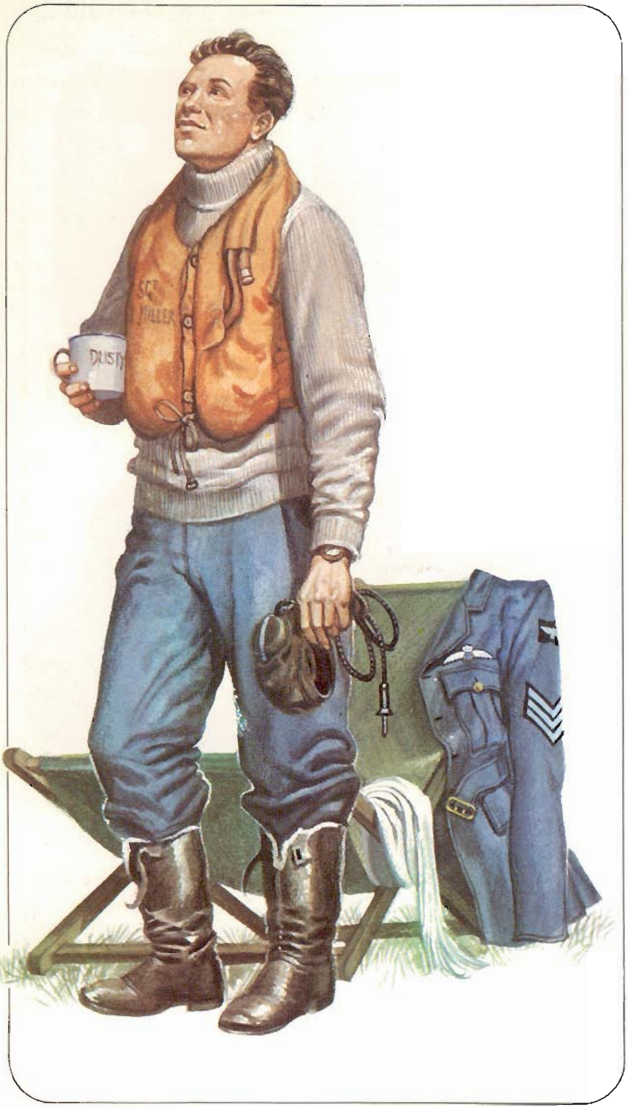
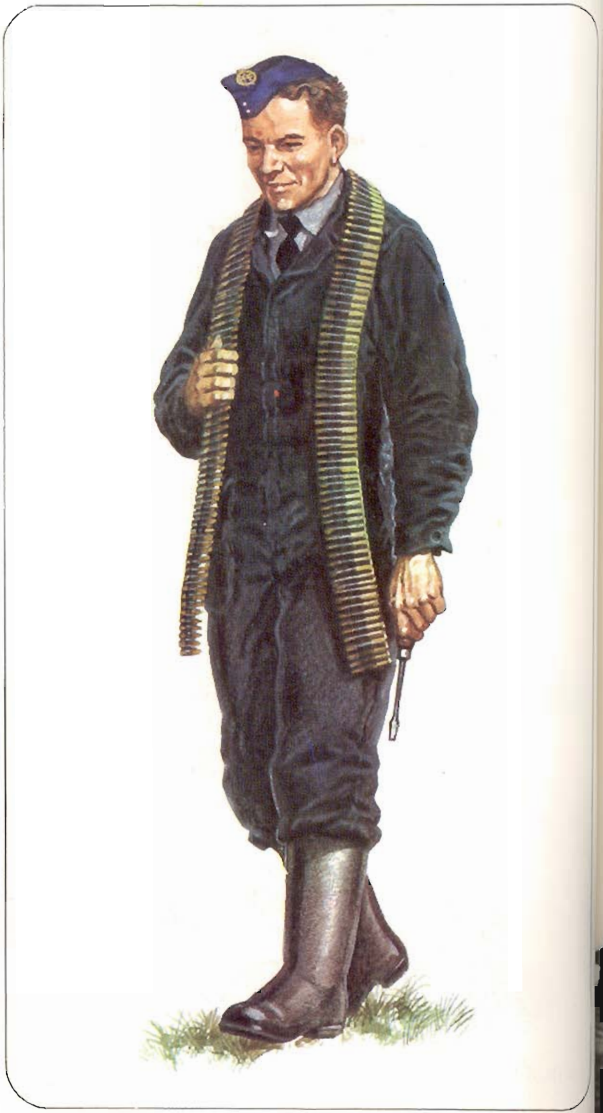


Albion 350 petrol bowser of No.73 Sqn. RAF; Rouvres, France, winter 1939–40



ABOVE: Sergeant Pilot, RAF Fighter Command, 1940. This NCO wears a common type of informal flying outfit – a heavy woollen polo-neck pullover, worn with his 'second best' blue trousers and sheepskin-lined leather flying boots. The boots did not open down their length, having a small 'nick' in the top front edge with a short tightening strap at the same level. The 'Mae West' life jacket appeared with several variations of detail; the type illustrated was in widespread use throughout the Battle of Britain. The owner's name was often painted on the fabric. The sergeant holds an early pattern leather flying helmet, Type C General Purpose, with zipped leather covers over the earphone housings. On the chair hangs his service tunic. The shoulder patch was worn by all personnel below commissioned rank; it depicted a pale blue albatross on a dark blue rectangle. The sergeant's three chevrons of rank are also in pale blue on dark blue and appear on both arms. Pilot's wings are worn above the left breast pocket.

BELOW. Typical appearance of Royal Air Force ground-crew fitters and armourers in 1940. The RAF-blue sidecap bears the enlisted men's brass cap badge forward on the left side. The black or dark blue one-piece denim overalls are worn over service dress trousers and a pale blue shirt with black tie. Wellington boots were worn not just as protection on sometimes muddy airfields, but also as a precaution against damage when clambering about on the aircraft. This 'erk' carries a belt of ·303 machine-gun ammunition.

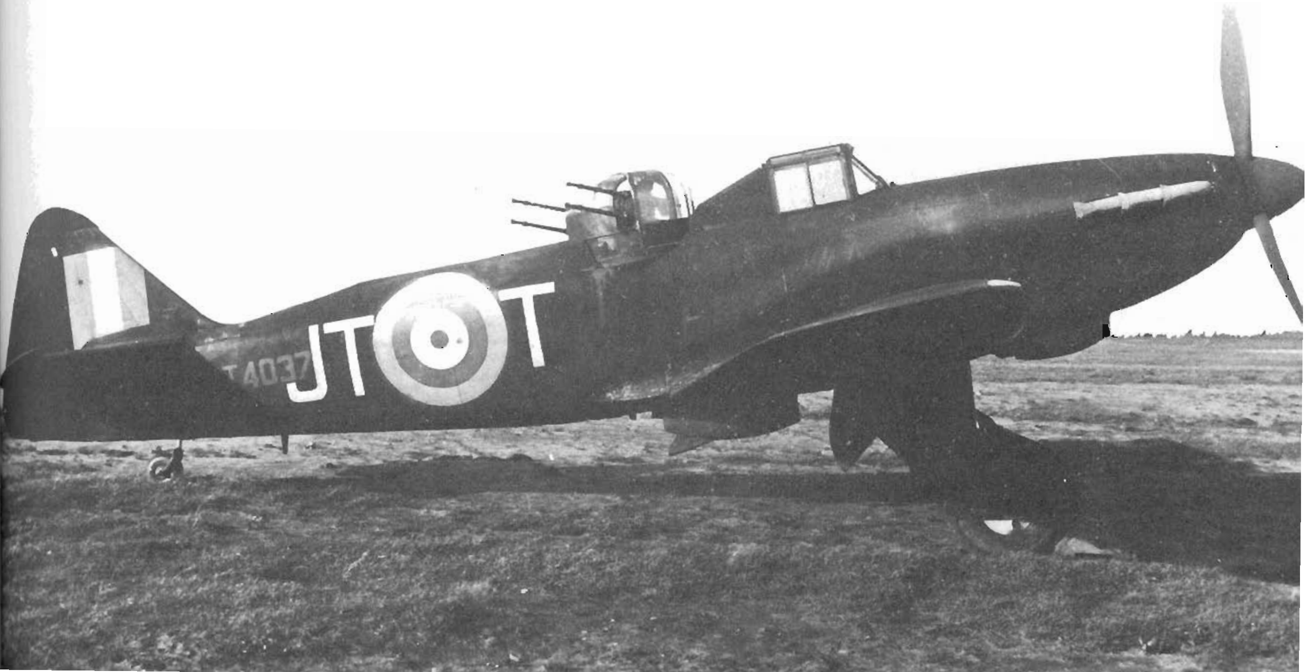


activity on 16 August when a large formation of Ju87s attacked Tangmere. Spitfires of No.602 Squadron attacked the escorting fighters while Hurricanes of Nos.1, 43 and 601 Squadrons gave the Stukas their undivided attention, destroying seven of them while the Spitfires frustrated the efforts of the Bf109s to defend their charges. Despite the high mortality rate of the Ju87s Tangmere was severely damaged, and as the bombs crashed into the hangars, workshops, officers' mess and other buildings, a damaged Hurricane flown by Plt. Off. W. Fiske, an American volunteer pilot who three days earlier had shot down a Ju88 of KG54, landed among the bursting bombs and craters. It immediately became a target for strafing, and before Fiske could abandon his cockpit the aircraft was set on fire and he was seriously burned. He died the following day, the first American airman to lose his life defending Britain.

At Ventnor part of the same formation of Ju87s attacked the radar installation and this time the Bf109s, although under heavy attack from Spitfires of No.152 Squadron, managed to protect the dive-bombers. The station was put out of action for seven days. A force of 30 enemy aircraft, this time Ju88 bombers protected by eighteen Bf110 fighters, attacked the naval airfield at Gosport with comparative immunity as the Spitfires of No.234 Squadron failed to intercept them, but they did not escape entirely unscathed, for in the area there were three Hurricanes of No.249 Squadron, who had only moved into the battle zone two days before. Red Section, led by Flt. Lt. J. Nicolson, attacked the twin-engined fighters, but as they mounted their attack they were hit from behind by a *Staffel* of Bf109s.

Nicolson's Hurricane was immediately hit and set on fire; parts fell off it, and a cannon-shell ripped into the cockpit, showering perspex into Nicolson's eyes. Another shell hit the petrol tank and a third wrecked the instrument panel. Instinctively the Hurricane pilot, blinded by blood from his damaged left eye, threw the Hurricane into a right turn. The controls responded sluggishly and his immediate reaction was to take to his parachute, but as he jettisoned the canopy and lifted himself into the slipstream he saw the Bf109 which had attacked him diving away in front. With the Hurricane blazing like a torch and shedding wreckage in a continual shower, Nicolson lowered himself back into the cockpit and fired a lethal burst into the enemy machine, which crashed into the sea. Nicolson managed to bail out of the stricken Hurricane and landed near the village of Millbrook. (During his descent he was also wounded by shotgun pellets fired by members of the local LDV

26 Night-fighter Defiant of No.256 Sqn. in 'soot black' scheme; this photograph illustrates how the fuselage top decking retracted to give the gunner a clear field of fire. (Imperial War Museum)



BOMBED
BUT
NOT
BEATEN

27 Between July and December 1940, alone, civilian casualties from enemy bombing reached 23,000 dead and more than 32,000 injured. The flag and slogan outside this wrecked shop in a London side street typifies the response of the majority of the population. (Imperial War Museum)

(forerunner of the Home Guard) who mistook him for a German parachutist. The LDV had been warned to expect the invasion to start with paratroops and their enthusiasm to join the action overcame their caution on this occasion.) Nicolson was rushed to hospital, and recovered from shotgun wounds and burns. For his determination in pressing home his attack Nicolson became the only Fighter Command pilot to receive the award of the Victoria Cross.

The determination displayed by Flt. Lt. Nicolson typified the spirit running through Fighter Command during this period. The pilots flew sortie after sortie, rarely finding time to eat or rest adequately. Some of them happened to be in the right position at the right time to destroy numbers of enemy aircraft; others flew as wingmen, covering their colleagues' vulnerable tail area, gaining little glory – not that they would have expected it – but performing just as important a task.

Many of the pilots had seen combat in France or in the early days of the war in England; even so, they still found that errors could occur in the heat of combat. One of them recounts in his diary how he encountered Bf109s for the first time in the Battle – although he had engaged them in combat over Scotland earlier in 1939 – and after lining up for a perfect attack found that he had not switched on his reflector sight or put the gun firing button from 'safe' to 'fire'. Such was the speed of combat that by the time this particular pilot realised his elementary error, the enemy formation had disappeared in cloud, without realising just how close they had come to losing one or two of their numbers.

The aerial battles continued throughout the summer months with the RAF gaining the advantage one day and the Luftwaffe striking back at them the next. Hurricanes and Spitfires were by now rolling off the production lines in ever-increasing numbers and those lost in action were being replaced without too much difficulty by the Maintenance Units (MUs). But the ever-growing problem was that of pilots. Although they were fighting mainly over their homeland where, if they were shot down, they could soon return to their units and get back into action with a new aircraft, there was a relatively high casualty rate among pilots which had to be matched by the training schools. At the beginning of June 1940 Fighter Command had a deficiency of over 360 pilots; by the end of July this had dropped to 79, but the battles of August and September saw it rise again. During this period the casualty rate was approaching 24% of the total number of pilots available, and Dowding was being forced to introduce young and inexperienced pilots onto the squadrons. Some of these nineteen- and twenty-year-olds had less than ten hours flying experience on Hurricanes and Spitfires, and naturally they needed a considerable amount of luck to survive. Their presence also increased the responsibility of the more experienced pilots, who tried to shield their younger colleagues while they gradually introduced them to the arts of survival in aerial combat.

During the four-month period July to October 1940 over 900 Fighter Command pilots were killed, wounded, taken prisoner or posted missing; and it was not until mid-October, when the main phase of the battle was over, that the strength of pilots exceeded the establishment. The introduction of Czech, Polish, French, Canadian, and other foreign pilots, as well as some from other RAF Commands and the Royal Navy, eased the burden, but the margin was frighteningly narrow throughout the Battle.

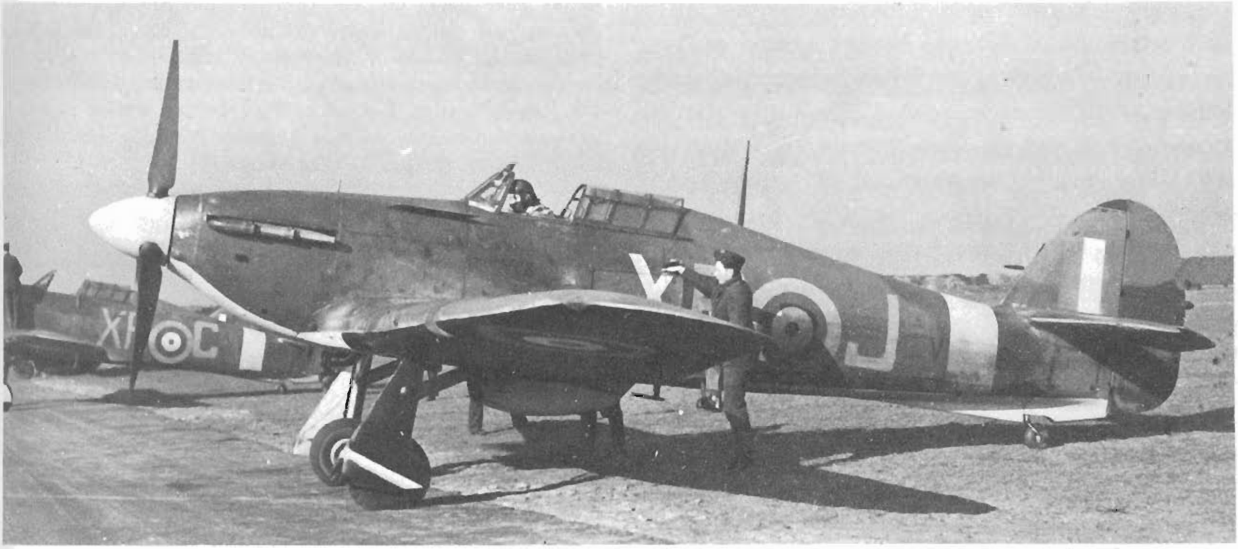
The third phase of the Battle of Britain opened on 7 September; it brought no slackening in the intensity of the air battles, but it signalled a major German error of judgement. At the point when the

28 Sgt. Pilot W. Leadbeater of No.43 Sqn. and his Hurricane 'Ramaekers'. Note the leg restraining straps of the early-style 'Mae West', tied in position. The aircraft's paintwork is badly weathered. Note also the pilot's entry foot-rest behind the port wing. (Imperial War Museum)

constant attacks on the fighter airfields, and the consequent erosion of the fabric of the defences were about to bring Fighter Command to a choice between withdrawal from the forward airfields and an apparently inevitable attrition, Göring switched his target. The cratered fighter stations, with their patched-up buildings and exhausted air and ground personnel, were left in peace to build up their strength and efficiency once more. The insolent RAF raid on Berlin was to be punished by crushing attacks on London, a target which Fighter Command would obviously defend to the utmost of its ability, thus committing to combat and destruction what Göring's advisers contemptuously termed 'the last fifty Spitfires'.

On 7 September over 300 bombers defended by nearly 650 Bf109s and Bf110s set course for the city. Radar detected them over the Channel and the Observer Corps plotted their approach down the Thames Estuary. Expecting the attacks to be a continuation of the raids on their airfields, squadrons of 11 Group were in position to intercept, but when the intention of the enemy formations became clear they were unfavourably placed to defend London. Airborne squadrons were diverted to intercept the enemy formations, which were severely mauled by Nos.1, 303, 504, 19, 242

29 No.71 (Eagle) Sqn., manned by American volunteers, carried out its first operational patrol from Kirton-in-Lindsey on 5 February 1941. Hurricane Mk I, V7608, XR-J is seen at readiness at Kirton-in-Lindsey later in the year. The underside of the port wing is black and the 'sky' fuselage band has been painted over the serial. The ground crewman has his foot in the stirrup rest and his right hand in the sprung-cover handgrip (Imperial War Museum)



30 A cannon-armed Hurricane Mk IIc of No.3 Sqn. in 1941. Attached to 63 Wing in France, the squadron moved north to Wick on its return to England, and remained in Scotland until April 1941, when it returned to the south and received the IIc. Mainly engaged in night operations, the unit did take part in daylight sweeps over France and also worked in co-operation with Turbinlite Havocs. (Imperial War Museum)

and 310 Squadrons, the most successful being the Poles of No.303 Squadron who encountered 40 Dornier Do17s and destroyed ten of them. For over 90 minutes German aircraft, harried by British fighters, bombed London, and left a trail of devastation behind them. This was the first major air bombardment suffered by the capital and the casualties were high, 448 people being killed and a further 1,337 seriously injured. The Luftwaffe lost 41 aircraft during the day, but on the other side of the coin Fighter Command lost 28 fighters and 17 pilots.

At the height of the battle over London over 1,100 aircraft had been engaged, so it is not surprising that claims on both sides were higher than the final figures confirmed by records after the war. This fact applied to almost every air combat in which large numbers of aircraft took part. It was impossible for pilots to watch their victims all the way to the ground and on many occasions several pilots fired, unknown to each other, at the same aircraft, each claiming a victory or probable victory. But the claims boosted the morale not only of the squadrons but also of the public; and when, on 15 September, the RAF claimed to have destroyed 185 enemy aircraft, the outburst of national triumph matched the importance of the victory that had been achieved. Records show that the Germans lost 56 aircraft on 15 September, but it was still the turning-point; by the end of the month concentrated daylight raids were giving way to night raids. Over the Channel in France plans for the invasion of England were shelved, being finally abandoned on 12 October. By the end of October, the RAF had destroyed 1,733 enemy aircraft for a loss of 915 machines and a total of nearly 1,500 aircrew; they had inflicted the first defeat suffered by the Luftwaffe, and were building their strength to hit back on the other side of the Channel, in skies where they had been savaged only a few months before.

THE NIGHT BLITZ

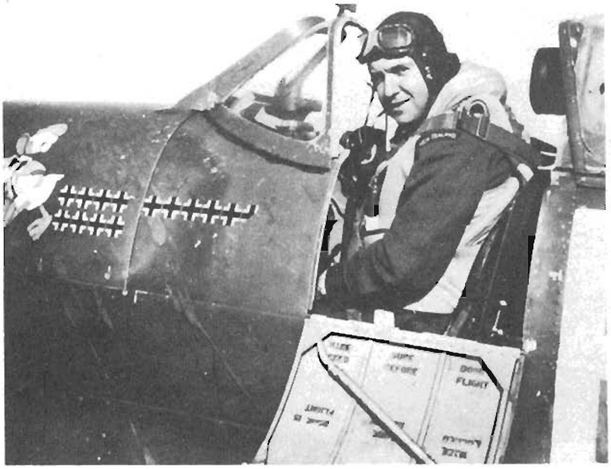
The defeat inflicted on the Luftwaffe during the Battle of Britain was by any standards decisive; it had prevented any invasion of England, as well as underlining the strength of the RAF. But the German air force was far from destroyed, and having been forced to abandon daylight raids it

31 The Hon. Peter Frazer climbs from the cockpit of a No.92 Sqn. Spitfire Vb during a visit to Biggin Hill airfield on 11 July 1941. The insignia painted below the windscreen, just visible above the officer's left hand, echoes Churchill's famous 'V for Victory' sign. Note the aerial coming from the centre of the fuselage roundel; this is the IFF (Identification Friend or Foe) aerial, which enabled ground radar operators to identify friendly aircraft on their 'scopes. (Imperial War Museum)

turned to the cover of darkness.

The first heavy night raid had occurred on 28 August when Liverpool was attacked, but the real test came in early September when concentrated attacks were mounted against London. For the following two months the Luftwaffe mounted air raids almost every night, most of them aimed at the capital, and during this period more than 12,000 sorties were flown by the German bomber *Gruppen*. Although more than 23,000 men, women and children were killed by the end of 1940, and a further 32,000 injured, morale stayed at a generally high level – and the rate of one death for every ton of bombs dropped was hardly proving economical for the German war effort. During this period the bombers operated with comparative immunity, for although Fighter Command had mastered the art of daylight interception they still had a lot to learn about the vastly more demanding rôle of the night-fighter.

Single-seat fighters were not ideal for operations at night, and the Blenheims and Defiants, although in some cases fitted with primitive Airborne Interception radar, met with little success. Many experiments were tried, ranging from dropping flares over the bomber squadrons to illuminate them for the fighters, to 'Operation Mutton' – the dropping of 2,000-foot lengths of wire with a bomb at one end and a parachute at the other in the path of enemy bombers. As the German air force did not use the bomber stream technique adopted later in the war by RAF Bomber Command, these experiments met with little success. The technique used by the enemy bombers was to fly along a radio beam directed over the target by one of the transmitting stations situated along the coasts of France, Holland and Norway; this device was code-named 'Knickebein'. One station transmitted a guiding beam and another transmitted a second which intercepted the first over the target. The pilot listened to the transmission of the guiding beam and when the signal in his earphones changed, indicating that the two beams had crossed, he knew that he was over the target area. The bombers flew in a single-aircraft procession approximately four minutes apart. This gave a spacing of about twelve miles between aircraft, thus making individual sightings by the intercepting fighters a matter of luck rather than scientific judgement.



32 Flt. Lt. J. A. Gibson, a New Zealand pilot of No.457 Sqn., in the cockpit of his Spitfire Vb, BL351, BP-H at Jurby in December 1941. Note the crowbar – for use of the pilot if breaking his way out of a crashed aircraft – held in clips inside the cockpit access panel. The right hand victory cross in the top row is halved, possibly indicating a shared victory. (Frank Smith via R. L. Ward)

An experimental counter-measure that never realised its apparent potential was introduced between May and December 1941, when ten flights were equipped with American-built Douglas A-20 Havoc aircraft fitted with a powerful searchlight (Turbinlite) in the nose. The idea was that each Havoc would operate in conjunction with a single-seat fighter, known as its 'satellite'. The Havoc used its radar to detect a target and when it was within 3,000 feet of its quarry would advise the single-seat fighter, usually a Hurricane, that it had made contact. The Hurricane would get below and ahead of the Havoc, and as the range closed to about 300 yards the searchlight would be switched on, illuminating the enemy aircraft for the Hurricane to destroy. A neat theory – but in practice a wildly-jinking enemy aircraft could not be held in the searchlight's beam and had little trouble in escaping. By the time Beaufighter and Mosquito night fighters with their much improved radar came into service, the Turbinlite Havoc squadrons (formed from the ten flights) had claimed only one enemy aircraft destroyed, one probable and two damaged, a scale of casualties which could have caused little embarrassment to the Luftwaffe.

Night-fighting at this time was very much a matter of luck; pilots trained to fly day fighters

LOTHAIRE
FT

33 Sgt. Pilot E. W. Bierer of No.43 Sqn. with his Hurricane, named 'Lothaire'. The 90-gal. underwing tanks were introduced in 1941 and date this photograph to the period of fighter sweeps over enemy occupied territory. (Imperial War Museum)

stood by for night operations, but once airborne they had only their eyes, the trembling fingers of the searchlights, and the flash of anti-aircraft shells to guide them to the likely location of the bombers. One pilot of the period aptly described it as 'like looking for a fly, in the dark, inside the Albert Hall'.

The success of British scientists in 'bending' the guiding beams used by the German bomber forces helped compensate for the poor results of the night-fighters; but on 14 November 1940 the Germans introduced a new method of target location and marking to guide 450 bombers to Coventry. This took the form of a more sophisticated directing beam coded *X-Gerät*, the equipment to receive this being carried in Heinkels of KGr100, who used it to locate the target which they then illuminated with incendiaries. During a ten-hour period 56 tons of incendiaries and 400 tons of high explosive bombs caused casualties of 1,350 and destroyed most of the city centre. This one attack clearly illustrated the effectiveness of a well-directed bomber attack, and it was fortunate that countermeasures for the jamming of *X-Gerät* were quickly found. Despite the damage to property and the deaths of civilians the German bombing effort achieved little of military significance overall, although during the attacks on Coventry they did hit a dozen aircraft factories and nine other industrial plants.

During November 1940 the German bomber sorties totalled over 6,000, during which only eight bombers were claimed as destroyed by fighters. In the early part of 1941 the weather curtailed operations to an extent that in February only 1,200 sorties were flown. Between November 1940 and February 1941 only 25 enemy aircraft were destroyed by fighters during a total of 12,000 sorties, figures which serve to underline the vital need at that time for an improved night interception technology. Happily, the technology was on its way, in the form of the Beaufighter and Mosquito. The Beaufighter had been in service since September 1940, when it made its operational debut in the hands of No.29 Squadron, but it was February 1941 before the squadron received enough Beaufighters to replace all its tired Blenheims. The first enemy aircraft to fall to a Beaufighter's four 20mm cannon was a Ju88 shot down on 20 November by Sqn. 'Ldr. John Cunningham

34 Pilots of No.303 (Polish) Sqn. with the squadron scoreboard, the fin from a Junkers Ju88, marked at this time in 1942 as the 178th victim of the squadron. The second Polish squadron formed, No.303 was the first to

of No.604 Squadron. This was the culmination of several nights' efforts, during which several members of the same squadron had come close to recording the first kill. Housing the radar and its operator in the aircraft was a significant advance, but once a contact had been made and the Beaufighter brought into the best position for an attack, the final sighting had to be made by the pilot.

In the darkened cockpit of the aircraft the radar operator and pilot would listen to the ground controller who, once he had picked up a trace on his screen, would vector the Beaufighter onto an interception course. The operator in the aircraft would peer intently into his screen until a tell-tale trace appeared; then he would take over from the ground controller and guide his pilot to a position below and to the rear of the enemy aircraft. With the range rapidly closing the pilot would concentrate on the darkness outside, straining for a glimpse of tell-tale exhausts or a reflection from his quarry. Once visual contact was made the rest depended on the gunnery of the pilot, and the skill of the enemy pilot in avoiding his attacker if he received warning either from an alert gunner or from an ill-aimed burst of fire from the interceptor. The success of the new breed of night-fighters is underlined by the fact that in January 1941 night-fighters shot down only three enemy aircraft, and in May 1941 no less than 96.

see combat with No.11 Group in the Battle of Britain. The Spitfire Vb in the background has the squadron badge painted below the windscreen and the Polish emblem below the exhaust stacks. (Imperial War Museum)

Although the German night bombing offensive caused damage to cities and thousands of civilian casualties, its military achievement was of little significance. The switch from attacks on targets of a strategic nature to area bombing of industrial, commercial and administrative centres suggested that they had finally given up trying to smash the basic defence structure of the British Isles.

As 1941 turned into 1942 the Beaufighters reigned supreme in the night skies, but in January 1942 they were joined by the de Havilland Mosquito. Originally designed as a bomber, the Mosquito eventually served the RAF in almost every conceivable rôle, including high-speed transport; in the capacity of night-fighter it defended Britain for three years, during which time it accounted for over 600 enemy aircraft, and destroyed 600 flying bombs in 60 nights. During 1942 the Mosquito replaced the Beaufighter in the night-fighter rôle; the first squadron to be equipped with the 'Wooden Wonder' was No.157. Long before the introduction of the Mosquito, however, Fighter Command had turned to the offensive and started hitting back at the enemy.

'RHUBARB' AND 'CIRCUS'

In December 1940 the new Commander-in-Chief Fighter Command, Air Chief Marshal Sholto Douglas, sent his rested squadrons to seek out the enemy over France. Operating in small groups, sometimes even in pairs, the fighters would intrude over enemy-occupied territory looking for targets of opportunity and trying to lure the Luftwaffe into the air. Strafing ground installations, troop con-

Royal Air Force Ranks and Army Equivalents

Aircraftman 2nd Class	*No equivalent*
Aircraftman 1st Class	*Private*
Leading Aircraftman	*Lance Corporal*
Corporal	*Corporal*
Sergeant	*Sergeant*
Flight Sergeant	*Staff Sergeant*
Warrant Officer	*Warrant Officer*
Pilot Officer	*2nd Lieutenant*
Flying Officer	*Lieutenant*
Flight Lieutenant	*Captain*
Squadron Leader	*Major*
Wing Commander	*Lt. Colonel*
Group Captain	*Colonel*
Air Commodore	*Brigadier*
Air Vice-Marshal	*Major General*
Air Marshal	*Lt. General*
Air Chief Marshal	*General*
Marshal of the Royal Air Force	*Field Marshal*

centrations, airfields, railways and coastal shipping proved rather costly, and in the first six months of 1941 33 pilots were shot down and only 26 enemy aircraft were destroyed; but at least these operations showed that the tide was beginning to turn, and it must be remembered that the Hurricanes and Spitfires were designed for air-to-air combat, and did not have the firepower of later ground-attack aircraft.

Some of the cannon-firing Spitfires and Hurricanes proved most effective, and it was at this time that four Mk II Hurricanes, powered by the Merlin XX and flown by No.1 Squadron, were fitted with twelve ·303 Browning machine-guns instead of the normal eight. These Hurricanes were in action on 7 April when Wing Commander J. Peel led five of the squadron in an attack on Berck airfield, setting on fire three Bf109s that were preparing to take off, and machine-gunning ground installations before flying up the coast and attacking a convoy of large vehicles carrying supplies for the German army. Intruder missions of this type came under the general name of 'Rhubarbs' when carried out by small formations and 'Circuses' when carried out at greater strength; on these latter raids fighters often returned to their primary rôle as interceptors while protecting daylight bomber formations.

One aircraft designed as an interceptor but more effective in the ground-attack rôle was the Westland Whirlwind. This twin-engined single-seat fighter went into action with Nos.263 and 137 Squadrons. The Whirlwind was armed with four 20mm cannon and was originally envisaged in the long-range interception rôle, but problems with its handling and engines delayed its introduction into service and the two-seat Beaufighter eventually took over the tasks for which it had been intended. After a very short period as an interceptor squadron, No.263 changed to the intruder rôle and went on the offensive, attacking targets in Northern France and shipping in the Channel. Occasionally the Whirlwind encountered enemy fighters, but if the combat was fought at low level it could hold its own and its firepower proved devastating.

Whirlwinds of No.263 Squadron undertook their first ground-attack mission on 14 June 1941, taking part in the first 'Warhead' operation. This was a code name for low-level strikes against enemy airfields, the targets on this occasion being Maupertuis and Querqueville; but on arrival the squadron found them obscured by ground mist, so transport concentrations were attacked instead. The efforts of the Whirlwind squadrons cannot be claimed as a resounding success, but at least proved that a heavily armed aircraft was the only satisfactory weapon for effective ground attack. The four grouped 20mm cannon in the Whirlwind's nose proved capable of sinking E-Boats, wrecking locomotives, destroying aircraft on the ground, knocking out armour, and were also more than useful in low-level air-to-air combat. The Whirlwind played a significant part in evolving the effective ground-attack techniques employed by the Typhoon and Tempest later in the war.

In June 1941 the Germans turned their attention to Russia, and on the 22nd of that month 'Operation Barbarossa' opened with raids by KGs 2, 3 and 53 on Soviet targets. In an attempt to relieve the pressure on the Russians the RAF increased the pace of their sweeps over France. Most of the Luftwaffe units based in France and the Low Countries during the Battle of Britain had been withdrawn to the

35 Sgt. Pilot Mann of No.452 Sqn. at Jurby in 1942, with his Spitfire Vb, AB198, UD-R 'Sniffer II'. The dog holds a sausage in his mouth, and the signpost is lettered 'BERLIN'. The apparently black outer ring of the fuselage is in fact yellow – this is a distortion due to the type of film used. (Frank Smith via R. L. Ward)

Russian front, leaving only a token force of some 200 aircraft to face the Royal Air Force. In six weeks Fighter Command flew more than 8,000 offensive sorties consisting of both 'Rhubarbs' and 'Circuses'. These operations cost the RAF a total of 123 pilots for the destruction of 81 enemy fighters. The result of these operations was that the Luftwaffe was forced to withdraw some of its fighter units from the Russian front to reinforce what they had considered a holding force in the West.

The counter-attacks over France were not confined to daylight operations, and at night, alongside the early efforts of Bomber Command, RAF fighters carried out intruder missions. The tactics employed were to use a fighter-bomber such as the Blenheim or Boston/Havoc, operating freely in enemy airspace looking for targets of opportunity. The most sought-after target was an enemy airfield with the flare path illuminated, indicating that aircraft were returning or starting out on a mission, and would be at their most vulnerable. A bomber on final approach, with flaps and undercarriage down, the crew beginning to relax after a hard night's work and thinking of the meal and warm bed that awaited them, was a target to dream about. The intruder would get into the circuit, follow a bomber, and at the right moment hit it with all its firepower; destruction was almost certain and those on the bomber rarely knew what had hit them. The airfield lights would immediately be extinguished, but the damage had been done; quite often the intruder pilot would deposit a bomb-load as he passed over the aircraft he had destroyed. The endurance of the aircraft used was such that they could stay over enemy territory for three or four hours; often pilots would remain in the vicinity of one airfield, making several attacks throughout their period of patrol.

One squadron which enjoyed success in this exciting but dangerous work was No.23, which throughout the German night raids had operated as a night-fighter squadron with Blenheims. In March 1941 the squadron started to receive Havocs. A fighter/intruder version of the Boston light bomber, the A-20 Havoc was faster and more heavily armed than the Blenheims the squadron had already been using on daylight sweeps and night intruder missions. One of the first successes enjoyed by No.23 Squadron in 1941 came on 2 January, when Flg. Off. P. Ensor trailed a Heinkel to Dreux in Northern France. With fuel running low and the ever-present danger of the Heinkel crew spotting the Blenheim, Ensor decided to attack before his quarry reached its airfield. He closed to 100 yards, but the German crew still failed to see their attacker and only became aware of its presence when Ensor's ammunition started to hit their aircraft. The Heinkel was set on fire, but before the British fighter could administer the *coup de grâce* its ammunition ran out and the action had to be broken off.

Ensor could only claim a probable; but on 21 April, two weeks after the Havocs had commenced operations, the Blenheim bowed out fittingly with a confirmed kill by Flt. Lt. B.

36 The second 'Eagle' squadron, No.121, was formed at Kirton-in-Lindsey in May 1941, with Hurricanes. They later converted to Spitfires, and this Mk. Vb, BM590, AV-R 'Olga' operated from Debden in September 1942. (via R. L. Ward)

O'Bryen-Hoare, which typified the whole concept of intruder operations. After bombing the airfield at Douai, O'Bryen-Hoare made for St. Leger, where the flare path was switched on and two sets of navigation lights could be seen in the circuit. The first aircraft landed safely but the second, a Focke-Wulf Fw200 anti-shipping bomber, exploded and fell to the ground in pieces under the impact of the Blenheim's shells, which had hit it from a range of less than 50 yards. The Blenheim returned in triumph to Manston, where pieces of its victim were found embedded in its wings.

Havocs continued the work started by the Blenheims but by July 1942 the Mosquito started to replace them, the first kill in the new aircraft going to the man who made the last Blenheim kill, now Wing Commander O'Bryen-Hoare. The Mosquito carried a much heavier punch than either the Blenheim or Havoc, and its four 20mm cannon backed by a similar number of ·303 machine-guns proved most effective when attacking railway locomotives, ships and military installations on the occasions when no enemy aircraft could be located. The intruder Mosquito was basically identical to the version used in the night-fighter rôle, but carried no radar in case this vital weapon should fall into enemy hands. Intruder operations were dangerous, especially when well-trained anti-aircraft crews were encountered, and losses to *flak* were fairly heavy. Flying over blacked-out country with very few navigational aids, the intruder crews had to be wary of any target. When encountering an enemy aircraft they had no way of knowing if an alert gunner had seen them and was giving a running commentary to his pilot as to their position. In general, however, most of the advantages lay with the hunter rather than the hunted, as many RAF bomber crews were to find later in the war when the Luftwaffe adopted the same intruder tactics.

Intruder missions, fighter sweeps, convoy patrols and escort work continued to occupy more and more of Fighter Command's time, and the sight of RAF fighters either escorting them or passing over their ships in the Channel boosted the morale of many seamen. During a coastal sweep on 12 February 1942 two Spitfires spotted the German battle-cruisers *Scharnhorst* and *Gneisenau* with the heavy cruiser *Prinz Eugen* steaming through the Channel. This daring dash by the German battle fleet achieved complete surprise; hurried plans were made, and the RAF attacked the capital ships, which were well protected by E-boats and an umbrella of fighters. In the ensuing battle little damage was caused to the German ships and the RAF received a severe mauling. Cannon-armed Hurricanes of No.1 Squadron together with Spitfires of No.129 Squadron attacked the escorting destroyers, raking their superstructures with a withering fire which caused some damage, but

37 Havoc Z2184, a Turbinlite- and radar-equipped aircraft of 1453 Flight (No.532 Sqn.); these aircraft operated in conjunction with single-seat night fighters in early attempts to combat the Luftwaffe's night bomber offensive. The original name proposed for this modified version of the Boston was 'Helmore', but it was never used. (Imperial War Museum)

38 Roy Briggs of No.131 Sqn. with his Spitfire Mk. Vb, NX-Z 'Karmie', in early 1942. The aircraft is plugged into its starter, and the pilot's parachute rests on the wing-tip. (via R. L. Ward)

return fire from the destroyers accounted for two Hurricanes and their pilots. Meanwhile Whirlwinds of No.137 Squadron engaged at least twenty escorting Bf109s in one of the first aerial combats between the two types, with honours clearly going to the German single-seaters, which shot down four of the Whirlwinds.

The success of the German 'Channel Dash' improved enemy morale and spelt out a timely reminder to the British; but it did not signal any general loss of initiative over the Channel, which was to remain under British interdiction. Small German warships, E-boats, submarines and coastal transports continued to suffer from the attentions of the Spitfires, Hurricanes, Whirlwinds, Beaufighters and Mosquitos of RAF Fighter Command during the early months of 1942. The tenacious defence of 1940 laid the foundations for an enthusiastic offensive spirit, as new aircraft, new equipment and new tactics were perfected; the UK-based fighter squadrons, conscious of the exploits of their comrades in other theatres of war, looked forward to carrying the war ever more closely into the enemy's territory.

RAF Fighter Command, 8 August 1940

No 10 Group

92 Squadron	Pembrey	Spitfire Mk. I
87 Squadron	Exeter	Hurricane I
213 Squadron	Exeter	Hurricane I
234 Squadron	St. Eval	Spitfire I
247 Squadron (One Flt.)	Roborough	Gladiator II
238 Squadron	Middle Wallop	Hurricane II
604 Squadron	Middle Wallop	Blenheim IF
609 Squadron	Middle Wallop	Spitfire I
152 Squadron	Warmwell	Spitfire I

No 11 Group

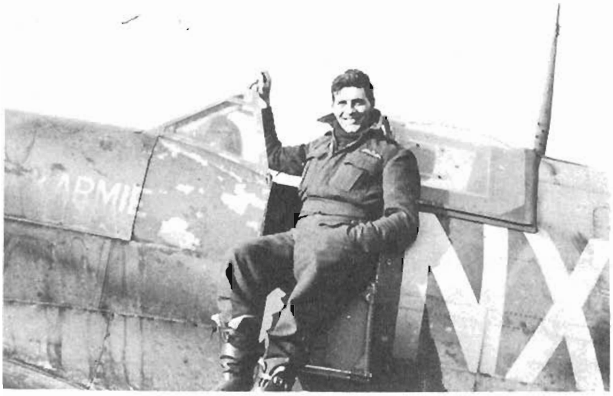
17 Squadron	Debden	Hurricane I
25 Squadron	Martlesham	Blenheim IF
85 Squadron	Martlesham	Hurricane I
151 Squadron	North Weald	Hurricane I
56 Squadron	Rochford	Hurricane I
41 Squadron	Hornchurch	Spitfire I
54 Squadron	Hornchurch	Spitfire I
65 Squadron	Hornchurch	Spitfire I
74 Squadron	Hornchurch	Spitfire I
43 Squadron	Tangmere	Hurricane I
601 Squadron	Tangmere	Hurricane I
145 Squadron	Westhampnett	Hurricane I
1 Squadron	Northolt	Hurricane I
257 Squadron	Northolt	Hurricane I
64 Squadron	Kenley	Spitfire I
615 Squadron	Kenley	Hurricane I
111 Squadron	Croydon	Hurricane I
32 Squadron	Biggin Hill	Hurricane I
610 Squadron	Biggin Hill	Spitfire I
501 Squadron	Gravesend	Hurricane I
600 Squadron	Manston	Blenheim IF

No 12 Group

73 Squadron	Church Fenton	Hurricane I
249 Squadron	Church Fenton	Hurricane I
616 Squadron	Leconfield	Spitfire I
222 Squadron	Kirton-in-Lindsey	Spitfire I
264 Squadron (B. Flt.)	Kirton-in-Lindsey	Defiant I
264 Squadron (A Flt.)	Ringway	Defiant I
29 Squadron	Digby	Blenheim IF
46 Squadron	Digby	Hurricane I
611 Squadron	Digby	Spitfire I
66 Squadron	Coltishall	Spitfire I
242 Squadron	Coltishall	Hurricane I
229 Squadron	Wittering	Hurricane I
266 Squadron	Wittering	Spitfire I
23 Squadron	Coly Weston	Blenheim IF
19 Squadron	Duxford	Spitfire I

No 13 Group

72 Squadron	Acklington	Spitfire I
79 Squadron	Acklington	Hurricane I
607 Squadron	Usworth	Hurricane I
605 Squadron	Drem	Hurricane I
232 Squadron	Turnhouse	Hurricane I
253 Squadron	Turnhouse	Hurricane I
141 Squadron	Prestwick	Defiant I
219 Squadron	Catterick	Blenheim IF
245 Squadron	Aldergrove	Hurricane I
3 Squadron	Wick	Hurricane I
504 Squadron	Castletown	Hurricane I
232 Squadron (Det. Flt.)	Samburgh	Hurricane I
603 Squadron (A Flt.)	Dyce	Spitfire I
603 Squadron (B Flt.)	Montrose	Spitfire I



39 Close-up of Briggs on the wing of 'Karmie'; note the RAF battledress, which came into use during 1942 – the three-point pocket flaps are the only detail of the cut which differed from khaki army battledress. Rank was worn in the form of slip-over loops on the ends of the shoulder-straps, echoing the number and thickness of the cuff stripes on officers' service dress. Note also the very weathered appearance of this operational fighter. (via R. L. Ward)

Hawker Hurricane Mk I

Designed by Sydney Camm, the Hurricane entered service with No.111 Squadron from December 1937 – the RAF's first retractable undercarriage, closed cockpit, monoplane fighter, the first to mount eight guns, and the first to exceed 300 mph. By late 1940 32 squadrons were flying the Hurricane; it destroyed more enemy aircraft in the Battle of Britain than all other air and ground defences put together. Rugged, forgiving of the novice pilot, a steady gun-platform, it held its own surprisingly well against the faster and tighter-turning Bf109E. Early production models were entirely of metal frame construction with fabric covering, but by 1940 the early wings had been replaced by a type with stressed metal skinning. Over 14,000 Hurricanes of all marks were built.

Wing span 40ft 0in *Length* 31ft 4in *Height* 13ft 4$\frac{1}{2}$in *Wing area* 258sqft *Weight loaded* 6,600lb *Armament* 8 × ·303in Browning machine-guns *Powerplant* One Rolls-Royce Merlin II; 1,030bhp *Max. speed* 316mph at 17,500ft *Climb* 6·3 mins to 15,000ft *Ceiling* 33,200ft *Range* 525 miles

Vickers Supermarine Spitfire Mk II

R. J. Mitchell's superb all-metal stressed skin monoplane first entered service with No. 19 Squadron in July 1938, and by the outbreak of war nine squadrons were fully equipped. Frailer and more streamlined than the Hurricane, it handled like a pilot's dream, and was arguably the most aesthetically beautiful aircraft ever to fly. There was little to choose in performance between the Spitfire and the Bf109E; the latter's superior dive and climb were balanced by the Spitfire's superior manoeuvrability. More than 20,000 were built of all marks, and Spitfires still represented some 20% of the RAF's strength in 1945.

Wing span 36ft 10in *Length* 29ft 11in *Height* 12ft 3in *Wing area* 242sqft *Weight loaded* 6,317lb *Armament* 8 × ·303in Browning machine-guns* *Powerplant* One Rolls-Royce Merlin XII; 1,150bhp *Max. speed* 357mph at 17,000ft *Climb* 7 mins to 20,000ft *Ceiling* 37,500ft *Range* 395 miles

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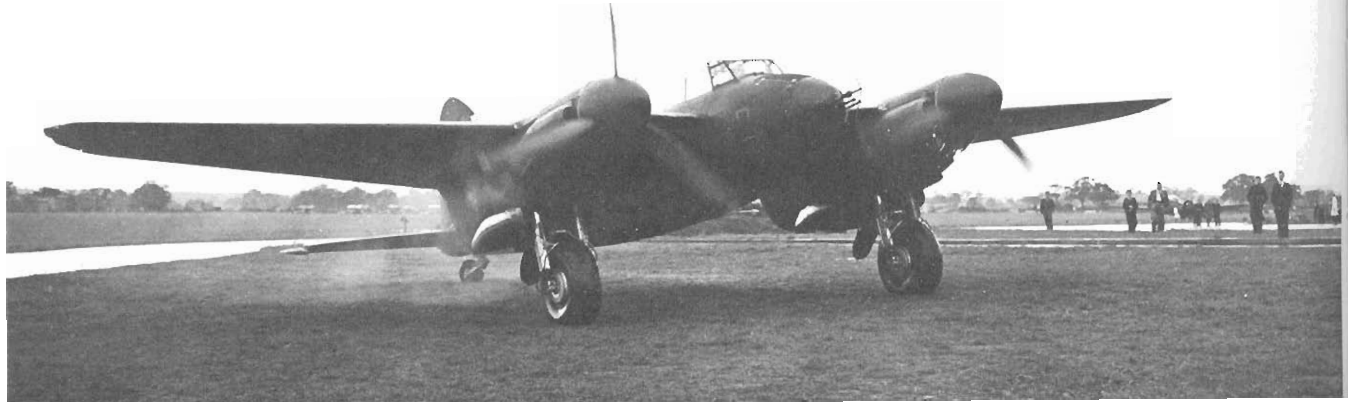
* Spitfire Mk. Ib aircraft fitted with two 20mm cannon and four ·303 machine-guns entered service in August 1940 with No.19 Sqn., but achieved only limited success. The difficulties were overcome in 1941.

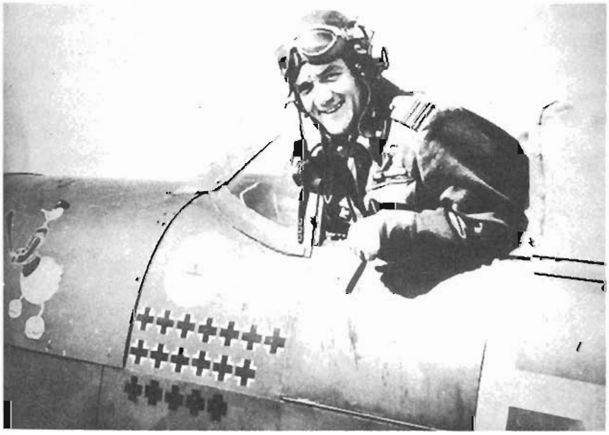


40 Mosquito Mk II night-fighter equipped with AI Mk. IV radar, in all-over night black finish. (Imperial War Museum)

De Havilland Mosquito Mk II

Conceived as a private-venture high speed bomber, the Mosquito, constructed largely from wood, exhibited such magnificent performance figures that it was quickly modified as a fighter, and eventually served in numerous operational rôles. No.157 Squadron took delivery of the first night-fighters in January 1942; the operational debut took place in April 1942, and 466 NF.IIs were built in all. With radar removed the Mk II also served as an intruder attack aircraft.

Wing span 54ft 2in *Length* 40ft 4in *Height* 17ft 5in *Wing area* 435sqft *Weight loaded* 18,567lb *Armament* 4 × 20mm Hispano cannon, 4 × ·303in Browning machine-guns *Powerplant* Two Rolls-Royce Merlin 21 or 23; 1,460bhp *Max speed* 370mph at 14,000ft *Climb* 6·75 mins to 15,000ft *Ceiling* 34,500ft *Range* 1,705 miles.



41 The Spitfire V of Sqn. Ldr. Johnny Zumbach, No.303 (Polish) Sqn., displays 13 confirmed kills and 5 'probables' below the 'Kosciuszko' emblem of the squadron. (via R. L. Ward)

LÉGENDES

1 Le Roi George VI d'Angleterre passant la revue du No.615 Sqn., Auxiliary Air Force; en France début 1940. Un Blenheim Mk IV en arrière plan.

2 Hurricanes du No.87 Sqn. RAF, Vassincourt, en France, début 1940. Remarquez le terrain boueux. Les appareils ont l'emblème de l'escadron sur leurs empennages à la place occupée ultérieurement par l'insigne nationale rouge-blanc-bleu. La plupart des appareils ont des hélices Watts à deux ailes.

3 Blenheim Mk IV's de la 'Force Avant-garde de l'Armée de l'Air' (AASF) en France, hiver 1939–40.

4 Hurricane I's, No.85 Sqn. à Sellin à la frontière franco-belge, début 1940. L'hexagone blanc est l'insigne de l'escadron. L'appareil au premier plan a son dessous bâbord peint en noir : le système A de camouflage; et des cocardes de fuselage de 35 inch de diamètre.

5 Blenheim Mk IF's, No.604 Sqn., Auxiliary Air Force; Northolt, le 6 avril 1940. Remarquez le canon, en barbette au centre du fuselage (dessous) et les dessous bâbords peints en noir.

6 Hurricanes du No.73 Sqn. en France, 1940, avec des rayures tricolores à l'empennage, mesure d'idendité pour les Forces Françaises. Remarquez que tous sauf un appareil ont leurs lettres d'idendité d'escadron 'TP' effacées par la peinture.

7 Spitfires faisant le plein, début 1940; l'appareil en arrière plan a des dessous bâbords peints en noir et une lettre individuelle 'O' d'idendité sous l'hélice.

8 Spitfire Mk IIa, No.603 Sqn. récuperé par une équipe de sauvetage Luftwaffe après un atterissage brutal en France.

9 Des appareils démolis intentionnellement en France pour empêcher les Allemands de les capturer indemnes lorsqu'ils étaient immobilisés par une attaque ou un manque d'essence; un Blenheim I du No. 53 Sqn. et plusieurs Hurricanes.

10 Un pilote du No.310 Sqn. (Tshécoslavaque) après une patrouille opérationnelle en 1940; il porte un casque de vol et un masque d'oxygène des premiers modèles, et un vieux pullover comme tenue de vol, par temps doux.

11 Hurricane Mk I No.85 Sqn. pendant la Bataille d'Angleterre; système de camouflage B et une cocarde de fuselage du type AI ave un boucle jaune extérieur.

12 Tangmere 1940, l'entretien par l'équipage au sol d'un Hurricane Mk I, P3886, UF-K du No.601 Sqn. (Comté de Londres). L'insigne de l'empennage comprend des rayures blanches et bleues de 9 inch avec tout l'avant de l'empennage peint en rouge; ce style était adopté à l'usine Hawker.

13 Livraison de l'essence aux réservoirs principaux d'un aéroport sous la surveillance d'un Officier d'équipement.

14 Hurricanes du No.111 Sqn. faisant le plein à un camion-citerne Albion 350, à Wick, février 1940. L'escadron donna du soutien aérien jusqu'à la base navale Scapa Flow.

15 Vérification des contrôles de pompage d'un camion-citerne Albion 350.

16 Gloster Gladiator Mk. II, N2308, HP-B, No.247 Sqn.; Roborough, août 1940. Celui-ci était l'unique escadron Gladiator en opération pendant la Bataille d'Angleterre et leurs bases se trouvaient à Plymouth et St. Eval.

17 Pilot Officer A. G. Lewis, No.85 Sqn., se prépare à monter dans son Hurricane; le mécanicien démarre le moteur pendant que Lewis règle l'harnais de son parachute.

18 Lewis se fait aider pour monter dans la carlingue du Hurricane VY-R. La plaque qui dépasse sur le nez de l'appareil protégeait les pilotes des éclats des échappements, la nuit.

19 Vendeur de fruits dans une rue bombardée de Londres, été 1940. La pancarte indique que 'Les bombes d'Hitler ne nous auront pas .'

20 P3395, JX-B, un Hurricane Mk I du No.1 Sqn. à Wittering, octobre 1940; cet appareil figure également dans la planche couleur 'E'. Le pilote, Flying Officer Arthur Clowes (Distinguished Flying Medal), peigna des rayures sur l'emblème de la guêpe, enrégistrant ses victoires.

21 Les équipages de No.264 Sqn (des avions de chasse Defiant) se reposent entre missions; les gilets de sauvetage 'Mae West' sont portés par-dessus les tenues de service journaliere.

22 Spitfire Mk Ia, No.19 Sqn., faisant le plein entre missions; Duxford, octobre 1940. La 'litière' devant la roue sert à porter

les boîtes de munitions.

23 Le pilote belge, Le Roy du Vivier dans son Hurricane du No.43 Sqn. déployant les drapeaux belges et RAF au-dessus de l'emblème à carreaux blanc et noir traditionnel de l'escadron. Il commanda par la suite l'escadron, combattant en France, Grande Bretagne et en Afrique du Nord.

24 Une pilote d'un Spitfire portant la casque de vol, dernier modèle; le siège qui se trouve dans la position surélevée pour le décollage, serait baissé et la capote de la carlingue fermée dés le décollage.

25 L'équipage au sol en tenue de service journalierc avec un un avion Havoc équipé d'un 'Turbinlite'. à Wittering, 1941.

26 Avion de chasse de nuit Defiant du No. 265 Sqn., camouflage en noir mat, avec le pont au-dessus du fuselage abaissé afin de donner un meilleur champ de tir à le mitrailleur.

27 Un magasin bombardé à Londres, toujours ouvert pour le commerce, avec un slogan écrit en craie 'Bombardé mais pas battu . . .' Entre juillet et décembre 1940, 23,000 civils britanniques sont morts dans les bombardements ennemis et 32,000 ont été blessés.

28 Sergeant Pilot W. Leadbeater, No. 43 Sqn., avec son Hurricane 'Raemaekers' qui a souffert des intempéries. Remarquez les courroies pour les jambes du gilet de sauvetage, un des premiers modèles.

29 Un Hurricane Mk I, V7608, XR-J du No.71 (L'aigle) Sqn. à Kirton-in-Lindsey, 1941. Ce premier escadron volontaire américain a effectué sa première patrouille opérationnelle le 5 février 1941. Le dessous de l'aile bâbord est peint en noir et une bande de couleur 'ciel' couvre le numéro de série.

30 Hurricane Mk IIc du No.3 Sqn. avec des canons 20mm, été 1941. Après son retour de France en 1940, l'escadron était en Ecosse jusqu'à avril 1941, retournant au sud pour effectuer des patrouilles de jour au-dessus de la France occupée et pour travailler en coopération avec les unités 'Turbinlite' Havoc.

31 Spitfire Mk Vb, No.92 Sqn., Biggin Hill, le 11 juillet 1941. Remarquez l'enseigne 'V pour Victoire' juste en-dessous du parebrise, et une antenne d'equipement IFF (Idendité, Ami ou Ennemi) débouchant de la cocarde du fuselage. IFF permettait aux opérateurs du radar au sol de reconnaître les appareils britanniques.

32 Flight Lieutenant J. A. Gibson de la Nouvelle Zélande dans un Spitfire Vb, BL351, BP-H du No.457 Sqn.; Jurby, décembre 1941. Le lévier à l'intérieur du panneau pliant aidait les pilotes à sortir des appareils abattus. Remarquez l'enseigne victorieux séparé en deux, indiquant sans doute une victoire partagée avec un autre pilote.

33 Sergeant Pilot E. W. Bierer, No.43 Sqn. avec un Hurricane 'Lothaire'; les réservoirs sous les ailes de 90 gallons indiquent que cette photo date de 1941, l'époque de nombreuses patrouilles au-dessus de la France.

34 Des pilotes polonais du No.303 Sqn., avec un tableau de points fabriqué d'un empennage d'un Junkers Ju88A, enregistrant la 178e victoire de l'escadron en 1942. L'escadron était le premier unité polonais d'aller au feu à la Bataille d'Angleterre. En arrière-plan, un Spitfire Mk. Vb avec un insigne de l'escadron en dessous du parebrise et un emblème polonais sous les échappements.

35 Sergeant Pilot Mann, No.452 Sqn., Jurby, 1942. Le Spitfire Mk. Vb, AB198, UD-R est nommé 'Sniffer II'. L'emblème montre un chien avec une saucisse à la bouche et un poteau indicateur vers Berlin. Le boucle extérieur de la cocarde du fuselage est en vérité jaune, l'impression noire étant provoqué par le type de pellicule utilisée.

36 Spitfire Mk Vb, BM590, AV-R 'Olga' du No.121 Sqn., le deuxième escadron 'Aigle' constitué des volontaires américains, à Kirton-in-Lindsey en mai 1941. 'Olga' vola depuis Debden pendant le mois de septembre 1942.

37 Havoc, No. de série Z2184 du No.1452 Flight (No.532 Sqn.), équipé de radar et 'Turbinlite' pour des opérations avec les avions de chasse contre les bombardiers de nuit Luftwaffe.

38 & 39 Roy Briggs, un pilote du No.131 Sqn. avec un Spitfire Mk Vb, NX-Z 'Kamie' début 1942. L'appareil est branché à sa remorque de démarrage, et le parachute est prêt accroché à l'aile.

40 Mosquito Mk II, appareil de chasse de nuit, avec radar AI Mk IV et camouflage tout en noire.

41 Spitfire Mk V de Squadron Leader Johnny Zumbach, No. 303 (polonais) Sqn., affichant 13 victoires certaines et 5 victoires 'probables' sous l'insigne de l'escadron 'Kosciuszko'.

Notes pour les illustrations en couleurs.

Page 25: Flying Officer RAFVR (Réserve volontaire de la RAF) 1940. Il porte la tenue de service avec l'attribut de pilote au-dessus de la poche gauche, et un galon autour du poignet. Des insignes en cuivre de Réserve volontaire sur le col; un ruban de la D.F.C. (Distinguished Flying Cross) sous l'attribut de pilote. Des bottes de pilote en daim avec du cuir sur la partie couvrant le pied. Il porte à la main le blouson Irvin havane, qui était très recherché par les pilotes, et il porte de façon typique un foulard de soie autour du cou.

Page 26 en haut. cet avion, R6923, était à l'origine un Mk Ib avec deux canons de 20 mm, qui fut piloté en juillet 1940 par le Sergeant J A. Potter du No. 19 Sqn.; sur l'illustration ici on le voit après sa transformation en Mk Vb. avec deux canons et quatre mitrailleuses, ·303, en service avec le No 92 Sqn. en 1941. Méthode B de camouflage; les cocardes du type B au-dessus des ailes; le type A en-dessous des ailes, type A1 sur les côtés du fuselage. Les codes de l'escadron QJ, le code individuel de l'avion S.

Page 26 en bas: cet avion, N1535 était perdu le 24 août 1940 lorsque le pilote et le mitrailleur, Squadron Leader Hunter et Pilot Officer King, furent abattus; No. 264 Sqn. perdirent six avions ce jour là. Méthode B de camouflage; des cocardes du type B au-dessus de l'aile; aucune cocarde sous les ailes; des cocardes du type A1 sur les côtés du fuselage. Les codes de l'escadron PS, le code individuel de l'avion, A; le drapeau du Squadron Leader sous la carlingue sur les deux côtés.

Page 27: Remarquez le dessous blanc et noir de cet avion qui était en service en France en 1939–40. Les cocardes du type B sur les deux côtés du fuselage; un circle devant sur le capot du moteur en bronze; les enjoliveurs des roues argentés.

Pages 28–29: P3395 fut piloté par Flying Officer A. V. Clowes depuis Wittering, en octobre 1940. On lui avait accordé $3\frac{1}{2}$ victoires aériennes pendant la Bataille d'Angleterre. Il mourut plus tard pendant la guerre. L'emblème de la guèpe était son insigne personnel. Méthode A de camouflage, avec des signes typiques d'usage, des cocardes du type B au-dessus des ailes; des cocardes du type A en-dessous des ailes; des cocardes du type A1 sur les côtés du fuselage. Les codes de l'escadron JX, et le code individuel de l'avion, B.

Page 30: Ce Mosquito, peint entièrement en noir avec des lettres de code en rouge très attenué, vola au-dessus de la France en opérations resquilleuses de nuit; il ne fut pas équipé de radar. Des cocardes du type B au-dessus des ailes; et du type C1 sur les côtés du fuselage.

Page 32, à gauche; Exemple typique d'un sergent pilote chasseur de 1940, portant la tenue de vol non-officielle; un pullover en grosse laine avec ses pantalons d'uniforme, des bottes de pilote et un gilet de sauvetage 'Mae-West'. Les noms étaient souvent indiqués sur ces gilets de sauvetage. Sur la chaise se trouve la tunique, avec l'attribut de pilote au-dessus de la poche, et les trois chevrons de sergent, en bleu pâle et bleu foncé sur les deux manches. Sur chaque épaule se trouve l'insigne porté par tout le personnel RAF en-dessous du rang d'officier: un albatros bleu pâle sur fond rectangulaire bleu foncé.

Page 32, à droite: Une équipe typique de mécaniciens, en 1940, portant une ceinture des cartouches ·303. Le calot bleu a un insigne en cuivre situé à l'avant sur la gauche, ill était porté par tout le personnel des rangs. Des salopettes noires sont portées avec des bottes Wellington, ces dernières pour éviter les dégats occasionnés lorsqu'on grimpait sur les avions avec des bottes à clous.

ÜBERSCHRIFT

1 König George VI von England auf einem Besuch bei No.615 Sqn., Auxiliary Air Force; Frankreich, Frühling 1940. Im Hintergrund ein Blenheim Mk IV.

2 Hurricanes von No.87 Sqn. RAF; Vassincourt, Frankreich, Frühling 1940 – den Schlamm beachten! Auf den Seitensteuerflächen der Maschinen steht das Staffelwappen, wo später das rot-weiss-blaue Emblem getragen wurde. Die Mehrzahl der Maschinen sind mit dem Watts zwei-Blatt Propeller ausgerüstet.

3 Blenheim Mk IV's der 'Vergeschobenen Luftangriffs-Gruppe' (Advanced Air Striking Force – AASF); Frankreich, Winter 1939–40.

4 Hurricane Mk I's, No.85 Sqn., bei Sellin, in der Nähe der französisch-belgischen Grenze; Frühling 1940. Das weisse Sechseck ist das Staffelabzeichen. Die Backbordunterseite des im Vordergrund stehenden Flugzeugs ist schwarz angestrichen worden. Tarnschema 'A' mit Rumpferkennungskreisen mit einem Durchmesser von 35 inches.

5 Blenheim Mk IF's, No.604 Sqn., Auxiliary Air Force; Northolt, 6. April 1940. Kanonenhulse unterm Rumpf, und die Schwarz-angestrichenen Backbord Unterseite beachten.

6 Hurricanes von No.73 Sqn., Frankreich 1940. Wegen Zusammenarbeit mit den franzosischen Streitkräften, sind dreifarbigen Erkennungszeichen an den Seitensteuerblatt angebracht worden. Die Staffel Erkennungsbuchstaben 'TP' sind, bis auf der eine Maschine, überstrichen worden.

7 Spitfires beim Tanken, Frühling 1940. Beim Flugzeug im Hintergrund ist die Backbord Unterseite schwarz angestrichen worden. Unterm Propeller ist die Erkennungsbuchstabe 'O' angebracht worden.

8 Spitfire Mk. IIa, No.603 Sqn., wird von der Luftwaffe nach Absturz in Frankreich geborgen.

9 Maschinen, die durch Gefechtsschäden oder Triebstoffmangel nicht einsatzfähig waren, die von den eigenen Kräften, um eine mögliche Erbeutung durch die deutschen Streitkräften zu verhindern, zerstört worden sind. Ein Blenheim I von No.53 Sqn. und einige Hurricanes.

10 Pilot von No.310 (tschechische) Sqn. nach Einsatzflug, 1940. Er trägt den älteren Fliegerhelm mit Sauerstoffmaske, und ein altes Pullover als Fliegeruniform im milden Wetter.

11 Hurricane Mk I, No.85 Sqn., während dem Luftschlacht über England. Tarnfarben Schema 'B', Rumpfemblem Typ A1 mit gelber Umrandung.

12 Tangmere 1940. Bodenpersonal bei Bedienung der Hurricane Mk. I, P3886, UF-K von No.601 (Grafschaft von London) Sqn. Das Seitensteuerblattemblem besteht aus 9-inch weiss und blaue Streifen. Der ganze Vorderteil des Seitensteuerblattes ist rot gefärbt worden. Diese Farben sind in der Hawker Fabrik angebracht worden.

13 Ein Nachschuboffizier übersieht eine Triebstofflieferung im Flugplatz Haupttriebstofflager.

14 Hurricanes von No.111 Sqn. nimmt Triebstoff von einem Albion 350 Tankwagen an Bord; Wick, Februar 1940. Diese Staffel wurde als Luftverteidigung bei dem Marinestützpunkt Scapa Flow eingesetzt.

15 Uberprufung von Pumpeinrichtungen in einem Albion 350 Tankwagen.

16 Gloster Gladiator Mk. II, N2308, HP-B, No.247 Sqn.; Roborough, August 1940. Die einzige Gladiator-Staffel die während dem Luftschlacht über England geflogen wurde. Sie wahr in Plymouth und St. Eval stationiert.

17 Pilot Officer A. G. Lewis, No.85 Sqn., besteigt seine Hurricane. Der Mechaniker lässt den Motor an, Lewis schnallt sein Fallschirmgeschirr fest.

18 Lewis besteigt, mit Unterstützung, die Kanzel der Hurricane VY-R. Die Scheibe vor der Kanzel schützt der Pilot von der Glut der Auspuffe bei Nacht.

19 Obstverkäufer auf einer bombenbeschädigten Londoner Strasse, Sommer 1940. Das Plakat lautet 'Hitler's Bomben können uns nicht besiegen!'

20 P3395, JX-B, eine Hurricane Mk. I von No.1 Sqn.; Wittering, Oktober 1940. Das Flugzeug ist auf Farbtafel E abgebildet. Der Pilot, Flying Officer Arthur Clowes, DFM (Distinguished Flying Medal) hat seine Siege im Luftkampf mit Streifen auf den Wespenabzeichen notiert.

21 Bordpersonal von No.264 Sqn. (Defiant Jagdflugzeuge) nehmen zwischen Einsatzflüge ihre Ruhe. Die 'Mae West' Rettungswesten werden über die Dienstanzüge getragen.

22 Spitfire Mk. Ia, No.19 Sqn., wird mit Munition zwischen Einsatzflüge versorgt; Duxford, Oktober 1940. Die Karre vorm Rad ist für die Munitionskisten.

23 Belgischer Pilot Le Roy du Vivier in seiner Hurricane von No.43 Sqn., mit belgische und RAF Fahnen über die schwarz-weisse Wurfeln, traditionelles Staffelemblem. Er wurde später Staffelkapitän, und focht in Frankreich, Grossbritannien und Nord Afrika.

24 Spitfire Pilot mit dem später eingeführten Fliegerhelm. Der Sitz, für den Abflug hochgestellt, wurde in Flug niedergestellt und die Kanzelhaube wurde zugemacht.

25 Bodenpersonal in Dienstanzüge mit einem Havoc (Douglas A-20) Flugzeug, das mit 'Turbinlite' ausgerüstet ist; Wittering, 1941.

26 Defiant Nachtjagdflugzeug, No.265 Sqn., mit mattschwarzer Tarnfarbe. Das Rumpfoberdeck ist niedriger gestellt worden, um den MG-Schützer ein besseres Feuerfeld anbieten zukönnen.

27 Bombenbeschädigte Londoner Laden hat noch auf. Die Losung lautet: 'Ausgebombt aber nicht besiegt!' Zwischen Juli und Dezember 1940 sind 23 000 britische Zivilisten durch Bomben getötet und 32 000 verletzt worden.

28 Sergeant Pilot W. Leadbeater, No.43 Sqn., mit seinem zerfetzten Hurricane (Namens 'Ramaekers'). Die Rettungswesten hatten bei Kriegsausbruch, wie hier gezeigt, Beinenriemen.

29 Hurricane Mk I, V7608, XR-J, von No.71 (Adler) Sqn.; Kirton-in-Lindsey, 1941. Diese ersten amerikanische Freiwilligenstaffel wurde 5. Februar 1941 zum ersten Male eingesetzt. Die Unterseite des Backbordflügels ist schwarz angestrichen, ein himmelfarbiges Band ist über die Standnummer angestrichen worden.

30 Hurricane Mk IIc von No.3 Sqn. mit 20mm Kanonen bewaffnet, Sommer 1941. Nach wiederkehr von Frankreich 1940, ist diese Staffel bis April 1941 nach Schottland verlegt worden. Anschliessend nach Sudengland versetzt, ist sie bei Tagesangriffe über besetzten Frankreich, und in Zusammenarbeit mit Havoc 'Turbinlite' Einheiten eingesetzt worden.

31 Spitfire Mk. Vb, No.92 Sqn., Biggin Hill, 11. Juli 1941. 'V für Victory' – 'den Sieg' – unter der Windschützscheibe beachten. Aus der Mitte des Rumpferkennungskreises ragt eine 'IFF' (Identifizierung Freund/Feind) Antenne vor. 'IFF' ermöglichte eine Erkennung britischer Flugzeug durch Radar Bedienungsmannschaften.

32 Flight Lieutenant J. A. Gibson, aus Neu-Seeland, in seiner Spitfire Vb, BL351, BP-H von No.457 Sqn.; Jurby, Dezember 1941. Das Brecheisen an der Falttafel-innenseite ist als Ausbruchshilfe für Piloten abgestürzten Flugzeuge gedacht. Das halbierte Siegeszeichen deutet an einen Sieg, den vielleicht mit einem anderen Piloten geteilt worden ist.

33 Sergeant Pilot E. W. Bierer, No.43 Sqn., mit Hurricane 'Lothaire'. Die 90-Gallon Triebstoffbehälter unter den Flügeln helfen uns, das Bild im Jahre 1941 zu setzen. Damals wurden viele, langdavernden Streifflüge über Frankreich geflogen

34 Polnische Piloten von No.303 Sqn. Als Anzeigetafel dient die Seitensteuerrungsfläche einer Junkers Ju88A. Darauf erscheint der 178. Sieg der Staffel, Jahre 1942. Diese Staffel wurde als erste polnische Einheit im Luftschlacht uber England eingesetzt. Im Hinterground, eine Spitfire Mk. Vb, mit Staffelabzeichen unter der Windschützscheibe, und polnischen Hoheitsabzeichen unter dem Auspuffrohr.

35 Sergeant Pilot Mann, No.452 Sqn.; Jurby, 1942. Die Spitfire Mk. Vb, AB198, UD-R hiess 'Sniffer II'. Das Emblem ist ein Hund, mit einem Wurst im Mund, und Wegweiser nach Berlin. Obwohl der äussere Ring des Rumpfkreises schwarz erscheint, er ist in der Tat gelb. Die schwarze Erscheinung ist eine Wirkung des Films.

36 Spitfire Mk Vb, BM590, AV-R 'Olga' von No.121 Sqn. Die zweite amerikanischer Freiwilligen 'Adler-Staffel', errichtet zu Kirton-in-Lindsey, Mai 1941. 'Olga' wurde von Debden aus während September 1942 geflogen.

37 Havoc, Standnummer Z2184, von No.1453 Flight (No.532 Sqn.), mit Radar und 'Turbinlite' für Einsatz mit Einmannjagdflugzeuge gegen Luftwaffe Nachtbomber ausgerüstet.

38 & 39 Roy Briggs, Pilot der No.131 Sqn., mit Spitfire Mk Vb, NX-Z, 'Karmie'; Frühling 1942. Das Flugzeug ist mit dem Anlassgerät gekoppelt. Der Fallschirm liegt auf dem Flügel.

40 Mosquito Mk II Nachtjagdflugzeug mit Radargerät AI Mk. IV und schwarze Tarnfarbe.

41 Spitfire Mk. Vb von Squadron Leader Johnny Zumbach, No.303 (polnische) Sqn. Sie zeigt 13 bestätigte und 5 unbestätigte Siege unter dem 'Kosciuszko' Staffelabzeichen.

Farbtafeln

Seite 25: Flying Officer, RAF Volunteer Reserve, 1940. Er trägt Dienstanzug mit Fliegerabzeichen über die Linke Brusttasche. Die Tressen um die Ärmelumschläge sind Dienstgradabzeichen; die 'VR' Kragenabzeichen sind aus Messing. Untern Fliegerabzeichen befindet der Band des Distinguished Flying Cross. Die Fliegerstiefel haben Wildlederne Schaften. Bei sich hat er seine beigefarbige, Schafpelz 'Irvin' Fliegerjacke (der letzte Schrei!) die, wie auch das seidene Halstuch, sehr beliebt war.

Seite 26, Oben: Dieses Flugzeug R6923, ursprunglich ein Mk. Ib mit zwei 20mm Kanonen, ist in einem Mk. Vb mit zwei Kanonen und vier ·303 inch MGs umgebaut worden. Es wurde Juli 1941 von Sergeant J. A. Potter, No.19 Sqn. geflogen, es leistet aber hier Dienst bei No.92 Sqn. Tarnfarbenschema B. Hoheitsabzeichen (Kokarden): Flügeloberseiten – Typ B; Flügelunterseiten – Typ A; Rumpfseiten – Typ A1. Staffelerkennungsbuchstaben – 'QJ'; Maschinekennzeichen – 'S'. *Seite 26, Unten:* Das hier abgebildete Flugzeug N1535 wurde mit Pilot, Squadron Leader Hunter, und MG Schützer, Pilot Officer King, 24. August 1940 abgeschossen. No.264 Staffel verlor an diesen Tag 6 Flugzeuge. Tarnfarbschema B. Kokarden: Flügeloberseiten – Typ B; Flügelunterseiten – keine; Rumpfseiten – Typ A1. Staffelerkennungsbuchstaben – 'PS'; Maschinekennzeichen – 'A'. Unterm Kanzel, an beiden Seiten, befindet sich das Staffelkapitänessemblem, ein Wimpel.

Seite 27: Die schwarz-weiss gestrichenen Flugzeugunterseite, Frankreich, 1939–40 beachten! Rumpfseitenkokarden – Typ B. Motorenhaubevorderring – bronzfarbig; Radkappen- silber.

Seiten 28 u.29: Maschine P3395 wurde von Flying Officer A. V. Clowes vom Flugplatz Wittering, Oktober 1940 geflogen. Während der Luftschlacht über England ist er mit 3½ Luftsiege zugetraut worden. Er fiel später im 2. Weltkrieg. Das Wespenemblem war seine persönliche Wappen. Tarnfarbschema – A (abgenutzt). Flügelkokarden: Oberseiten – Typ B; Unterseiten – Typ A; Rumpfseiten – Typ A1. Staffelerkennungsbuchstaben – 'JX'; Maschinekennzeichen – 'B'.

Seite 30: Dieses schwarzgestrichene Mosquito mit dunkelroten Staffel- und Maschinenbuchstaben wurde bei Nacht über Frankreich eingesetzt. Es war mit Radar nicht ausgerüstet. Kokarden: Flügeloberseiten – Typ B; Rumpfseiten – Typ C1.

Seite 32, links: Ein typischer Sergeant Jagdflugzeugpilot 1940 in unvorschriftsmässiger Fliegerausrüstung: dicke Wollpullover, Dienstanzughosen, Fliegerstiefel und 'Mae West' Rettungsweste. Es war üblich Namen an den Rettungswesten anzubringen. Am Stuhl hängt seine Dienstanzugjacke mit Fliegerabzeichen und die drei Winkel eines Feldwebels (hellblau auf dunkelblau) auf beiden Ärmeln. An den Schultern ist das Abzeichen, dass von allen Unteroffiziere und Mannschaften getragen ist – auf einem dunkelblauen Rechteck, ein hellblauer Albatros. *Seite 32, rechts:* Typischer Bodenpersonal (Mechaniker) 1940, mit ·303 inch MG Munitionsgurtel. Das blaue Schiffschen hat vorne, links das messinge Mützenemblem, dass für Unteroffiziere und Mannschaften vorgeschrieben ist. Der Man trägt schwarzer Arbeitsanzug mit Gummi (oder 'Wellington') Stiefel um das Flugzeug mit eisenbesetzten Lederstiefel nicht zu beschädigen.

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