

NOVEMBER 2014

## In Flanders Fields

In Flanders fields the poppies grow  
Between the crosses, row on row  
That mark our place: and in the sky  
The larks still bravely singing, fly  
Scarce heard amid the guns below.

We are the Dead. Short days ago  
We lived, felt dawn, saw sunset glow,  
Loved, and were loved, and now we lie  
In Flanders fields.

Take up our quarrel with the foe:  
To you from failing hands we throw  
The torch: be yours to hold it high!  
If ye break faith with us who die  
We shall not sleep, though poppies grow  
In Flanders fields.

John McCrae

## I SAW THE SOLDIERS MARCHING

I saw the soldiers marching, one drear November day,  
Those heroes bold, from wars of old, in countries far away.  
I heard the drums like thunder, the sound of marching feet,  
As men of ancient valor marched down our little street.

I heard the skirl of bagpipes, the blare of brasses bold,  
As heroes from another time relived the days of old.  
The old, the halt, the lame, the slow, they marched with solemn pace,  
To honor comrades fallen at another time and place.

I felt the tightness in my throat, the tears that burned my eyes,  
As I watched the quiet dignity of old men marching by.  
The fine young men, and women too, in battles long ago,  
Who gave their youth and some, their lives, to fight our country's foe.

On this day will be remembered by comrades who remain,  
And by the heavens, weeping, with softly falling rain.

The medals softly jingling on every passing chest,  
In memory of companions who've long been laid to rest.

There are some unfit, and some who sit, in wheelchairs, row on row,  
While they recall what price was paid to turn our country's foe.  
And some will stand with tear-dimmed eyes, and some with faces grim,  
While all repeat the solemn vow, "WE WILL REMEMBER THEM."

*by A. Lawrence Vaincourt*

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## Canadian Moment

*by William Bedford*

The plaintive wail of the pipes and the soft beat of the muffled echo in the morning mist.  
The maple leaf snaps in the wind above the bowed heads of the mourners  
while the words of John McRae's immortal poem: "In Flanders Field." are read.  
As the bugler sounds the last post the youngsters fidget, and  
look forward to playtime.  
The oldsters shuffle, cough and look backward to wartime  
The past and future of this blessed land mingle here  
at the eleventh hour  
on the eleventh day  
of the eleventh month.

Lest we forget.

## SHOOTING DOWN A POPULAR MYTH

For decades popular mythology claims then-prime minister John Diefenbaker ordered the cancellation of the Avro Arrow project and the destruction of all planes and blueprints at the behest of the United States military, who were worried that the Arrow would challenge the supremacy of the U2 spy planes. In fact, recently declassified top-secret memos from 1958 discovered by Peter Zuuring reveal Gen Charles Foulkes, Canada's chairman of the chiefs of staff for the Department of Defence pressured Diefenbaker to scrap the plane, citing, not only its exorbitant cost, but the worrisome lack of Canadian military control over Avro and the Arrow project.

According to Pierre Sevigny, the associate defense minister in John Diefenbaker's cabinet from 1959 to 1963, the Americans actually offered to help save the program.

Documents obtained by Zuuring corroborate this, revealing that American secretary of the air force James Douglas floated the idea of purchasing and using a squadron of Arrows on behalf of the United States as a line of defense against possible Soviet attack in the Arctic. The Canadian government turned down the offer. As for the actual destruction of the planes, Sevigny has gone on record claiming that Crawford Gordon, head of A.V. Roe, ordered the destruction of all 37 Arrows and the blueprints out of spite when the program was scrapped in 1959.



## A PRETTY PICTURE



Member Rick Thorburn recently took the picture at left to show the aircraft that he has built. A retired architect, Rick's passion is converting boxes of aluminum stock and AN hardware from Van's factory in Aurora OR into things of beauty. At left is the first aircraft he completed: an RV-6A, now owned by John Madsen and has over 500 hours on the clock. Next is another RV-6A sporting a neat red and white paint scheme with only 50 hours since completion. It is fitted with a 160 horsepower Lycoming engine with a fixed pitch metal propeller and has a Dynon 100 in the panel. Proudly displaying polished aluminum, a checkerboard tail, and red nose, tips, and undercart, Rick's third aircraft also has fifty hours on a 180 horsepower IO-360 Lycoming engine and has a Dynon 100 in the panel. Next to it, and forsaking side-by-side seating for a more "sporty" tandem seating, Rick's latest model is a bright yellow RV-8A that sports a black upper cowling and "speed streak" on the sides and was only a fin and stabilizer when he purchased it from another builder. Rick hopes to have it in the air in the near future.

## CROC FREE WATERS

While fishing off the Australia coast, a tourist capsized his boat. He could swim, but his fear of crocodiles kept him clinging to the overturned craft. Spotting an old beachcomber standing on the shore, the tourist shouted, "Are there any crocs around here?!"

"Naw," the man hollered back, "they ain't been around for years!"

Feeling safe, the tourist started swimming leisurely toward the shore.

About halfway there he asked the guy, "How'd you get rid of the crocs?"

"We didn't do nothing," the beachcomber said. "The sharks got 'em."

The following is a trifle long but, in addition to being difficult to truncate, the article tells the story of several familiar aircraft; from the Camel to the Harrier.

## KINGSTON'S AVIATION EMPIRE

### Sir Thomas Sopwith's suburban Surrey hub

He learned to fly aged 22, set up his first aircraft factory aged 24 and by 30 his fighters dominated the skies over the Western Front. Thomas Octave Murdoch Sopwith - later, Sir - founded the Sopwith Aircraft Company in 1912, turning out aeroplanes from a Edwardian roller-skating rink in Kingston upon Thames. Yes, the Edwardians had a love affair with roller skating.

His firm and its successors notched up the firsts - float plane, tri-plane, British mono-wing fighter to exceed 300mph, aircraft capable of taking off and landing vertically. Some of these planes became legends: the Camel, best all-round fighter of the First World War, the Hawker Hurricane, mainstay of the RAF during the Battle of Britain, the Hawker Tempest that dueled with Adolf Hitler's first jet fighters, and the Harrier jump jet - taking off and landing on the spot.

But while these aircraft were revolutionary, they were also practical. Thanks to their cunning designs and an efficient manufacturing operation, Sopwith achieved market saturation in WWI and, later, of the RAF and of British aviation. The story of Sopwith isn't just the aircraft - it's also a tale of business risk. Sopwith liquidated Sopwith Aviation to rise again and buy rivals as HG Hawker Engineering and then Hawker Aircraft. He also pressed on with the Hurricane without getting any actual government orders.

His legacy? BAe Systems, the successor to those early firms: an £18bn global colossus employing 88,000 people, spanning diverse activities and today making the Hawk - flying the flag with the RAF aerobatic team, the Red Arrows.

The backdrop for this manufacturing success wasn't the industrial heartland of the Midlands but rather the market town of Kingston upon Thames, in leafy North Surrey.

*The Sopwith Camel, WWI's most lethal fighter. Credit: the Royal Air Force Museum*

Sopwith established not one but three factories in Kingston, meaning a small town in the commuter belt was responsible for the majority of fighter designs in WWI and the heart of Britain's military aviation industry for years afterwards. He became one of Kingston's largest employers with a trio of factories plus research shop. Entire households became dependant on Sopwith's pay packets; over nine



decades Sopwith and its successor firms is thought to have employed 40,000 in Kingston. A network of suppliers grew up, too, feeding in parts, materials and services into those Kingston factories.

BAe closed the last site in the 1990s. All that's left today in the town are some random civic sculptures and streets bearing relevant names. Kingston University also runs undergraduate courses in aviation and has both a building and a scholarship named after Sopwith's top designer, Sir Sydney Camm.

*Thomas Octave Murdoch Sopwith in 1910 - father of an industrial empire*



*The Register* decided to tour Sopwith's former industrial town. We navigated the backroads searching for the lost buildings and former factory sites. Along the way we saw plenty of plaques on walls. These are the work of Kingston Aviation, which has been running events with Lottery Funding, to raise awareness of Kingston's aviation past. Kingston Aviation is the work of ex-BAe engineer David Hassard, who we spoke to for this piece.

We started at the site of the Edwardians' roller skating rink on Canbury Park Road: the first of Sopwith's three Kingston plants. Back then, Canbury Park Road had Victorian terraces down one side, facing mansions on the other and a modernist bunker that was the Regal cinema at the top. The Rink pressed its cheek up to the wall of the cinema.

Today, the cinema is closed, with the building being home to a dance studio and TV shop around the side, with sprigs of Buddleia shooting from various brickwork. The rink and mansions are gone, knocked down for red-brick and green-glass offices. It all feels post industrial and sort of run down. A narrow alley runs between the cinema and the offices on what would have been the Rink's entrance.

*Gone but not forgotten - the site of Sopwith's Rink factory. Credit: Gavin Clarke*

Back in the 1912 the rink glowed with modern civic pride; arched windows and Art Nouveau signage on the front, looking like a conservatory. What lay behind was a space of 13,000 square feet with a high roof and no internal columns: ideal for skating. Or, for building aeroplanes. What brought Sopwith here?

Educated in engineering, Sopwith was fascinated by almost anything with a motor and was taken with new-fangled aeroplanes. Having learned to fly and formed an aviation school at Brooklands Airfield in Weybridge, 15 miles away, in 1910. He was joined by two of the three brains that would help him design and deliver those first planes: Fred Sigrist, an engineer on Sopwith's yacht who became engineer and designer, and an Australian named Harry Hawker who'd worked at Daimler and become Sopwith's test pilot and chief designer.

Their first order came in 1913, for a Bat boat - the world's first floatplane - with the Royal Navy. Having talked the talk, Sopwith and Co. had to deliver the goods. He needed a factory and so he came to river-side Kingston. Why pick a rural market town where retail (department store Bentalls opened its doors there in 1867) was the big thing?

Kingston had developed as important post for trade and transport thanks to its history as a major Thames crossing point. This meant a work force on tap skilled in building with wood – skills not dissimilar to those used in building the first aircraft.

### Squeezed in and ready for take off

Initially with just six workers by WW1 150 staff were squeezed into the rink - wood workers, panel beaters and polishers, wiremen, fitters and welders. Machinists hollowed out wood to make their aircraft's spars lighter while others beat and fashioned metal brackets, bearings, flanges, plates and made fuel tanks. Women sewed the linen fabric for the wings and bodies, painted dope on the fabric and painted the wood and fuselage with varnish. It was dangerous work and in those pre-health-and-safety days the women donned gloves to protect against blisters caused by the caustic dope and drank milk every day in the belief it would stop the powerful fumes damaging their lungs, according to Kingston Museum and Heritage Services.

As WWI developed and more men went to the front, women moved out of simply doping wing fabric and onto the shop floor, soldering, running presses and carrying out inspections so that by the final year of WWI nearly a third of Sopwith's workforce of 3,500 were women.

Such was the pace of orders that Sopwith soon needed a bigger factory: he picked a site just 109 yards up the road, a facility that became the heart of his empire - at the corner of Canbury Park Road and Elm Crescent.

*The Island Factory, with Sopwith's offices behind the bay windows credit: BAE Systems via Royal Air Force Museum*

Surrounded by roads, this site became known as The Island. It began as a 14,000 square foot shed in 1913 but by 1917 stretched to 40,000 square feet, was built from brick and reached up three storeys.

The Island was self contained: it featured a sawmill, machine and sheet metal shops, tool stores, aircraft assembly floors and separate dope and paint shops.

One whole wing – along the Canbury Park Road side – was dedicated to design while there were separate departments for sales, ordering and accounts. It was through these that orders for essentials such as engines and machine guns flowed.

From Canbury Park came the design of every one of Sopwith's aircraft between the years of 1916 to 1958 – from biplane, to monoplane to jet aircraft.

This was the Henry Ford approach to aircraft production, coming at a time when most aircraft firms had one or two models that were delivered in small runs. And the results showed: 25 per cent of British fighter aircraft designs in WWI came from Sopwith; 60 per cent of all single seater aeroplanes in the British and allied air forces were a Sopwith. This includes models designed and built in Kingston or just designed in Kingston and built under license elsewhere.

Kingston produced 16,237 aircraft of 32 designs for WWI. The best known of these is arguably the Camel, which made its first flight in December 1916 and during its relatively short time claimed more enemy aeroplanes shot down than any other aircraft: 1,294. Five-thousand and five hundred Camels were built – 550 in Kingston alone.

The Camel became a hit because it was a revolutionary aircraft, with a winning combination of firepower, speed and maneuverability.



In a design first the Camel featured twin, forward-facing guns - a pair of .303" Vickers machine guns. It was a mounting that became an RAF standard. The guns used the fledgling synchronization gear technology, developed to allow fixed forward-firing guns to fire through the aircraft's propeller blades without shooting them off. Anything caught head-on by a Camel got a hot-lead shower.

The most common model of the Camel featured a nine-cylinder 130 horse power Clerget air-cooled engine giving it a climb of 1,085 feet per minute – double that of the German's Fokker D.II and nearly twice as fast as the D.III. It was faster, too, with a top speed of 118mph and it could fly higher – touching 19,000 feet.

*Testing on the Thames at Kingstron's Canbury Gardens. Credit: BAE Systems via Royal Air Force Museum*

What made the Camel so lethal was its manoeuvrability. Ninety per cent of the plane's weight - engine, fuel, guns, ammunition and pilot - were packed into the first seven feet of the fuselage, making it compact and finely balanced.

It wasn't perfect: front loading made the Camel fast on the turn but too fast for the inexperienced pilot. Pilots also had to combat a powerful clockwise rotary effect in the engine that made left turns nearly impossible and saw pilots forced to sweep right.

Kingston Aviation's Hassard credits the Camel's design and performance to the driving desire of Sopwith's chief test pilot, Hawker, who was a motorbike fanatic. "He wanted something so compact you could throw it around," Hassard told us.

It was a Camel pilot who was closely involved in the shooting down of Manfred von Richthofen, the infamous Red Baron with 81 allied kills and who flew a Fokker Dr.I triplane painted a brilliant red at the head of Germany's pre-eminent Flying Circus.

Richthofen's Fokker was a copy of Sopwith's own triplane model; the Germans had studied one that crashed behind their lines. But, while the German three-winger was highly manoeuvrable it was slower than Sopwith's and it was dogged by structural failures, with the top wing prone to breaking.

*The Island factory as Sopwith House with Sigrist Square behind. Credit: Gavin Clarke*

The Camel features in a planned First World War Air Exhibition at the [RAF Museum, Hendon](#), in December 2014, marking the 100th anniversary year of WW1.

By 1917 Sopwith's factories couldn't keep up with demand. In April 1918, Sopwith opened his third Kingston plant - the then new National Aircraft Factory No. 2 that had been built by the Ministry of

Munitions in a period of just 26 weeks during the winter of 1917, which stood on a field near the Thames just outside Kingston and off Richmond Road. Less than a mile away from Canbury Park Road, it was leased to Sopwith and became known as the Ham Factory.

The Ham Factory looked like a series of hangars squatting next to each other, and behind their huge front doors lay a cavernous belly. In here hundreds of Sopwith Snipes, Dolphins and Salamanders were lined up and churned out.

But Ham, or possibly peace, killed Sopwith's company. War finished seven months later, leaving Sopwith with piles of parts and unwanted orders.

Sopwith limped on, trying to retain his remaining 1,400 staff by turning them to produce civil aircraft and ABC motorcycles. Yet, faced by immediate repayment of wartime profits, Sopwith was liquidated in 1920 and Ham was sold to British lorry maker Leyland Motors for £227,000.

#### From ashes to acquisitions

But this wasn't the end of Tom Sopwith or his presence on Richmond Road: Sopwith was rebooted as H.G. Hawker Engineering in 1920 and he bought back the Ham factory in 1948, for £585,000. I'll come back to that.

Back on our tour, I'm at the junction of Canbury Park Road and Elm Crescent looking at what's left of The Island. Now called Sopwith House and strictly residential, it's a Grade-II listed building.

You can walk a loop of the old Island. Sopwith House fronts a small, Brookside-like housing development called Sigrist Square. Sopwith House is part of Sigrist Square, behind a brick and iron fence featuring a motif of propeller blades. Look at the ends of Sopwith House and you can see where the new bricks join the old, where the building was cauterized after its other parts were cut off.



Walk a few yards from the corner, down Canbury Park Road, and you find a pair of brick gateposts bearing two plaques from Kingston Aviation.

*Siddeley House, Sopwith's former Experimental Shop and home to the Hurricane. Credit: Gavin Clarke*

Come back to the corner of Canbury Park Road and Elm Crescent and you'll see the first-floor bay window – that was Sopwith's office. From the early 1920s to the 1930s the design offices of Sopwith's chief designer Sydney Camm were behind the upstairs windows along Canbury Park Road.

Turn 180 degrees: breathing down your neck in this narrow road is a redbrick, fort-like building fronted by high windows. This is Siddeley House, also listed.

Leased offices now, owned by Search Office Space, in the 1930s this was Sopwith's Experimental Shop – used to develop top-secret projects. The first aircraft built here was the prototype Hawker Hurricane in 1935. Peek inside and you'll see the original block and tackle with runner in the ceiling and the dangling hook used to load lorries that pulled up to the spot where you're standing.

The Experimental Shop was self-contained: on different floors were canteen, fitters and assembly facilities. Space was tight, with large, semi-assembled parts passed between floors down the outside fire escapes.



*An all-theatres workhorse - the Hurricane in North Africa in WWII*

Also developed in this building were the Hawker Henley, Hotspur, Tornado and Typhoon but it was the Hurricane that made the biggest hit.

Camm joined Sopwith's firm in 1923 becoming chief designer in 1925 and, in addition to working more than 3,000 biplanes, started on an Air Ministry tender for a monoplane fighter.

Rivals at Supermarine – later Vickers-Armstrong – in Southampton were working on the Spitfire, too, but the Hurricane flew first, in November 1935, and entered mass production ahead of the Spitfire. The Hurricane also dominated the RAF's count of mono-wing fighters – outnumbering Spitfires at the pivotal Battle of Britain. Hurricanes scored more aerial victories, too, during that conflict: 1,593 of a total 2,739.

All this while Germany's Willy Messerschmitt had prototyped his Bf 109 in 1935. This became the Luftwaffe's lead fighter in the Battle of Britain but got its first combat

experience in the Spanish Civil War, between 1936 and 1937.

The Hurricane was the epitome of Sopwith's design ethos: practical while scoring a number of firsts. The Hurricane was the RAF's first fighter capable of exceeding 300mph. It featured a retractable undercarriage and had space for eight wing-mounted machine guns capable of firing without striking the propeller blades, doing away with synchronization mechanisms in the engine.

The aeroplane was tough: an engine capable of operating in all theatres of war – European, desert and tropical while the Spitfire suffered engine problems outside Europe. It was light, too, being constructed in part using lighter-than-wood aluminium.

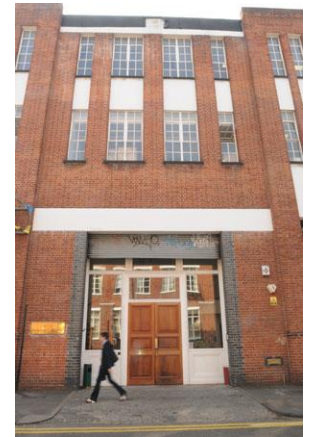
Camm, with Sopwith's managing director Sigrist in the 1920s, had developed and patented a technique using steel tube frames that helped ensure the overall airframe light yet tough. They squared off tubes that were replacing wood as the structure of modern airframes so that they could be bolted together instead of welded. Bolting was critical: the quality of welding could vary, making it a potential critical weak spot.

Camm also took two important steps to ensure his Hurricane beat the Spitfire. One was to adapt the design of his existing Hawker Fury biplane. Another was employing a combination of wood and canvas with aluminium not just in the frame but also in the skin - a technique that helped spread weight and stress and, again, meant a lighter and less bulky airframe.

Camm's approach meant the Kingston production lines could accommodate the new model with relatively little disruption. Supermarine, working on the Spitfire, didn't have it so easy: it was building a new type of aeroplane with a completely aluminium frame, skin and wing design that used flush rivets for greater speed. It wasn't just a brand new aircraft – it was a brand-new manufacturing process, too, which caused problems in construction and helped ensure delays and missed deadlines.

*The block and tackle with hook inside Siddeley House reception. Credit: Gavin Clarke*

“What he did was design for manufacturing; he made sure even though they were building the best aircraft, they could be built effectively and efficiently. He was keeping an eye from on top saying things like: 'Don't do that, we can't build that that quickly,' or: 'We can't build that time and



time again,'” Hassard told *The Reg*.

For all that, the Hurricane was a gamble. Sopwith pressed into production on the first 600 fighters without actually ever receiving an order from the all-powerful Air Ministry – the customer. That meant investing in the people and the plant to produce a new aircraft with no guarantee of an actual buyer.

“They took a big risk,” Hassard said. “That was Tommy Sopwith all over – he was a man who was very quick at taking decisions. A brilliant businessman for those reasons.”

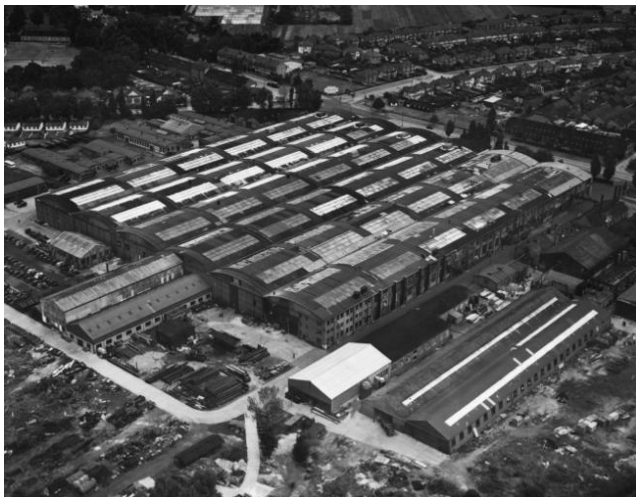
After the Hurricane, Camm went on to design the all-aluminium Tempest, the RAF’s fastest fighter of WWII with a top speed of over 450mph that played a major part in downing Germany’s V1 flying bombs and Messerschmitt’s jet-powered Me 262 – the world’s first operational jet fighter, flying at 870km/h.

#### From wood to metal

It was during this period that the character of the Kingston plants changed, as aeroplanes went metal.

Kingston’s wood workers were slowly outnumbered by machinists shaping and making aluminium alloys and titanium; people treating metals to prevent corrosion; copper and pipe smiths; and tool makers who ensured the factories’ machines made identical parts. Engineers worked on pneumatics and hydraulics in retractable landing gear on the emerging mono-wing fighters.

Hundreds of technicians were deployed on experimental work with test rigs to stress-test airframes through endless cycles of take offs and landings, checking for fatigue or engine failure. Boffins from the National Physical Laboratory (NPL), in Teddington, ran their slide rules over the planes, testing and recording performance in the facility’s wind tunnels.



*Sopwith's Ham factory from above. Credit: BAE Systems via the Royal Air Force Museum*

It sounded busy, but everything is relative: Hassard reckons this wasn’t mass production as we’d know it today – the factories in Kingston turned out just a few dozen planes a month in the 1930s and one hundred Hurricanes a month during WWII.

But it was enough: at some points during the 1930s up to 80 per cent of the aircraft serving in the RAF were a Sopwith design. Sopwith’s company was a cash-flow positive as a result of the business, and he bought up rivals including Gloster Aircraft, maker of the nippy little Gladiator biplane fighter and later a manufacturing plant for Hurricanes and Typhoons. He also bought Lancaster-Bomber maker Avro. During this period, through a spate of acquisitions, H G Hawker Engineering became Hawker Aircraft.

At the end of WWII, as Sopwith’s factories turned to jets, it was clear Canbury Park was too small. Following a brief search, in 1948 Sopwith bought the Ham factory he’d had to surrender 28 years earlier.

It’s here that our tour goes back up Canbury Park Road, past the rink, and heads north up the Richmond Road/A307 to the site of that factory. In the car, you’ll need to navigate Kingston’s one-way maze to get back onto the A307. Or, you can take the 65 bus from Kingston station, and get off at Tudor Drive.

Ham spanned 47 acres so you need to make two stops. First, up to the junction of the A307 and Dukes Avenue. If in the car, turn left and pull into Northweald Lane; if bus, get off at Tudor Drive and walk a short distance. This is the start of a village in all but name; an estate of neat homes and eddying lanes with names like Camel Grove built on half of the old factory site. Head back to the corner and at the junction you’ll find a brick pillar bearing two stainless steel plaques from Kingston Aviation marking the location’s significance and featuring a Harrier – one of the main aircraft built there.

Get back in the car, or walk past the Tudor Drive stop, and travel a few hundred yards back down the A307, turn right onto Lower Ham Road and you end up at a sports field and the YMCA Hawker Centre. This is the other half of the Ham factory – the half that didn’t fall to developers.

*Sopwith Snipes, at Factory No. 3 in WWI. Credit: BAE Systems via the Royal Air Force Museum*

To the right, the field runs up against the wall marking the housing estate we just left. Ahead and to the left, the YMCA Hawker Centre. On the right-hand wall of the centre inside the reception is a bronze commemorative plaque. Go in and turn right, past the reception: you’ll find a glass wall bullet-pointing the history.





Back outside and standing on the sports field, you'll have to imagine Sopwith's factory surrounded by a cluster of busy offices and facilities.

It was 1958 when the focus moved out of Canbury Park to here as the design office moved into Ham. It was also the year when Richmond Road received massive facelift, acquiring a brand-new façade that was reputedly the work of the architect who'd designed the Milk Marketing Board's offices in nearby Thames Ditton. It was a grand exterior of tall windows and towering columns looking more like some suburban municipal offices rather than an HQ of national defence.

The only thing that gave anything away was a humble wooden sign reading Hawker Siddeley Aviation Limited, then British Aerospace Company and then just British Aerospace, when the company's name changed again in 1977 following mergers with other British aircraft makers and nationalisation by the then Labour government.

In addition to design and build were test facilities, including the Mithraeum to strength- and fatigue-test large parts such as entire airframes. Additional testing equipment put fuel, hydraulic, flying and electrical systems through their paces.

It was Ham that became the manufacturing centre for another first in aviation: the world's first viable vertical take off and landing (VTOL) aircraft.

*Plaque marks the spot: Kingston Aviation marker for Ham's Harrier factory. Credit: Gavin Clarke*



That VTOL aircraft was the Hawker P.1127, which evolved into the Harrier. Nearly 1,000 Harriers were built overall - a seemingly small number, but they made an impact. Harriers were ordered and adapted by the Royal Navy and the RAF. Harriers were also ordered by US forces, normally served by their own defense contractors. Harriers flew with the US Marine Corps under a design produced by US giant McDonnell Douglas and BAe. The last 74 Harriers were only retired by the Brits in

2011 – and they were bought at fire-sale prices by the USMC for parts to keep their Harrier II fleet airworthy.

### Vertical take off, at last

The Harrier saw combat two decades after entering service in 1969, during the Falklands War against Argentina in 1982. 26 Harriers and Sea Harriers were embarked aboard the Royal Navy aircraft carriers *HMS Invincible* and *HMS Hermes* on the mission to recapture the Falklands. Their presence helped stop the Argentinians inflicting heavy losses on the British task force so close to the Argentinian mainland and military machine.



*Harriers on cargo-ship-turned-aircraft-carrier, the Atlantic Conveyor. Credit: CPO Bob Gellert*

As it was Argentinian aircraft struck 17 ships, sinking five warships and one civilian vessel, the *Atlantic Conveyor*. Of the Harriers, five were lost – two to bad weather – in return for 20 Argentinian aircraft downed.

The Harrier found a niche in military planning – short take off and landing, suited to the role in the Falklands; conceived to serve against the Soviets launching without airstrips from the forests of Europe. Some 14 Harriers had arrived in the Falklands packed on the decks of the *Atlantic Conveyor* - fortunately they had been flown off before she was sunk.

*Harriers in production at Ham. Credit: BAE Systems via the Royal Air Force Museum*

Work on the P.1127 started in 1957, in a Bristol outpost of what had become Sopwith's aviation empire. Michel Henry Marie Joseph Wibault developed the concept for a vertical and short take off and landing (V/STOL) engine using a Bristol BE.25 Orion turboprop engine. Wibault's engine directed thrust down via two nozzles on the outside of the aircraft. The Orion powerplant hailed from Sopwith's Bristol Siddeley firm.

The engine evolved to a more powerful BE.53 but Bristol needed help ironing out lingering technical problems – plus, it also needed an airframe to mount the new engine in. The firm approached Hawker and Camm, who suggested the addition of two extra external nozzles to direct the airflow, solving the problem of balance. The Hawker and Bristol teams began work on the P.1127 as a “high-speed helicopter.”



NATO funded 75 per cent of the cost of developing of the engine and the teams meshed. The British Ministry of Aviation ordered two prototypes and four developmental aircraft in 1960.

The P.1127 was actually designed at Canbury Park Road but built by hand at Richmond Road. The Harrier was a long way from the early biplanes: 200,000 components with a quality-control process that inspected things like welding joints using X-ray systems. The work had become more specialized, too, giving rise to apprentices. Over time, aircraft bodies shifted from aluminium to carbon fibre.

“In this area of North Kingston there was hardly a family who didn’t have somebody who worked there,” Hassard says. “You couldn’t get a more complete industry or broader range of skills.”

The Ham factory closed in 1992 and was knocked down after BAe pulled out of London and as the local authority succumbed to housing developers. The land was carved up between these developers building more than 300 homes, the council that owns the large field, and the Hawker Athletic Social Club.



According to Hassard grown men cried as the wrecking balls tore into the Ham factory. It’s not hard to see why, as you stand on the football pitch outside the Hawker Athletic Social Club and superimpose the image in your head of what was once on this now mostly wide-open vista.

*Home of the Harrier now homes and sport, site of the Ham Factory. Credit: Gavin Clarke*

Today, Richmond Road **would** have been turned into urban dwellings. At least the façade might have been retained, like at Canbury Park Road.

Like the factories, Sopwith and his team are gone, too. Harry Hawker died in a plane crash in 1921, Sigrist passed away in 1956 and Sydney Camm – knighted for his services to the nation’s defence, like Sopwith -

passed away in 1966.

Sopwith outlasted them all, dying in 1989. He retired from day-to-day business in 1963 and became board chairman. He was still there aged 90 and then made president for life of British Aerospace. BAe pulled out of the town where he’d started a few years after he passed and the wrecking balls flew.

We’re at the end of our solo flight. Your best bet is to loop back to Kingston for refreshments and – if you want – shopping. There’s a cinema and theatre, too, if you want to linger, and lots of riverside bars and cafes.

My advice? Go riverside, near the theatre and where cheeky swans bob about waiting for passers-by to throw them pieces of bread, and reflect: reflect on the boat building business that helped lure Sopwith to Kingston, turning this rural market town into an industrial powerhouse.

*Lifted from: The Register: Sci/Tech News for the World*

## REMEMBERING...



Although not taken on Remembrance Day, this photo was shot outside the front door of 434 (Fighter) Squadron in Zweibrücken, a camouflaged building in which I called home for three-and-a-half years in the middle of the last century. The horseshoe pit in the foreground and the shepherd with his flock of sheep just beyond belie the tensions that characterised the Cold War. Indeed, during my time there, the Cuban Missile Crisis erupted in October 1962 and the world waited for thirteen days – seemingly on the brink of war – and hoped for a peaceful solution. Day fighter F-86 Sabres, like those shown, and night fighters, like the CF-100, went on heightened alert; ready to scramble on two minutes notice. For those in Europe in November, Remembrance Day takes on added meaning. For the lonely shepherd on the hill, the Armistice itself is not observed in Germany; the national day of mourning is called the Volkstruertag and usually takes place on the second Sunday closest to the 16 November.

## ASSEMBLING THE MIGHTY EIGHTH

Leslie A. Lennox Lt./Col. USAF(ret)

*Of all the stories that have been written, and movies that have been shown, about the 8th Air Force, very little attention has been given to what was involved in assembling 1200 B-17's and B-24's each day, to get them in formation to carry out a strike against Germany. Certainly showing bombers under attack by fighters, or encountering heavy flak, was a reality, and are interesting to watch. Also, stories about some of the rougher missions make interesting reading. But what was going on over England, each morning, could get just as scary to the crews as the time spent over some of the targets. The planning, and coordination, that had to be accomplished during the night, by the operations planners of each Group, so that the crews could be briefed, was unbelievable. If the planners had failed to do their jobs properly, there would have been a free for all among Bomb Groups, in the skies over England. The rendezvous points, altitude, and times had to be precise, and known by all of the crews, before the Eighth Air Force could get in formation. The success of the planners, in accomplishing their mission, enabled the Eighth Air Force to become the most powerful air armada ever assembled. In my view, how this was accomplished is one of the major untold stories of the war.*

I was a pilot in the 95th Bomb Group, in late 1944 and early 1945, and what follows is a typical mission, as I remember it, from a crew member's perspective.

Early in the evening, our Squadron Operations would post the names of the crews that were scheduled to fly the following day. There were two ways we could be notified if the Group had been alerted to fly. One was by means of lights on the front of the orderly room, and the other with the raising of colored flags. If a green light was on, the Group was alerted, if a red light was on we would fly, and if a white light was on, the Group would stand down. The light was monitored frequently throughout the evening to learn our status and, normally, we would know before going to bed if we would be flying the next day.



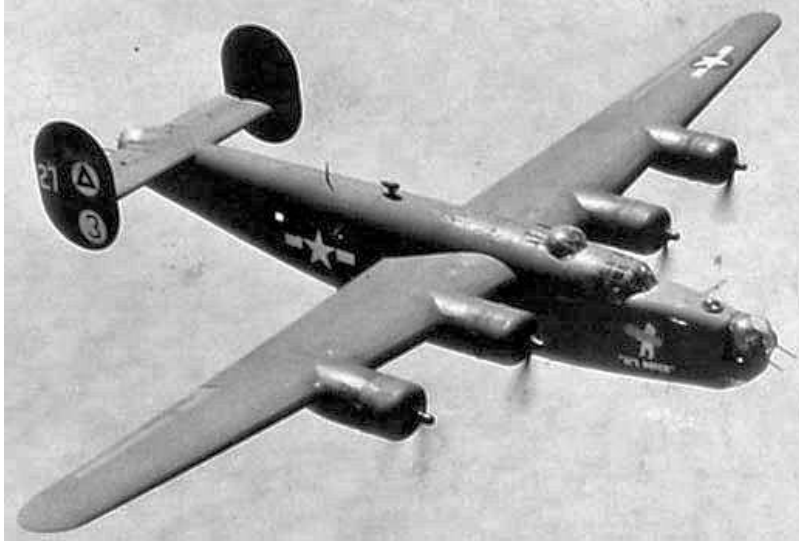
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On the morning of a mission, the CQ (charge of quarters) would awaken the crews about four or five o'clock, depending on takeoff time. The questions we always asked were, "What is the fuel load?" and, "What is the bomb load?" If his answer was, "full Tokyo tanks," we knew we would be going deep into Germany. Shortly after being awakened, "6-by" trucks would start shuttling us to the mess hall. We always had all the fresh eggs we could eat, when flying a mission. After breakfast, the trucks carried us to the briefing room. All of the crew members attended the main briefing, and then the Navigators, Bombardiers and Radio operators went to a specialized briefing. At the main briefing, in addition to the target information--anti-aircraft guns, fighter escort and route in--we received a sheet showing our location in the formation, the call signs for the day and all the information we would need to assemble our Group and get into the bomber stream.

After briefing, we got into our flight gear, drew our parachutes and loaded onto the trucks for a ride to our plane. We were now guided by the time on our daily briefing sheet. We started engines at a given time and watched for the airplane we would be flying in formation with to taxi past, then we would taxi behind him. We were following strict radio silence.

We were now parked, nose to tail around the perimeter, on both sides of the active runway, and extremely vulnerable to a fighter strafing attack. At the designated takeoff time, a green flare would be fired and takeoff would begin. Every thirty seconds an airplane started takeoff roll. We were lined up on the perimeter so that the 12 airplanes of the high squadron would take off first, followed by the lead and then the low squadron.

Each Group had a pattern for the airplanes to fly during climb to assembly altitude. Some would fly a triangle, some a rectangle and our Group flew a circle, using a "Buncher" (a low frequency radio station) which was located on our station. The patterns for each Group fit together like a jig saw puzzle. Unfortunately, strong winds aloft would destroy the integrity of the patterns, and there would be considerable over running of each other's patterns.



Many of our takeoffs were made before daylight, during the winter of '44 and '45, when I was there, so it was not uncommon to climb through several thousand feet of cloud overcast. Also it was not uncommon to experience one or two near misses while climbing through the clouds, although you would never see the other airplane. You knew you had just had a near miss, when suddenly the airplane would shake violently as it hit the prop wash of another plane. It was a wonderful feeling to break out on top, so you could watch for other planes, to keep from running into each other. To add to the congestion we were creating, the Royal Air Force Lancasters, Halifaxes, and Wimpys would be returning from their night missions, and flying through our formations. Needless to say, pilots had to keep their heads on a swivel and their eyes out of the cockpit.

After take-off, the squadron lead would fire a flare every 30 seconds, so that we could keep him located and enable us to get into formation quicker. The color of our Group flare was red-green. The first thing you would see, when breaking out of the clouds, was a sky filled with pyrotechnics, so you had to search the sky for the Group flare, which would identify the lead airplane of your Squadron. Once you had it located, you could adjust your pattern to climb more quickly into formation with him. As each airplane pulled into formation, they would also fire a flare, with the lead plane, making it much easier for the following aircraft to keep him in sight. I think most crew members would probably agree that the pyrotechnic show, in the skies over England, in the morning when the Eighth was assembling, was a rare sight to behold.

The order of progression for assembling the Eighth Air Force was to first assemble the Flight elements, the Squadrons, the Groups, the Combat wings, the Divisions and, finally, the Air Force.

As soon as the four Squadron elements were formed, the high, low and second elements would take up their positions on the lead element, to form a Squadron. When the three Squadrons had completed assembly, it was necessary to get into Group formation. This was accomplished by having the three Squadrons arrive over a pre-selected fix at a precise time and heading. The high and low Squadrons were separated from the lead Squadron by 1000 feet and, after getting into Group formation, they would maintain their positions by following the lead Squadron.

Then it was necessary to get into the Combat Wing formation. We were in the 13th Combat Wing, which consisted of three Bomb Groups: the 95th, the 100th and the 390th. Whichever Group was leading the Wing that day, would arrive over a pre-selected point, at a precise time and heading. Thirty seconds later, the second Group would pass that fix, followed by the third Group, thirty seconds later. We were then in Combat Wing formation. The navigators in the lead airplanes had a tremendous responsibility, to ensure that the rendezvous times were strictly adhered to.

There were three Divisions in the Eighth, the 1st, 2nd and 3rd. The 1st and 3rd Divisions consisted of B-17s only, and the 2nd Division was B-24s. The B-24s were faster than the B-17s, but the B-17s could fly higher, therefore, the two were not compatible in formation. As a result the 1st and 3rd Divisions would fly together and the 2nd Division would fly separately.

Now that the Groups were flying in Combat Wing formation, it was necessary to assemble the Divisions. This was usually accomplished at the "coast out"--a city on the coast, selected as the departure point "fix." The Group leader in each Combat Wing knew his assigned position in the Division, and the precise time that he should arrive at the coast out departure point, to assume that position in the Division formation. The lead Group in the Division, which had been selected to lead the Eighth on the mission, would be first over the departure fix. Thirty seconds after the last Group in the first Wing passed that point, the second Wing would fall in trail, and so on, until all Combat Wings were flying in trail and the Division would be formed. One minute later, the lead Group in the other Division would fly over that point, and the Combat Wings in that Division would follow the same procedure to get into formation. When all of its Combat Wings were in trail, the Eighth Air Force B-17 strike force was formed and on its way to the target. At the same time the 2nd Division B-24s were assembling in a similar manner and also departing to their target.

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Meanwhile, as the bombers were assembling for their mission, pilots from the Fighter Groups were being briefed on their day's mission. Normally, 600 to 800 P-38's, P-47's, and P-51's would accompany the bombers to provide protection against enemy fighter attacks. Fighter cover was not needed by the bombers until they were penetrating enemy territory, therefore to help conserve fuel, fighter takeoffs were planned to give them enough time to quickly assemble after takeoff, and climb on course up the bomber stream to

the groups they would be covering. The combined strength of the fighters and bombers brought the total number of aircraft participating in a mission to approximately two thousand.



A major problem that presented itself, on each mission, was that the bomber stream was getting too stretched out. It was not uncommon for the headlines in stateside newspapers--in trying to show the strength of our Air Force--to state that the first Group of bombers was bombing Berlin, while the last Group was still over the English Channel. It made great headlines but was a very undesirable situation. It meant that the Groups were out of position, and not keeping the proper separation. Furthermore, it was almost impossible for them to catch up and get back into the desired formation. This made the entire bomber stream more vulnerable to fighter attacks.

Finally, our planners figured out what we were doing wrong. When the first Group departed the coast out fix, it started its climb to what would be the bombing altitude. Then, as each succeeding Group departed that fix, it, too, would start climbing. The problem with this procedure was that, as soon as the first Group started its climb, its true airspeed would start to increase, and it would encounter different wind velocities. Now it would start to pull away from the Group in back of it, and the "stretchout" of the bomber stream would begin. By the time the last Group had reached the coast out, to start its climb, the first Group would be leveled off, with a true airspeed approaching 250 miles per hour, and the bomber stream would be really stretching out.

The solution to this problem that had been frustrating the Bomber crews for so long was pretty simple. We would no longer start climbing at the coast out, but instead, at a designated time, *all* Groups would start climbing, irrespective of position. This meant that we all would have similar true airspeeds and would be influenced by the same winds aloft. That took care of the problem. It was still possible for a Group to be out of position, because of poor timing, but the entire bomber stream wouldn't get all stretched out.

When you consider the way our Air Traffic Control system operates today, and all the facilities at their disposal to guide each individual airplane through the sky to ensure its safety, it's almost unbelievable that we were able to do what we did. To think of launching hundreds of airplanes, in a small airspace, many times in total darkness, loaded with bombs, with complete radio silence, and no control from the ground, and do it successfully day after day, with young air crews, with minimum experience, is absolutely mind boggling.

The accomplishments of the Eighth Air Force have been and will be reviewed by historians from World War II on. There never will be another air armada to compare to it. I feel confident that they will never cease to be amazed by our ability to assemble hundreds of heavy Bombers, under the conditions we were confronting, into the devastating strike force we now fondly refer to as, "The



95th Bombardment Group B-17 over Germany in January 1944 (USAF via NARA) A 26644 A6

### A Lovely Hand

Last night I held a lovely hand, it was so small and neat,  
I thought my heart with joy would burst so wild was every beat.  
No other hand unto my heart could greater pleasure bring  
Than the one so dear I held last night: four aces and a king

Many will know that I consider the Commander series of aircraft some of the best I've ever flown; from the piston powered Shrike to the turbine powered Commander 1000. Below, another pilot joins the club...

## Happiness in Garmin 950 Commander



Neil Rosoff's research led him to the conclusion that a later-model turboprop Twin Commander had just about everything he was looking for in his next airplane: twin-engine safety for flying over high terrain and at night; excellent performance and benign handling characteristics in the event one of those two engines checked out; truly excellent performance with both engines operating; generous fuel capacity coupled with miserly fuel flows at altitude to yield long-range legs; and a grin-generating, "pilot's-airplane" personality. There was just one thing missing...

Rosoff had always wanted to learn to fly, but business and family took precedence. With his two children grown and gone and his successful IT staffing business sold, it was time for Rosoff to fulfill his dream. He started flight training at Essex County Airport in northern New Jersey, and spent long months learning the basics in Cessna 152s and 172s. At some point he realized that "these were not the airplanes I wanted to use for my mission — flying to Cleveland and Milwaukee to visit my children."

He looked around and discovered the Cirrus SR22. He was immediately drawn to it, so much so that he wanted to buy one and finish his training in it. The owner of the flight school balked — primary flight training in a fast, slippery, technologically advanced aircraft? But Rosoff was convinced. He bought a new Cirrus and hired an instructor who, over the next 18 months guided Rosoff through his Private and Commercial certificates and instrument rating, all in the SR22.

Training in the Cirrus meant Rosoff was born into and weaned on performance and technology. "I loved the airplane," he says, and over the next two-and-a-half years he flew it "all over the place." Its one shortcoming was ice protection. His SR22 was equipped with a TKS "weeping wing" deice system, but it was not certified for flight into known icing conditions. Rosoff found he was cancelling flights that would not have posed a problem in a more capable airplane.



The obvious solution was to get a more capable airplane. He looked at TBMs but concluded that a Piper Meridian was a more cost-effective choice for his mission. Rosoff began the transition to pressurized flight-levels flying in a turbine-engine airplane. What he did not have to transition to was the Meridian's Garmin G1000 panel.



Ed note: similar to aircraft I flew

Rosoff and his wife, Lori, have two children, and much of their flying in the Cirrus and then the Meridian was to visit their children — a son in Milwaukee, and a daughter in Cleveland. When their son, Henry, moved to Seattle to take a job as an on-air reporter for KIRO, Rosoff could see the writing on the wall. What had been a one-stop 750-nmi trip from New Jersey to Milwaukee would now be an all-day, three-stop, 2400-nmi flight in the Meridian. It was looking like time to take another step or two up the aircraft capability ladder.

Rosoff took another look at the faster, longer-range TBM 850, but like the Meridian it has just one engine. Rosoff liked the idea of having a second one when crossing the formidably tall cumulo-granite from Colorado west. He looked at the King Air 90 series, and at Twin Commanders. He quickly concluded that the King Air is slower, less fuel efficient, and more expensive than comparable Commanders. All signs pointed to a Commander, specifically a later model with Dash 10T engines and long-range fuel. But there was just one thing...

Rosoff had been flying the Garmin G1000 for more than five years, from training in the Cirrus to long family trips in the Cirrus and the Meridian. He knew the panel, he was comfortable with it, and he wanted it in his next airplane. But it was not available in the Commander — or at least it had not been. In researching turboprop twins Rosoff looked around for airplanes with advanced Garmin panels, “and this popped up,” Rosoff says. “This” was an Eagle Creek Commander 1000 retrofitted with a Garmin 950 panel, identical to a Garmin 1000 except for the S-TEC 2100 Digital Flight Control System in place of a Garmin autopilot.

Rosoff was intrigued. Jim Worrell, a salesman at Eagle Creek Aviation Services in Indianapolis, arranged for Rosoff to fly the prototype Garmin Commander from Naples, Florida, to Indianapolis with Eagle Creek CEO Matt Hagans. “With the exception of taxiing that thing — which is an art — I found it not that much different to fly than the Meridian,” Rosoff says. “Between the reputation of the airplane, the conversion, and the dollars involved, I really liked the plane. So Jim and I went shopping and found a 690D Commander 900, with the clear understanding that I was buying it to convert it to the Garmin panel.”



*A similar installation*

Along with the new panel, Rosoff had a new interior installed and the airplane repainted. “Eagle Creek did a lot of work,” Rosoff says. “They totally gutted it.” With just 1,000 hours since overhaul, the Honeywell TPE331-10T engines were good to go. “So for all intents and purposes I have a brand new plane,” Rosoff adds. “New panel, new paint, new interior.”

Rosoff also opted to equip the airplane for RVSM certification. Flying as high as possible eastbound from Seattle will maximize fuel efficiency, and make possible easy, one-stop return flights to New Jersey, Rosoff says.

After taking delivery of the airplane Rosoff spent three months flying with instructor Hugh Davis, building confidence in the Commander. One area that didn’t require much attention was the panel. “I don’t know if I would have

bought a Commander without the Garmin 950 conversion,” Rosoff says. “It was an easy transition from the Meridian. The panel was important. I had a lot of muscle memory, I knew where things were. It made the transition pretty easy.”  
*Purloined from “Flight Levels online”, the Twin Commander e-zine.*

### Trial By Jury

A defendant was on trial for murder. There was very strong evidence indicating guilt, but no corpse had been found. In the defense’s closing statement the lawyer, knowing that his client would probably be convicted, decided to try a trick.

"Ladies and gentlemen of the jury, I have a surprise for you all," the lawyer said as he looked at his watch. "Within one minute, the person presumed dead in this case will walk into this courtroom!" He looked toward the courtroom door. The jurors, somewhat stunned, all looked, eagerly. A minute passed. Nothing happened.

Finally, the lawyer said, "Actually, I made up the previous statement. But you all looked on with anticipation. I therefore put it to you that there is reasonable doubt in this case as to whether anyone was killed and insist that you return a verdict of not guilty."

With that, the jury retired to deliberate. But after only a few minutes, they came back and pronounced a verdict of guilty.

"But how?" the lawyer asked. "You must have had some doubt. I saw all of you stare at the door."

"Oh, yes," the jury foreman replied. "We all looked - except your client."

### Just for Dave...

A Scotsman and his wife walked past a swanky new restaurant.

"Did you smell that food?" she asked. "Incredible!"

Being a kind-hearted Scotsman, he thought, "What the heck..., I'll treat her!"

So, they walked past it again...

# THE MIGHTY ZERO



*Mitsubishi A6M3 Zero Model 22 (NX712Z), recovered from New Guinea in 1991 and used in the film Pearl Harbor*

In April, 1942, thirty-six Zeros attacking a British naval base at Colombo, Ceylon (now Sri Lanka), were met by about sixty Royal Air Force aircraft of mixed types, many of them obsolete. Twenty-seven of the RAF planes went down: fifteen Hawker Hurricanes (of Battle of Britain fame), eight Fairey Swordfish, and four Fairey Fulmars. The Japanese lost one Zero.

Five months after America's entry into the war, the Zero was still a mystery to U.S. Navy pilots. On May 7, 1942, in the Battle of the Coral Sea, fighter pilots from our aircraft carriers Lexington and Yorktown fought the Zero and didn't know what to call it. Some misidentified it as the German Messerschmitt 109.

A few weeks later, on June 3 and 4, warplanes flew from the Japanese carriers Ryujo and Junyo to attack the American military base at Dutch Harbor in Alaska's Aleutian archipelago. Japan's attack on Alaska was intended to draw remnants of the U.S. fleet north from Pearl Harbor, away from Midway Island, where the Japanese were setting a trap. (The scheme ultimately backfired when our Navy pilots sank four of Japan's first-line aircraft carriers at Midway, giving the United States a major turning-point victory.)

In the raid of June 4, twenty bombers blasted oil storage tanks, a warehouse, a hospital, a hangar, and a beached freighter, while eleven Zeros strafed at will. Chief Petty Officer Makoto Endo led a three-plane Zero section from the Ryujo, whose other pilots were Flight Petty Officers Tsuguo Shikada and Tadayoshi Koga. Koga, a small nineteen-year old, was the son of a rural carpenter. His Zero, serial number 4593, was light gray, with the imperial rising-sun insignia on its wings and fuselage. It had left the Mitsubishi Nagoya aircraft factory on February 19, only three-and-a-half months earlier, so it was the latest design.

Shortly before the bombs fell on Dutch Harbor that day, soldiers at an adjacent Army outpost had seen three Zeros shoot down a lumbering Catalina amphibian. As the plane began to sink, most of the seven-member crew climbed into a rubber raft and began paddling toward shore. The soldiers watched in horror as the Zeros strafed the crew until all were killed. The Zeros are believed to have been those of Endo, Shikada, and Koga.

After massacring the Catalina crew, Endo led his section to Dutch Harbor, where it joined the other eight Zeros in strafing. It was then (according to Shikada, interviewed in 1984) that Koga's Zero was hit by ground fire. An Army intelligence team later reported, "Bullet holes entered the plane from both upper and lower sides." One of



the bullets severed the return oil line between the oil cooler and the engine. As the engine continued to run, it pumped oil from the broken line. A Navy photo taken during the raid shows a Zero trailing what appears to be smoke. It is probably oil, and there is little doubt that this is Zero 4593.

After the raid, as the enemy planes flew back toward their carriers, eight American Curtiss Warhawk P-40's shot down four Val (Aichi D3A) dive bombers thirty miles west of Dutch Harbor. In the swirling, minutes-long dogfight, Lt. John J. Cape shot down a plane identified as a Zero. Another Zero was almost instantly on his tail. He climbed and rolled, trying to evade, but those were the wrong maneuvers to escape a Zero. The enemy fighter easily stayed with him, firing its two deadly 20-mm cannon and two 7.7-mm machine guns. Cape and his plane plunged into the sea. Another Zero shot up the P-40 of Lt. Winfield McIntyre, who survived a crash landing with a dead engine.

Endo and Shikada accompanied Koga as he flew his oil-spewing airplane to Akutan Island, twenty-five miles away, which had been designated for emergency landings. A Japanese submarine stood nearby to pick up downed pilots. The three Zeros circled low over the green, treeless island. At a level, grassy valley floor half a mile inland, Koga lowered his wheels and flaps and eased toward a three-point landing. As his main wheels touched, they dug in, and the Zero flipped onto its back, tossing water, grass, and gobs of mud. The valley floor was a bog, and the knee-high grass concealed water.

Endo and Shikada circled. There was no sign of life. If Koga was dead, their duty was to destroy the downed fighter. Incendiary bullets from their machine guns would have done the job. But Koga was a friend, and they couldn't bring themselves to shoot. Perhaps he would recover, destroy the plane himself, and walk to the waiting submarine. Endo and Shikada abandoned the downed fighter and returned to the Ryujo, two hundred miles to the south. (The Ryujo was sunk two months later in the eastern Solomons by planes from the aircraft carrier Saratoga. Endo was killed in action at Rabaul on October 12, 1943, while Shikada survived the war and eventually became a banker.)

The wrecked Zero lay in the bog for more than a month, unseen by U.S. patrol planes and offshore ships. Akutan is often foggy, and constant Aleutian winds create unpleasant turbulence over the rugged island. Most pilots preferred to remain over water, so planes rarely flew over Akutan. However, on July 10 a U.S. Navy Catalina (PBY) amphibian returning from overnight patrol crossed the island. A gunner named Wall called, "Hey, there's an airplane on the ground down there. It has meatballs on the wings." That meant the rising-sun insignia. The patrol plane's commander, Lt. William Thies, descended for a closer look. What he saw excited him.

Back at Dutch Harbor, Thies persuaded his squadron commander to let him take a party to the downed plane. No one then knew that it was a Zero. Ens. Robert Larson was Thies's copilot when the plane was discovered. He remembers reaching the Zero. "We approached cautiously, walking in about a foot of water covered with grass. Koga's body, thoroughly strapped in, was upside down in the plane, his head barely submerged in the water. "We were surprised at the details of the airplane," Larson continues. "It was well built, with simple, unique features. Inspection plates could be opened by pushing on a black dot with a finger. A latch would open, and one could pull the plate out. Wingtips folded by unlatching them and pushing them up by hand. The pilot had a parachute and a life raft." Koga's body was buried nearby. In 1947 it was shifted to a cemetery on nearby Adak Island, and later, it is believed, his remains were returned to Japan.

Thies had determined that the wrecked plane was a nearly new Zero, which suddenly gave it special meaning, for it was repairable. However, unlike U.S. warplanes, which had detachable wings, the Zero's wings were integral with the fuselage. This complicated salvage and shipping. Navy crews fought the plane out of the bog. The tripod that was used to lift the engine, and later the fuselage, sank three to four feet into the mud. The Zero was too heavy to turn over with the equipment on hand, so it was left upside down while a tractor dragged it on a skid to the beach and a barge. At Dutch Harbor it was turned over with a crane, cleaned, and crated, wings and all. When the awkward crate containing Zero 4593 arrived at North Island Naval Air Station, San Diego, a twelve-foot-high stockade was erected around it inside a hangar. Marines guarded the priceless

plane while Navy crews worked around the clock to make it airworthy. (There is no evidence the Japanese ever knew we had salvaged Koga's plane.)

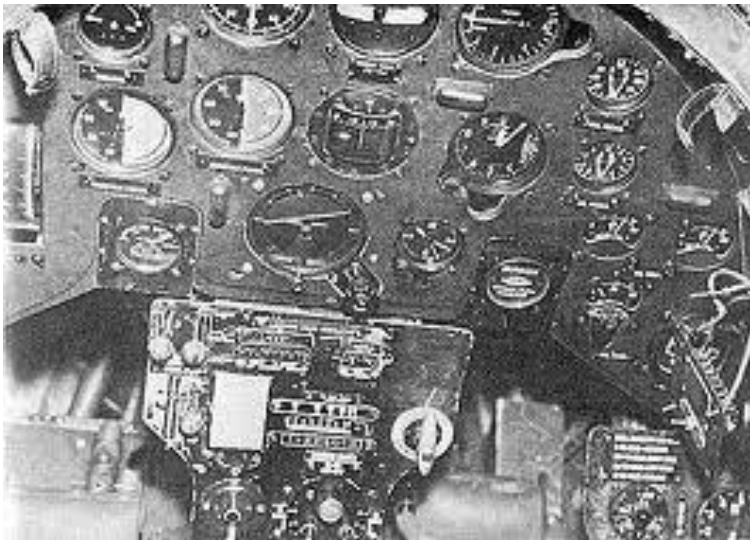
In mid-September Lt. Cmdr. Eddie R. Sanders studied it for a week as repairs were completed. Forty-six years later he clearly remembered his flights in Koga's Zero. "My log shows that I made twenty-four flights in Zero 4593 from 20 September to 15 October 1942," Sanders told me. "These flights covered performance tests such as we do on planes undergoing Navy tests."

"The very first flight exposed weaknesses of the Zero that our pilots could exploit with proper tactics. The Zero had superior maneuverability only at the lower speeds used in dog fighting, with short turning radius and excellent aileron control at very low speeds. However, immediately apparent was the fact that the ailerons froze up at speeds above two hundred knots, so that rolling maneuvers at those speeds were slow and required much force on the control stick. It rolled to the left much easier than to the right. Also, its engine cut out under negative acceleration [as when nosing into a dive] due to its float-type carburetor. We now had an answer for our pilots who were unable to escape a pursuing Zero. We told them to go into a vertical power dive, using negative acceleration, if possible, to open the range quickly and gain advantageous speed while the Zero's engine was stopped. At about two hundred knots, we instructed them to roll hard right before the Zero pilot could get his sights lined up. This recommended tactic was radioed to the fleet after my first flight of Koga's plane, and soon the welcome answer came back: "It works!" Sanders said, satisfaction sounding in his voice even after nearly half a century.

Thus by late September 1942 Allied pilots in the Pacific theater knew how to escape a pursuing Zero.

"Was Zero 4593 a good representative of the Model 21 Zero?" I asked Sanders. In other words, was the repaired airplane 100 percent?

"About 98 percent," he replied.



The Zero was added to the U.S. Navy inventory and assigned its Mitsubishi serial number. The Japanese colors and insignia were replaced with those of the U.S. Navy and later the U.S. Army, which also test-flew it. The Navy pitted it against the best American fighters of the time—the P-38 Lockheed Lightning, the P-39 Bell Airacobra, the P-51 North American Mustang, the F4F-4 Grumman Wildcat, and the F4U Chance Vought Corsair—and for each type developed the most effective tactics and altitudes for engaging the Zero.

In February 1945 Cmdr. Richard G. Crommelin was taxiing Zero 4593 at San Diego Naval Air Station, where it was being used to train pilots bound for the Pacific war zone. An SB-2C Curtiss

Helldiver overran it and chopped it up from tail to cockpit. Crommelin survived, but the Zero didn't. Only a few pieces of Zero 4593 remain today. The manifold pressure gauge, the air-speed indicator, and the folding panel of the port wingtip were donated to the Navy Museum at the Washington, D.C., Navy Yard by Rear Adm. William N. Leonard, who salvaged them at San Diego in 1945. In addition, two of its manufacturer's plates are in the Alaska Aviation Heritage Museum in Anchorage, donated by Arthur Bauman, the photographer.

Leonard recently told me, "The captured Zero was a treasure. To my knowledge no other captured machine has ever unlocked so many secrets at a time when the need was so great." A somewhat comparable event took place off North Africa in 1944-coincidentally on the same date, June 4, that Koga crashed his Zero.

A squadron commanded by Capt. Daniel V. Gallery, aboard the escort carrier Guadalcanal, captured the German submarine U-505, boarding and securing the disabled vessel before the fleeing crew could scuttle it. Code books, charts, and operating instructions rescued from U-505 proved quite valuable to the Allies. Captain Gallery later wrote, "Reception committees which we were able to arrange as a result may have had something to do with the sinking of nearly three hundred U-boats in the next eleven months." By the time of U-505's capture, however, the German war effort was already starting to crumble (D-day came only two days later), while Japan still dominated the Pacific when Koga's plane was recovered.

A classic example of the Koga plane's value occurred on April 1, 1943, when Ken Walsh, a Marine flying an F4U Chance-Vought Corsair over the Russell Islands southeast of Bougainville, encountered a lone Zero. "I turned toward him, planning a deflection shot, but before I could get on him, he rolled, putting his plane right under my tail and within range. I had been told the Zero was extremely maneuverable, but if I hadn't seen how swiftly his plane flipped onto my tail, I wouldn't have believed it," Walsh recently recalled. "I remembered briefings that resulted from test flights of Koga's Zero on how to escape from a following Zero. With that lone Zero on my tail I did a split S, and with its nose down and full throttle my Corsair picked up speed fast. I wanted at least 240 knots, preferably 260. Then, as prescribed, I rolled hard right. As I did this and continued my dive, tracers from the Zero zinged past my plane's belly. "From information that came from Koga's Zero, I knew the Zero rolled more slowly to the right than to the left. If I hadn't known which way to turn or roll, I'd have probably rolled to my left. If I had done that, the Zero would likely have turned with me, locked on, and had me. I used that maneuver a number of times to get away from Zeros." By war's end Capt. (later Lt. Col.) Kenneth Walsh had twenty-one aerial victories (seventeen Zeros, three Vals, one Pete), making him the war's fourth-ranking Marine Corps ace. He was awarded the Medal of Honor for two extremely courageous air battles he fought over the Solomon Islands in his Corsair during August 1943. He retired from the Marine Corps in 1962 after more than twenty-eight years of service. Walsh holds the Distinguished Flying Cross with six Gold Stars, the Air Medal with fourteen Gold Stars, and more than a dozen other medals and honors.

How important was our acquisition of Koga's Zero? Masatake Okumiya, who survived more air-sea battles than any other Japanese naval officer, was aboard the Ryujo when Koga made his last flight. He later co-authored two classic books, *Zero* and *Midway*. Okumiya has written that the Allies' acquisition of Koga's Zero was "no less serious" than the Japanese defeat at Midway and "did much to hasten our final defeat." If that doesn't convince you, ask Ken Walsh.

## INSIDE THE ZERO

The Zero was Japan's main fighter plane throughout World War II. By war's end about 11,500 Zeros had been produced in five main variants. In March 1939, when the prototype Zero was rolled out, Japan was in some ways still so backward that the plane had to be hauled by oxcart from the Mitsubishi factory twenty-nine miles to the airfield where it flew. It represented a great leap in technology. At the start of World War II, some countries' fighters were open cockpit, fabric-covered biplanes. A low-wing all-metal monoplane carrier fighter, predecessor to the Zero, had been adopted by the Japanese in the mid-1930's, while the U.S. Navy's standard fighter was still a biplane. But the world took little notice of Japan's advanced military aircraft, so the Zero came as a great shock to Americans at Pearl Harbor and afterward. A combination of nimbleness and simplicity gave it fighting qualities that no Allied plane could match. Lightness, simplicity, ease of maintenance, sensitivity to controls, and extreme maneuverability.

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## LUNCH AT HOOTER'S...

During a long day of looking around Cabela's, a couple of my friends and I stopped in at Hooter's for some hot wings and drinks. After being there for a while, one of my friends asked me which waitress I would like to be stuck in an elevator with. I told them "The one who knows how to fix elevators. I'm old, tired, and I go to the bathroom a lot."

**A REMEMBRANCE DAY SUGGESTION**

If you can't make it out to attend one of the Remembrance Day Ceremonies, give a listen to Chor Leoni and their a capella rendition of "And The Band Played Waltzing Matilda". Click [here](#).

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**GO OUT WITH A BANG**

A terrific explosion occurs in a gunpowder factory, and once all the mess has been cleared up, and inquiry begins. One of the few survivors is pulled up to make a statement. "Okay Simpson," says the investigator, "you were near the scene, what happened?"

"Well, it's like this. Old Charley Higgins was in the mixing room, and I saw him take a cigarette out of his pocket and light up."

"He was smoking in the mixing room?" the investigator said in stunned horror, "How long had he been with the company?"

"About 20 years, sir"

"20 years in the company, then he goes and strikes a match in the mixing room, I'd have thought it would have been the last thing he'd have done."

"It was, sir."

I'm supposed to respect my elders, but it's getting harder and harder for me to find one now.

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**THE BETTING MAN**

So, I walk into a sports bar just before 10 p.m., sat down next to a lady at the bar and stared up at the TV. The 10 pm news came on covering the story of a man on the ledge of a large building preparing to jump.

Making conversation, I said, "You know, I bet he'll jump."

My new friend replied, "Well, I bet he won't." I placed a \$20 bill on the bar and said, "You're on!"

Just as the N.F. placed his money on the bar, the guy on the ledge did a swan dive off the building, falling to his death.

My bar partner was very upset but handed over his \$20, saying, "Fair's fair. Here's your money."

I replied, "I can't take your money. I saw this earlier on the 5 pm news so I knew he'd jump."

The young fella replied, "I did too, but didn't think he'd do it again."

I took the money.

**Classic Southern Expressions**

"Well knock me down and steal muh teeth!"

"Well, butter my butt and call me a biscuit."