Research Notes on the

Supermarine Spitfire

Compiled by John Griffin

Part 2/3

Version 1.0 – 20 June 2026

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Photo J. McNulty

Spitfire V R 7143 Toronto 1947

Photos :-
H. Tate
from
K. Molson



Spitfire II

Moncton N.B.

P8332 A166



spitfire II

Photos: Ray F. Corley





MkIIB P8332 A-166 City Hall, Toronto 4 Nov 1943





T. Beilby



Two of the fastest fighter aircraft in Britain and the United States shared the same hangar in Ottawa in mid-May, when a Curtiss "P-40" of the U. S. Army Air Corps arrived from Wright Field, Dayton, Ohio, and was wheeled alongside a Supermarine "Spitfire." The latter, ABOVE, was flown by Air Corps officers while R. C. A. F. pilots tried out the Curtiss. The two planes are shown together in the LOWER picture.

McNab + "Chuck" Yeager.

Master Photo Book.

Spitfire V X4555

PL 24338

Fighter Book

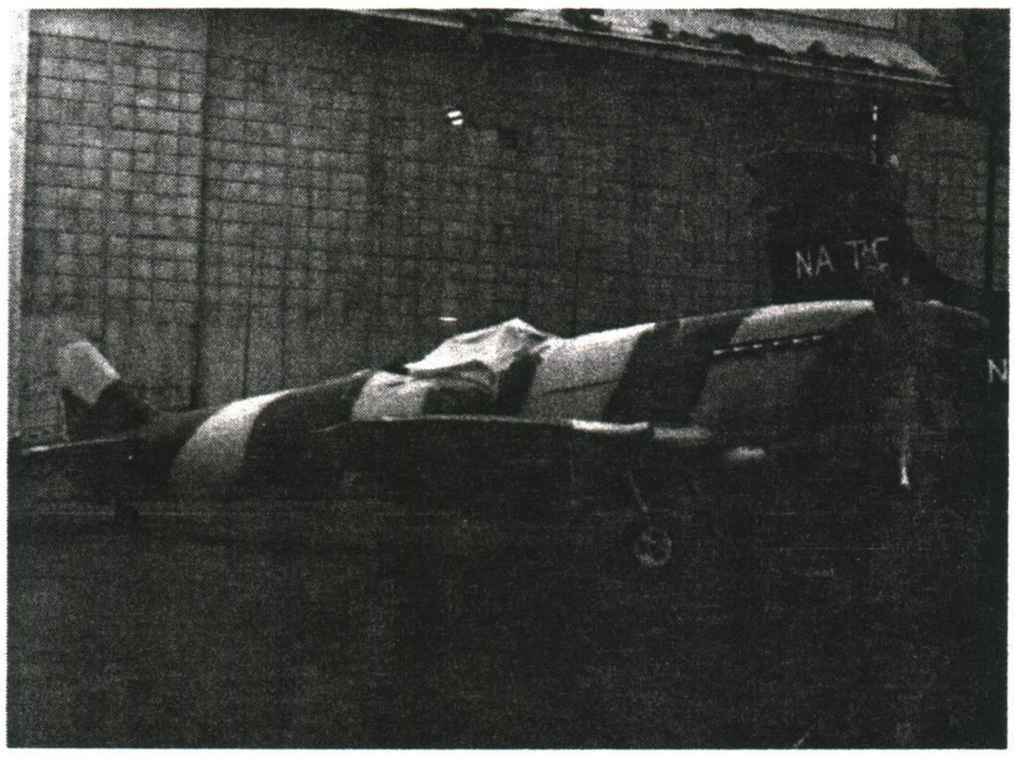
X4555

PL 25650

SUPERMARINE SPITFIRE FR.XIVe TZ138

This Spitfire FR.XIVe was somewhat the worse for wear when photographed at the Bradley Air Museum, Connecticut on 14 April 1981, despite escaping damage in the tornado which struck the museum on 3 October 1979. It bears no markings, but can be identified as TZ138.

The aircraft was one of a batch of 120 Mk.XIVs serialled TX974—TX998, TZ102-TZ149, TZ152-TZ176 and TZ178-TZ199, completed between May and December 1945. TZ138 was built at the Aldermaston dispersal factory, and initially allocated to the Controller of Research and Development, being delivered to Hucknall on 5 July 1945 to be prepared by Rolls-Royce for winterisation trials. From there it went on 4 November 1945 to No.47 Maintenance Unit, the



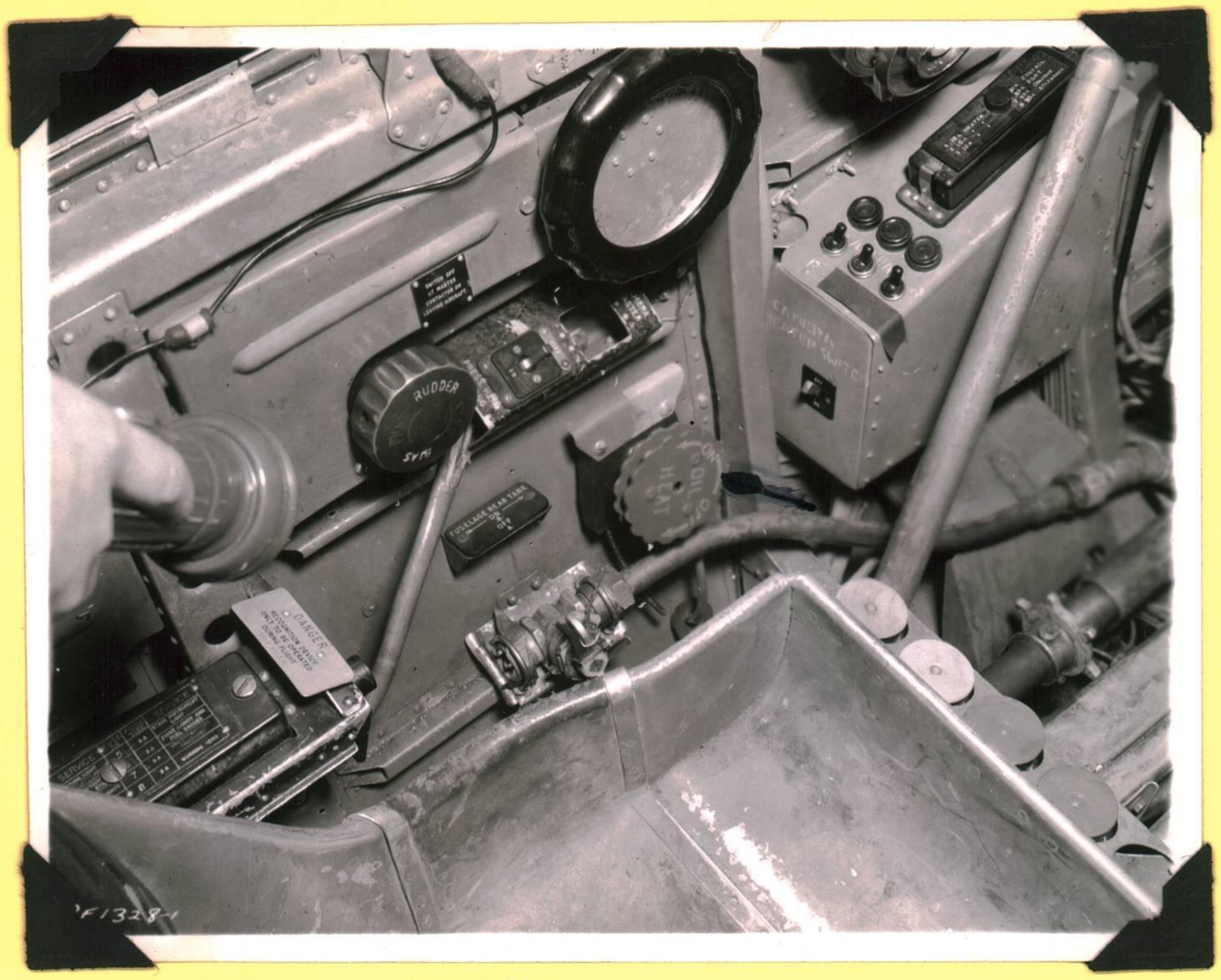
RAFs primary packing unit at Sealand, its engine being removed four days later. It was then shipped from Liverpool in *SS Alda Park*, arriving at St.John's, Newfoundland towards the end of November.

On arrival it was shipped across Canada by rail to the Winter Experimental Establishment at RCAF Namao, near Edmonton, Alberta. It was first tested there in January 1946, and officially taken on RCAF charge on 11 February 1946. It was given an engine change the following summer, prior to commencing a second series of tests which lasted from 28 November 1946 to 28 February 1947. Trials were carried out from Churchill, Manitoba and Fort Nelson, British Columbia, and on one occasion it nosed over while taxying in snow, but only the propeller was damaged. It was also fitted with Tiger Moth skis for a time, these being dropped after take-off, a normal wheeled landing then being made. TZ138 is believed to have been cocooned at one time, and a report was also made that the Gun heat was inadequate.

There was no further service requirement for the aircraft, and authority was given on 12 April 1949 for its disposal. In the summer of 1949 it was bought by a Flt Lt J.H.G. McArthur and then received the Canadian civil registration CF-GMZ. It was evidently still in flying condition, as it participated in the Ohio Air Races that year, bearing the racing number '80', coming third in the Tinnerman Trophy Race. Soon after this it was flown by McArthur to Hollywood Airport, Florida and registered N20E to the Cuban, Fulgencio Batista. It was intended for Cuba, but on 1 June 1961 Castro supporters broke off two propeller blades, and US Customs later took it over in lieu of unpaid dues.

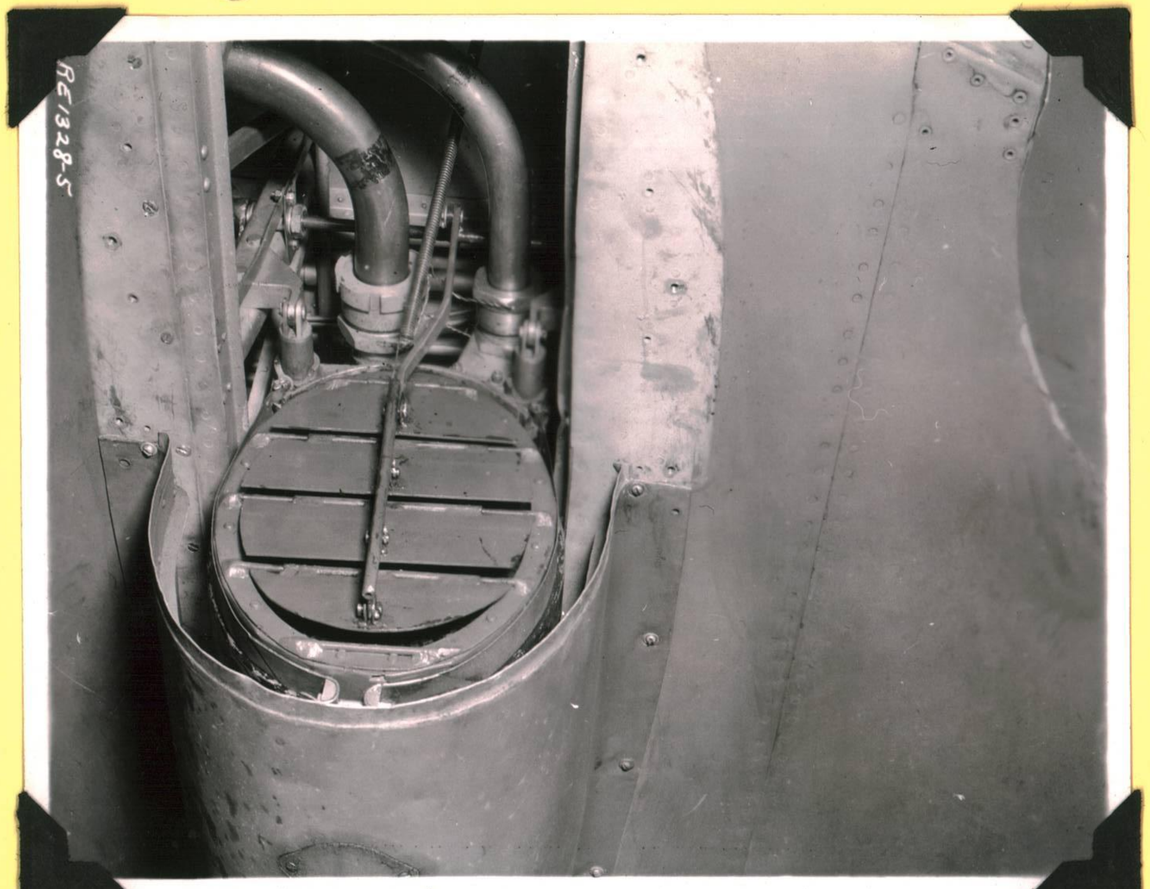
TZ138 subsequently underwent several changes of ownership, being re-registered N5505A in July 1965, when it was moved to Texas by rail. In 1971 it acquired the spurious code marking 'JR-A' for non-flying exhibition around Canada by Jack Arnold of Brantford, Ontario. In the late 1970s it was bought by Leonard A.Tanner who restored it for display as featured here. The aircraft was subsequently withdrawn for restoration to flying condition with the registration N138TZ. More recently, it was acquired in January 1989 by Don Knapp and re-registered N5505A to D.K. Precisions at Fort Lauderdale, Florida, but after Knapp's untimely death in a P-51, it went in 1990 to the 'Lone Star' Museum in Texas, its current home.

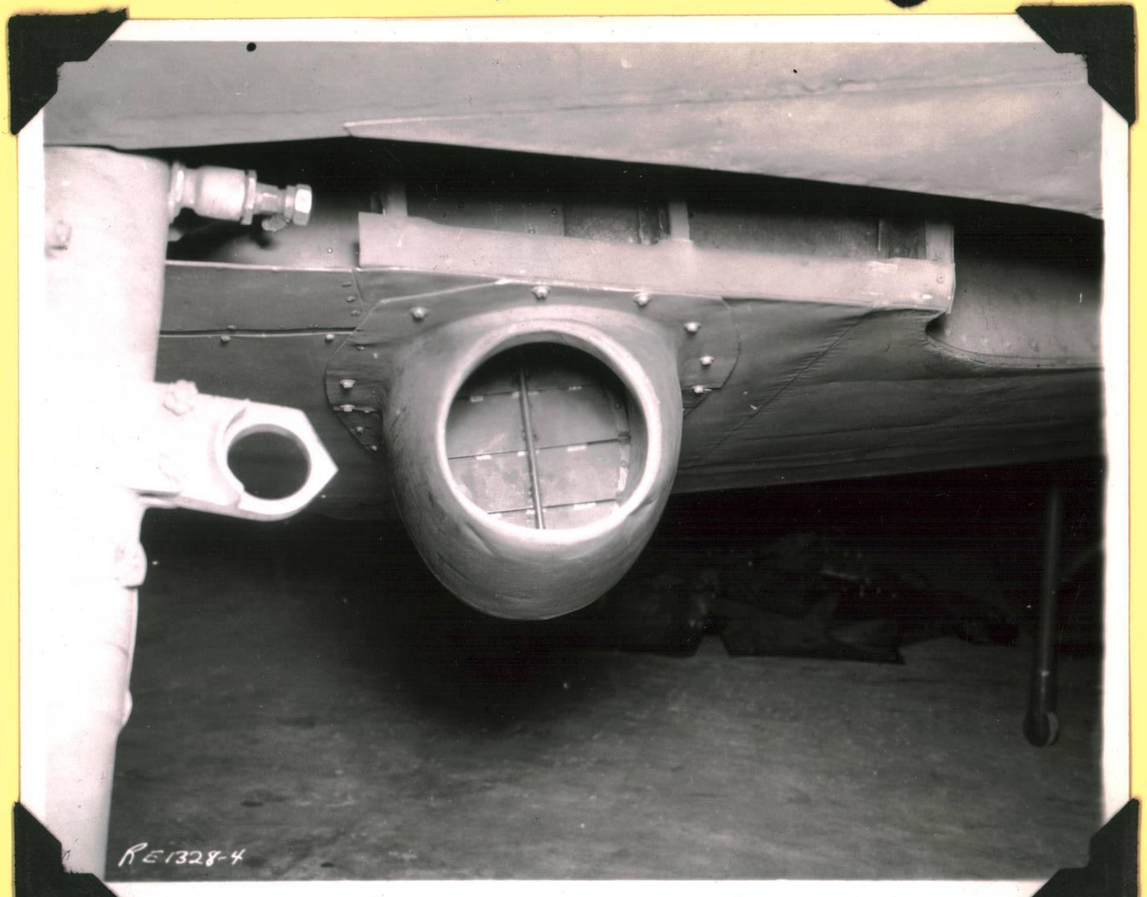
(Photograph from Trevor Hall of Newcastle-on-Tyne. Historical data by Ray Sturtivant with assistance from Peter Arnold).



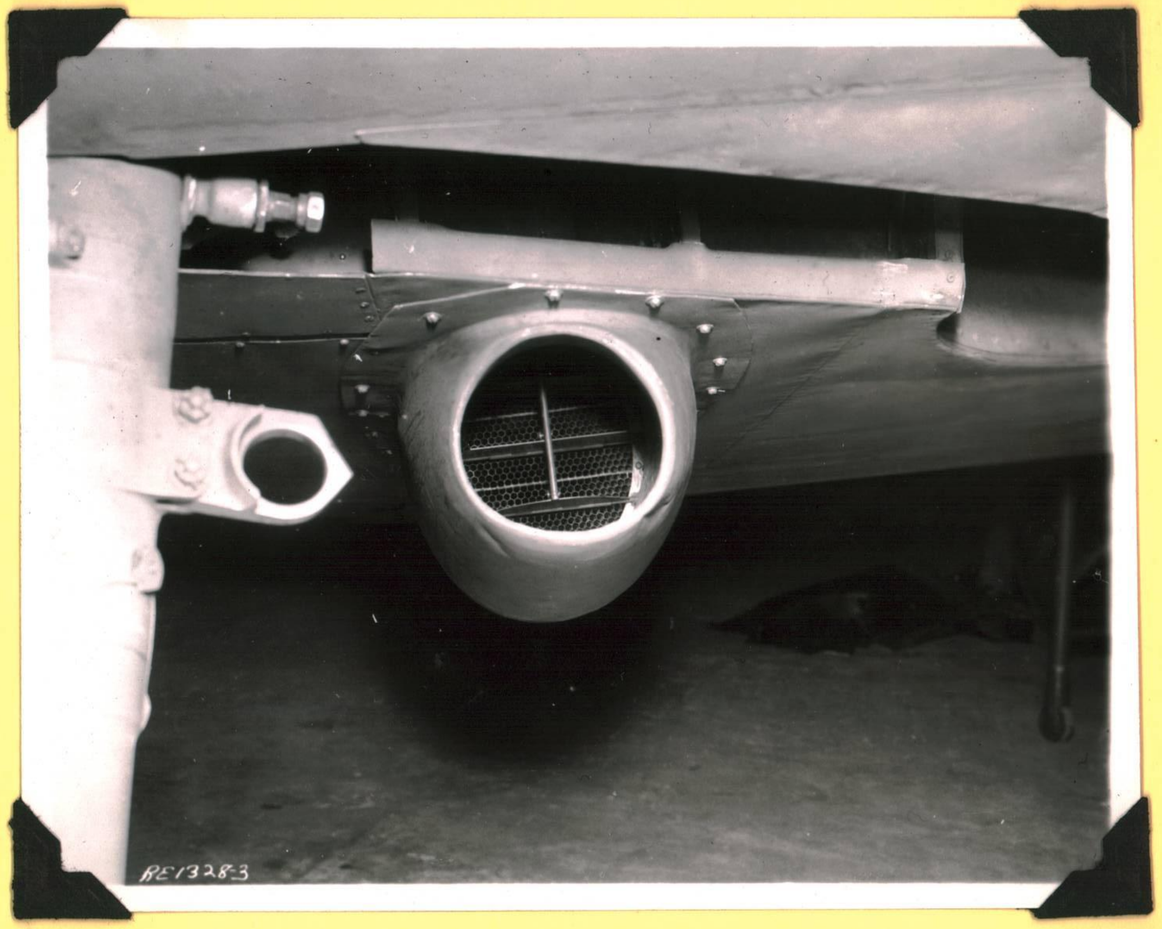
Cockpit Spitfire V
Showing oil cooler control.
centre of picture above pipe

Oil Cooler Spitfire V









Aircraft Album: The Supermarine Spitfire



First flown in March 1936, the *Spitfire* is famous as the leading British fighter of World War II. A total of 20,351 were built, excluding naval variants — more than any other British warplane. The *Spitfire* was first flown on Canadian operations by No. 403 Sqn. in March 1941, and a total of 14 RCAF squadrons eventually were flying the type. Of these, 10 were fighter and fighter-bomber squadrons based in Britain, three formed an RCAF fighter-reconnaissance wing, and one, No. 417, flew fighter-bombers in North Africa, Sicily, and Italy. The first Me. 262 jet fighter to be shot down fell to a *Spitfire* of No. 401 Sqn.

Oddly enough, only four *Spitfires* were operated in Canada during the war. One, on loan from the RAF, was used in 1940 to test the first Franks' "G" suit. The *Spitfire* V pictured above arrived at Rockcliffe in February 1943 and was used for high altitude tests.

Roger Dutrisac

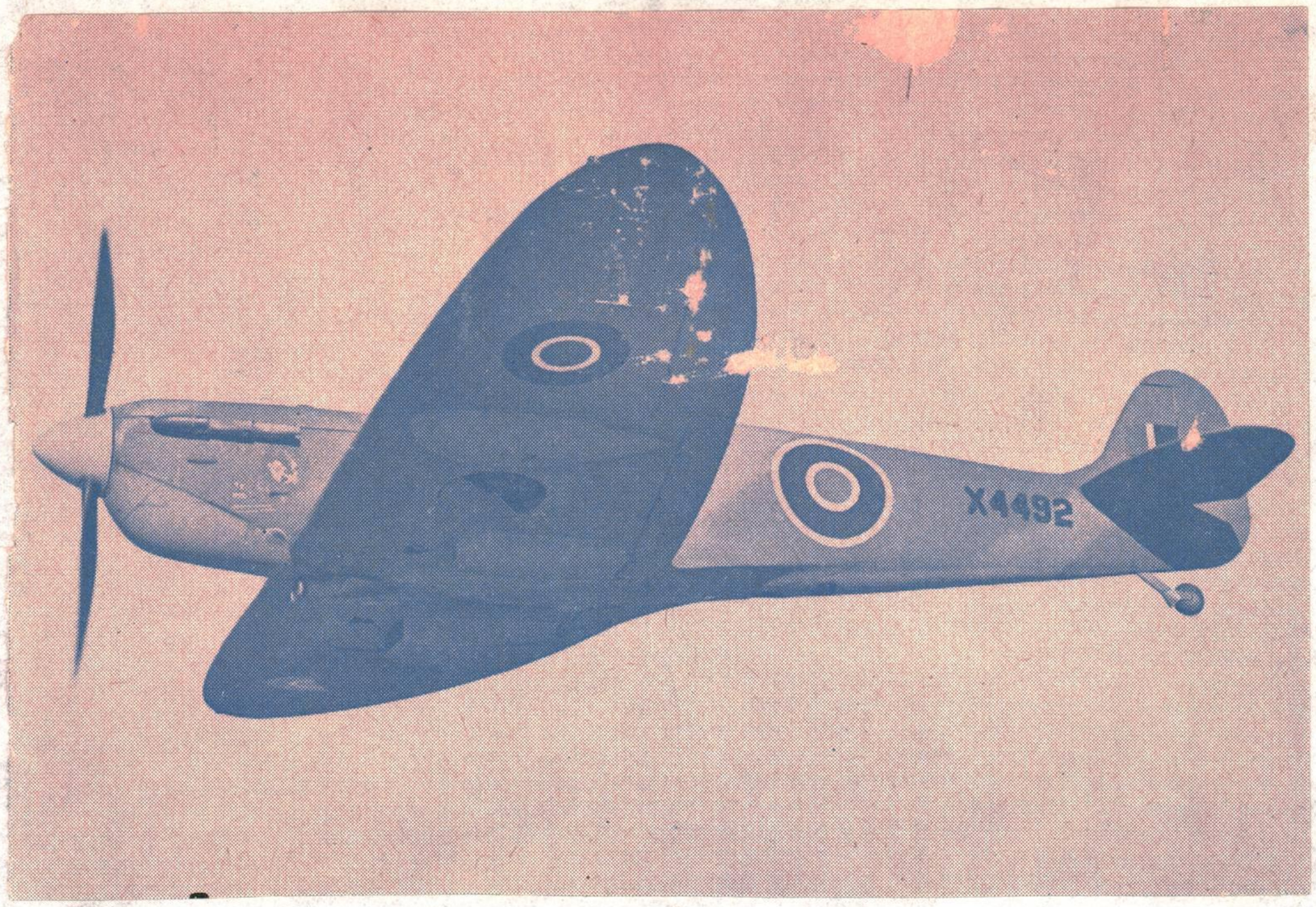
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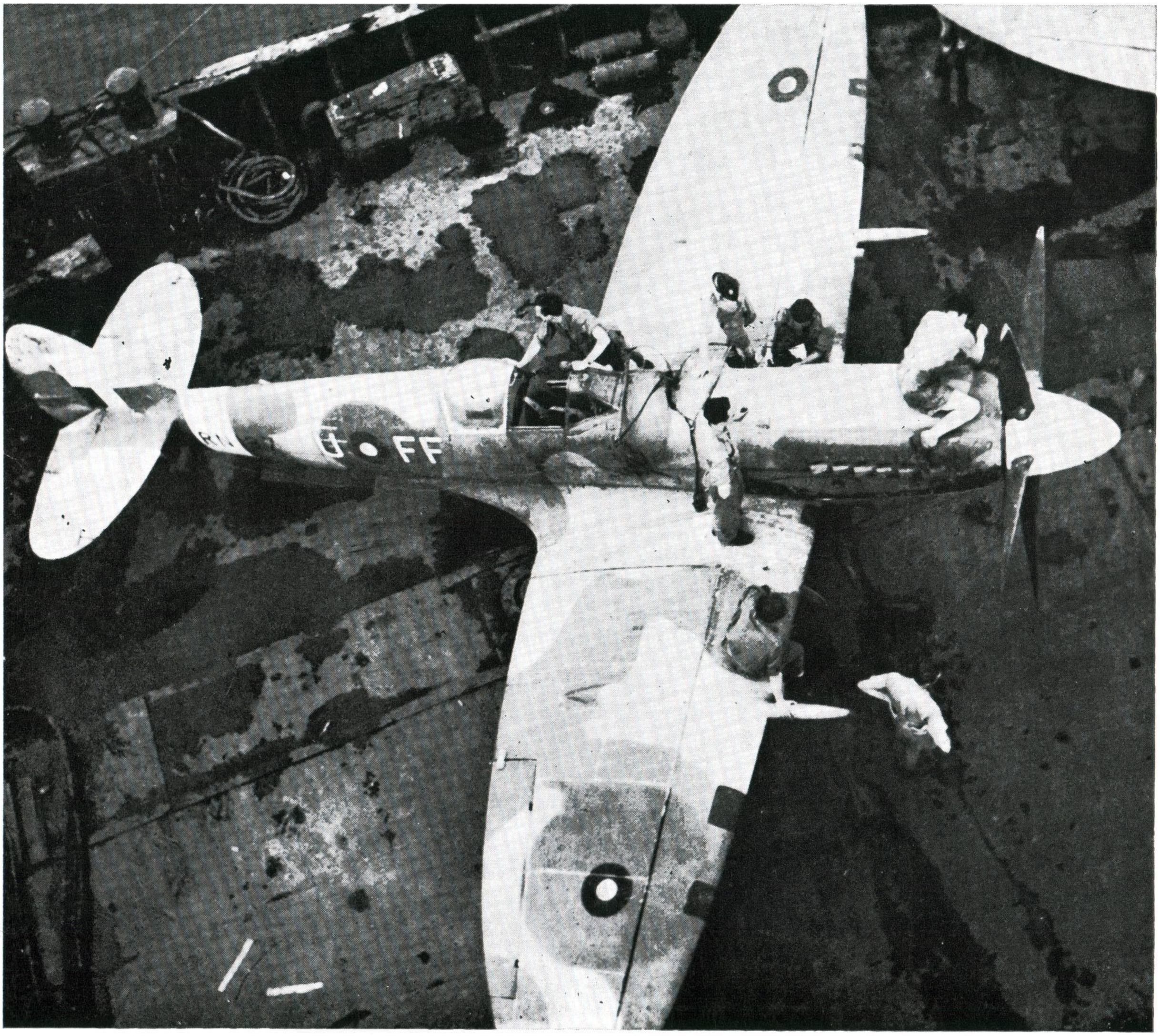
AIRCRAFT

PROFILE

246

Supermarine Spitfire (Griffons) Mks. XIV & XVIII

by L. J. Bachelor





Editorially Speaking . . . No. 17

SO, it's Concorde for the subject of the *Aircraft Profile No. 250 Competition* (the final closing date for entries *was August 31, 1972,* please note!) Bet some of you are slapping your foreheads in hindsight. No doubt some of the entrants were influenced by the fact that during the competition period, the Concorde made a well-publicized sales tour from the United Kingdom to the Far East and Australia.

The Concorde is always "news". No other new-concept aircraft has ever generated so much energetic abuse and counter-support on a world-wide scale. One might liken the lobbying to that which envelops any site proposed for any new international airport. It is important, therefore, that the *No. 250 Profile* will be seen to be what—so far, alas—no-one else has attempted, namely, a middle course which tries to answer the burning questions without fear or favour. As one of our readers recently expressed: "When I get into arguments about the Concorde, I am sometimes defeated because I haven't got printed evidence relating to a particular point at issue."

Love it or hate it, the Concorde is now too big an investment for it to be scrapped overnight.

Entries for the *No. 250 Competition* came from nearly 50 countries and this column hopes to come back to publishing some reflections on the fascinating contest in our next *Editorially Speaking*. The Editor joins the Publishers in congratulating the "lucky" ones. It was a difficult competition and those who did not qualify should take heart . . . the Editor's test entry joined the thousands of "also-rans". It's a hard world we live in!

CHARLES W. CAIN

ABOUT THE AUTHOR

No. 246: Supermarine Spitfire (Griffons) Mks. XIV & XVIII

L. J. (Len) Bachelor lives at Tunbridge Wells, Kent, a county of S.E. England which came to know the sight and sound of Merlin- and Griffon-powered Spitfires, through progressive Marks, during the whole span of World War Two. What more natural then that the "Spit" should claim the author's attention from that time on?

Len Bachelor is an insurance claims inspector by vocation but "Spitfire/Seafire Specialist" for *Air-Britain* (as well as the association's Hon. Librarian since 1955) by avocation. His serious researches began some 15 years ago but, as he wryly admits: "Just when you reckon you've got on top of a particular aspect, something new crops up to start you off again on a fresh line of investigation!" Maybe avocation and vocation are not so far removed after all.

With Peter W. Moss (another senior *Air-Britain* specialist), L. J. Bachelor produced his first *Profile—No. 206: Supermarine Spitfire* Mks. IX and XVI. For his first "solo", L. J. B. authored *No. 221: Supermarine Seafires (Merlins) Mks. I-III.* Staff artists **Mike Trim** and **Terry Hadler** are responsible for the superb colour views of the "Griffon-Spits" in *Profile No. 246.*

YOUR COMMENTS

A-7 Corsair II+2

Thought you might like to publish my photo of a new A-7 not available at the time Dave Anderton wrote his fine *Profile* (No. 239) on the Corsair II.

This is the YA-7H, a conversion to two-seat Navy combat trainer role with overall fuselage length extended by 34 inches.

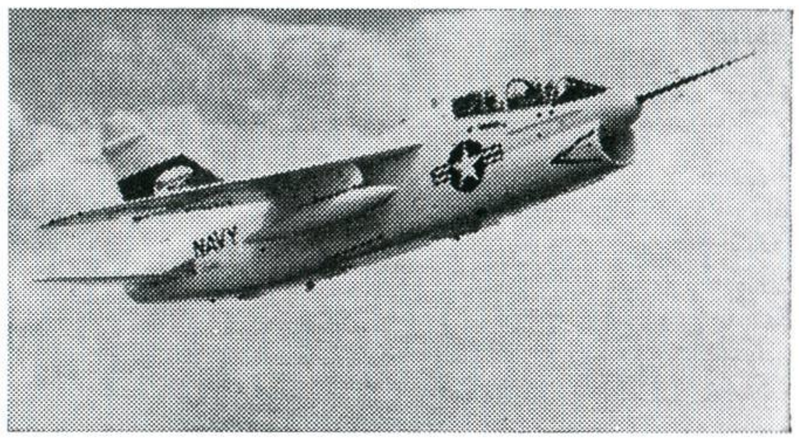
ARTHUR L. SCHOENI

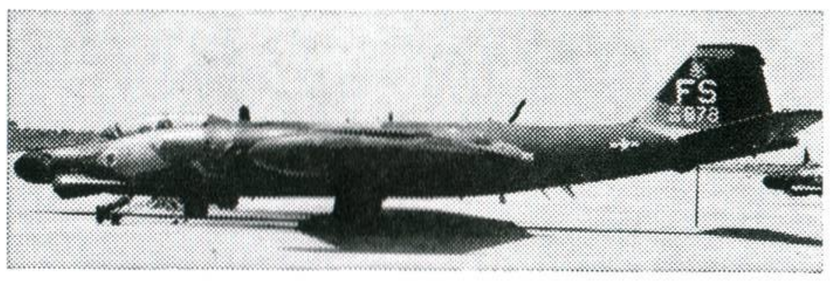
Dallas, Texas, U.S.A.

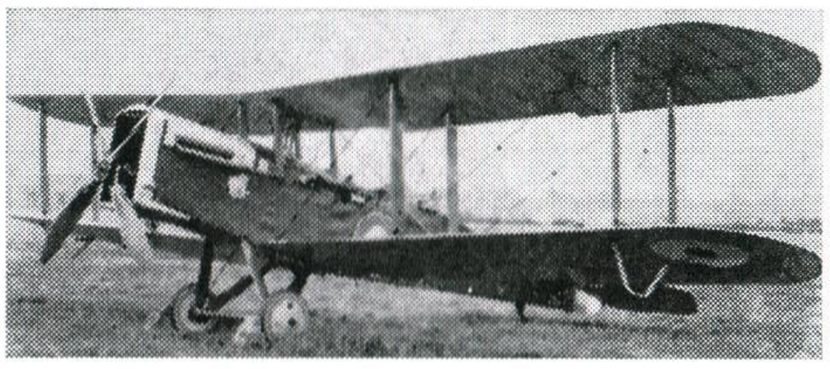
Editorially speaking . . . Art Schoeni retired in October 1972 after almost 19 years with Vought "writing and photographing". From 1943 to 1953 he became feature editor, then editor, of the always readable (U.S.) *Naval Aviation News.* In retirement now . . . no guesses . . . he will write about Vought aircraft, especially the old floatplanes. Mr. Shoeni's one of a rare breed, the professionals' 360° professional!

YA-7H (BuNo. 156801 converted) takes-off from LTV Dallas on August 29, 1972. (Photo: LTV/ Art Schoeni).









Your next AIRCRAFT PROFILES

No. 247: Martin B–57A/G Canberra & General Dynamics RB-57F

No. 248: de Havilland D.H.9A (RAF: 1918–30s)

If authors had their way, they would do away with editors. Take David A. Anderton *(No. 239: LTV Vought A-7A/E Corsair II);* he just wanted to call his second *Profile* (No. 247) "The Martin B-57 Night Intruders". This extravagance aside, D. A. A. has filed a fitting tribute to an outstanding combat aircraft.

A second *Profile,* too, from Chaz Bowyer, following up his *No. 237: Bristol F.2B Fighter (R.A.F.: 1918-30s)* with a similar one on the D.H.9A or "Ninak". Many of the photos are from private collections hitherto unpublished.

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Volume 11: Aircraft in Profile

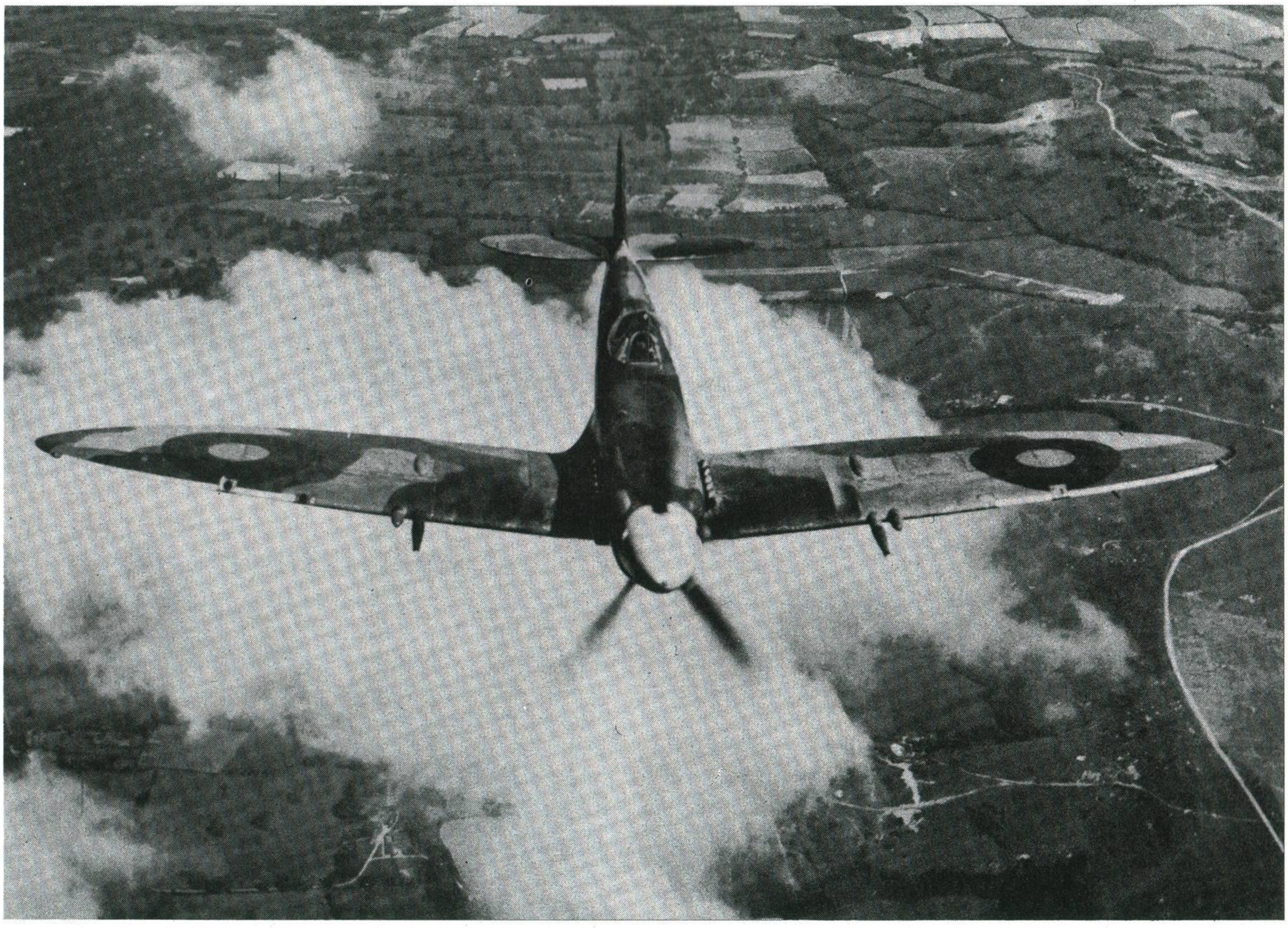
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Frontal view of a Spitfire F.Mk.XIV C shows off the "tear-drop" hood/"bubble" canopy. (Photo: IWM, CH.13814)

Supermarine Spitfire (Griffons) Mks.XIV and XVIII

by Len Bachelor

THE combination of the Spitfire and the Rolls-Royce Griffon aero-engine had already proved successful and operationally acceptable with the introduction of the Spitfire Mk.XII which used a Mk.V airframe for its development.

Meanwhile, a major redesign of the Spitfire was planned. This would use the Griffon engine and exploit the Mk.VIII airframe with a new mainplane. In due course this redesign was to appear as the Type 394 Mk.XVIII.

However, long before the new fighter appeared there was an operational demand in 1943, for an improved Spitfire capable of greater performance at higher altitudes.

To meet this demand, yet another interim type was evolved by the mating of a Mk.VIII airframe and the Griffon engine. The result was the Type 379 Spitfire Mk.XIV.

As had been the case with the Spitfire Mk.IX, built as a "stand in" for, but in larger numbers than, the Mk.VIII, so the Mk.XIV was built in greater numbers than the Mk.XVIII.

PRE-PRODUCTION SPITFIRE XIVs

Six Mk.VIII airframes, serialled JF316-321 were taken from the production line and used as conversion and development aircraft.

JF316. Converted at the Hursley Park works from whence it went to Rolls-Royce's aerodrome at Hucknall (Nottinghamshire) in April 1943 for propeller tests at low altitude with the Griffon 65 and 67 engines. Following these tests, it was returned to Vickers at Eastleigh near Southampton (Hampshire) in April 1944, and finally on to de Havilland Propellers Ltd. In 1948, JF316 finished its useful role at Sutton-on-Hull (E. Yorkshire) where it was burned in Royal Air Force fire-fighting tests.

JF317. Powered by a Griffon RG5SM (a pre-production development Griffon with a slightly lower supercharger gear ratio than the subsequent production Griffon 65); modified fin and rudder; Mk.VIII wing, without extended wingtips (and small-span ailerons as on the Mk.VII); and with "balloon"-type* cockpit hood, JF317 was evaluated by A&AEE—the Aeroplane & Armament Experimental Establishment—at Boscombe Down, near Salisbury (Wiltshire). The take-off weight for test purposes was 8,375 pounds; and the following observations are extracted from the official A&AEE report (reproduced by permission of the Controller of

*Not to be confused with the latterly-adopted rear-view "tear-drop" hood which was also known as the 360°-vision "bubble" canopy.—Editor

H.M. Stationery Office; Crown Copyright Reserved).

When taxying with an open hood, stated the A&AEE report, the pilot was unable to put his head out of the cockpit because of a considerable amount of heat and exhaust fumes being blown back by the propeller slip-stream.

Take-off length was short but there was a tendency to swing to starboard as the throttle was opened. However, this swing to the right could be controlled without difficulty by applying rudder and full left trim.

For the Mk.XIV, the stalling speeds were similar to those of other Spitfire marks. Calibrated indicated air-speed (IAS) measurements amounted to 88 miles per hour IAS with flaps and main undercarriage "up" (retracted) and 75 mph IAS with flaps and main gear in the "down" position.

If controls were applied quickly in an aileron turn, a yawing oscillation occurred.

The rudder was "heavy" and very difficult to hold in a fixed position at high speed.

With an "engine on" approach for landing, the aircraft could be brought in at around 85 mph, IAS.

In September 1943, JF317 was "loaned" to Rolls-Royce for tests with the Griffon 65; and, in June 1944, to Rotol Ltd. for their propeller tests.

JF318. Also flight tested at A&AEE between May 20 and September 25, 1943, after conversion by Air Service Training Ltd. at Hamble in Hampshire.

After 104 hours flying and 101 flights, the Griffon RG5SM engine failed. A replacement engine was fitted which also failed after 47 hours flight time and 54 flights. On the last flight, on September 25, the pilot baled-out successfully but the aircraft was "written-off" after making landfall near Amesbury in Wiltshire. The accident investigation revealed that a connecting-rod had fractured and broken through the crankcase on the port side; and that the main big end bearing had overheated.

During the period of trials, which included stability and carbon monoxide contamination tests, JF318 was flown at take-off weights of 8,160 lb., 8,200 lb. and 8,270 lb.

For take-off at maximum power with 2,750 revolutions per minute, a boost of 12 pounds per square inch was required. This increased to 15 lb./sq.in. for combat level flight and climb. In flight, if the throttle was opened too rapidly, the engine would "splutter"—a rather disconcerting experience to any pilot unaware of this characteristic.

JF319. The prototype Mk.XIV with Griffon RG5SM engine. Also went to A&AEE for flight tests. Between which included climb and level performance, position error, oil cooling and radiator suitability trials between September and November 1943. A "universal" wing with gun ports and muzzles sealed; "balloon" hood; modified fin and rudder (similar to JF317); and a highly polished finish.

For the performance trials, JF319 was flown at a take-off weight of 8,400 lb. and +18 lb./sq.in. boost—in combat maximum boost was only permitted for periods of five minutes. The best climbing speed was 175 mph up to 22,000 feet. But this decreased by 3 mph per 1,000 ft. thereafter. Time taken to climb to 10,000 feet was 2·3 minutes; 20,000 ft. in 5·1 min.; 30,000 ft. in 8·35 min. and to 40,000 ft. in 15·05 min. Absolute ceiling was 44,600 feet.

Taxying was found to be similar to that experienced with JF317. Short bursts of power were found to be more preferable than a steady flow of low power. This was due to the fact that the engine did not open up smoothly.

In the air, the swing to the right following full throttle setting was easily held by applying approximately three-quarters of the available rudder deflection.

To recover from a stall (flaps and undercarriage in the "up" position) presented no problem. At the stall, the nose dropped straight through 30° and recovery was complete with the resultant increase in speed.

Recovery from a dive was also trouble-free. It was quick and required only light stick force. JF319 was eventually lost in a flying accident following its development flying at A&AEE, Boscombe Down.

JF320 and JF321 were both used for propeller testing by Rotol; JF321 being fitted with a contra-rotating propeller.

EXAMINING THE GRIFFON

At this stage it is convenient to look in greater detail at the development of the Griffon aero-engine, which was originally conceived as a high-power, low-altitude unit to meet the requirement of the British Royal Navy.

Prior to the appearance of the definitive Griffon, there was the "Griffonized" Merlin engine which incorporated a Griffon crankcase but retained the Merlin cylinders, wheelcase, supercharger and reduction gear. This modified engine was first flight-tested in a Fairey Battle (N2234), October 16, 1939, from Hucknall aerodrome, the Rolls-Royce Experimental Flight Test Establishment in Nottinghamshire.

The Griffon proper (Mark IIA)—soon to be replaced by the Griffon IIB—had now been produced and was flight tested in a Hawker Henley (L3414) on March 13, 1941, also from Hucknall.

The principal feature of the Griffon was that the magneto and camshafts were driven from the front end of the crankshaft instead of the rear as on the Merlin. Drive for the supercharger and components at the rear of the engine was also taken from the front of the crankshaft; being effected by a long spring drive-shaft carried in bearings in the lower half of the crankcase. Considerable cleaning-up in design was also accomplished by the elimination of all possible external pipework; using instead internal passages in the castings. Thus, maintenance and overhaul requirements were considerably simplified.

The bore and stroke of the engine were 6·0 and 6·6 inches respectively giving a capacity of 36·75 litres. The two-piece construction cylinders were arranged, like the Merlin, in 60° vee formation with six cylinders per bank. Further particulars applicable to the Mks.IIA and IIB are as follows. Supercharger gear ratios of 8·25 (MS—moderately supercharged) and 11·22 (FS—fully supercharged). Supercharger rotor diameter 9·75 inches. Maximum power output was 1,735 brake horsepower at 16,000 feet.

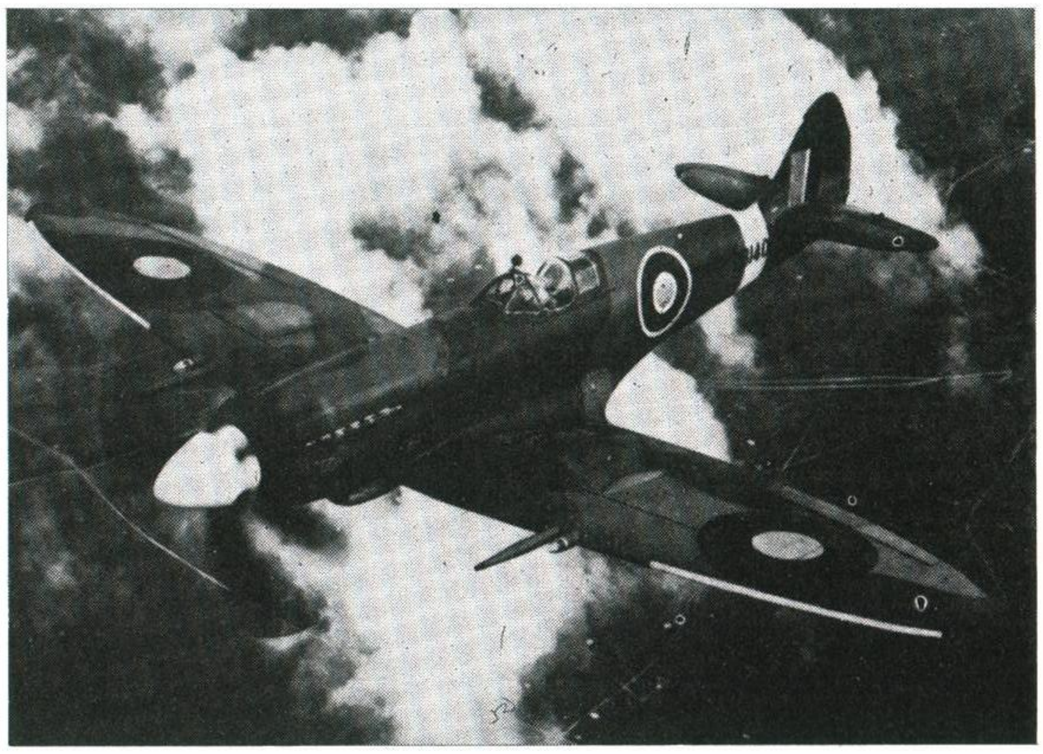
The first production Griffon IIB was delivered on March 31, 1942, this version being installed in the Royal Navy's Fairey Firefly—a carrierborne, two-seat reconnaissance fighter. Development and production of the single-stage, two-speed marks continued with the RG2SM (Griffon Mks.III and IV for the RAF's Spitfire XII) and the RG14SM (Mk.VI for the RN's Seafire XV and XVII).



Serving as the Spitfire Mk.XIV conversion prototype was this Mark VIII (RAF serial JF319) which displays the modified fin and rudder of the interim stage. (Photo: Imperial War Museum, ref. MH.5269)

Early production Spitfire F.Mk.XIV C (RB151). Ground clearance for the big five-blade Rotol propeller is noteworthy.
(Photo: IWM, ATP.12462c)

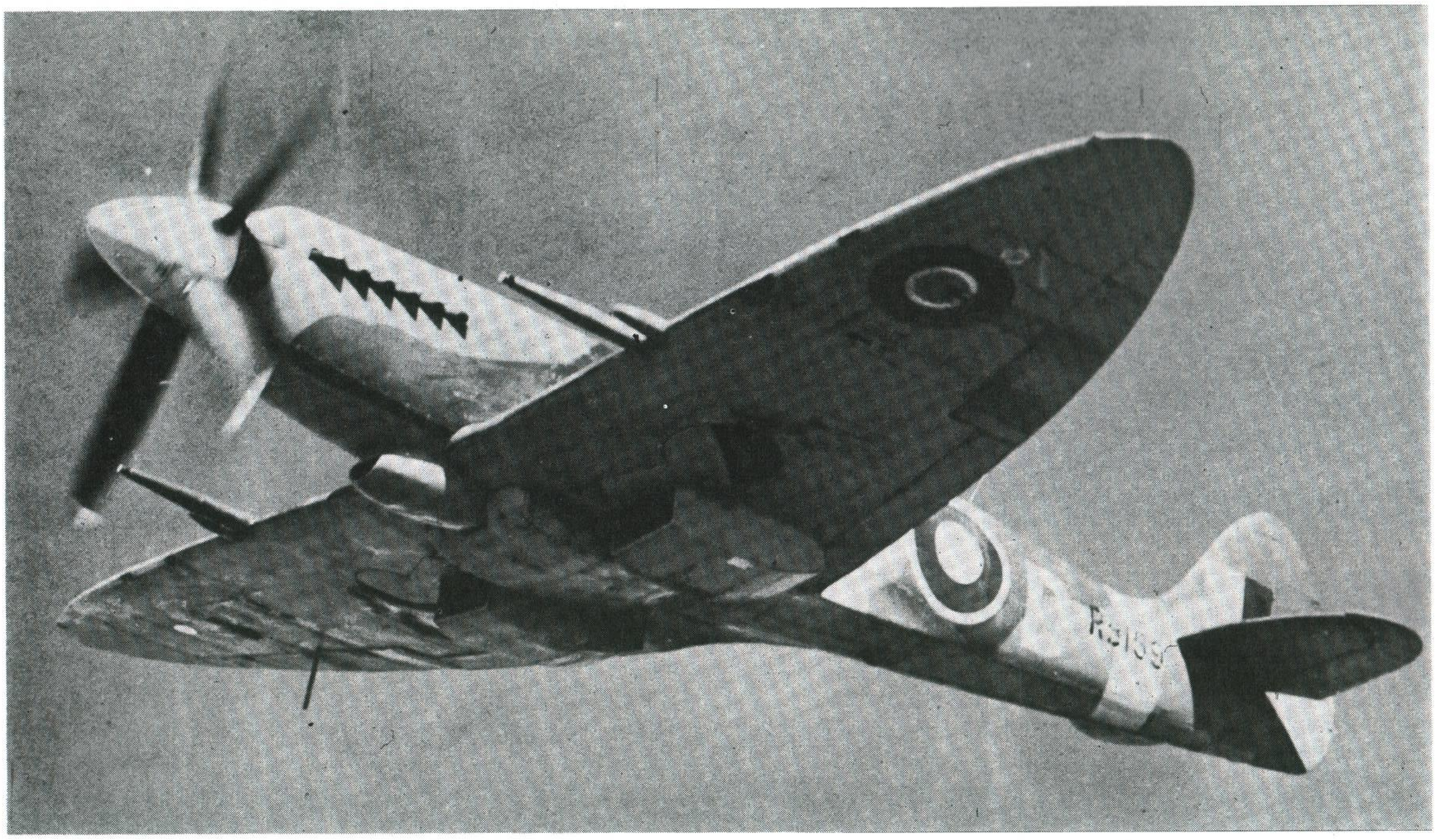
The first production example of the Spitfire F.Mk.XIV C (RB140).
(Photo: Real Photographs of Liverpool)

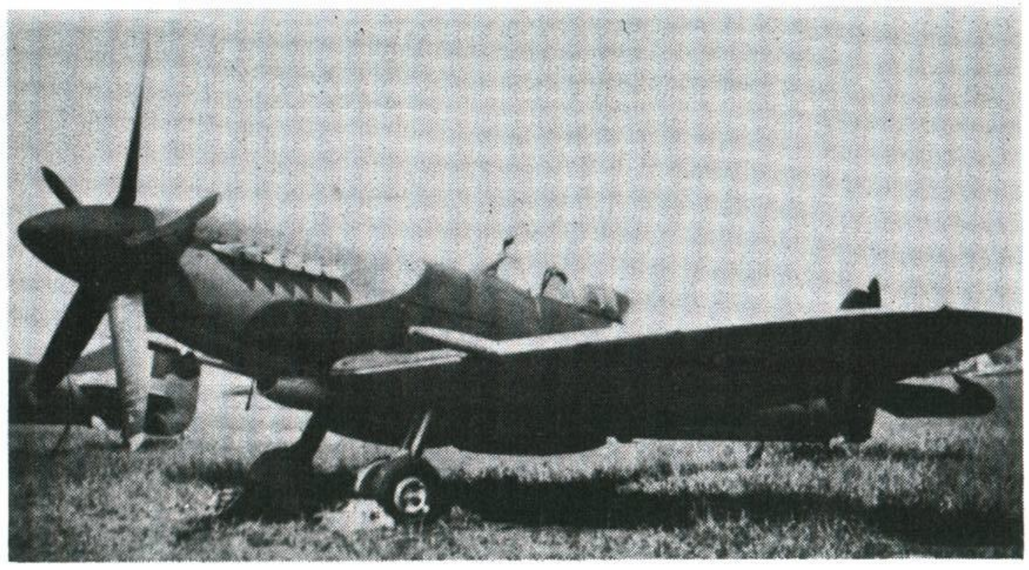


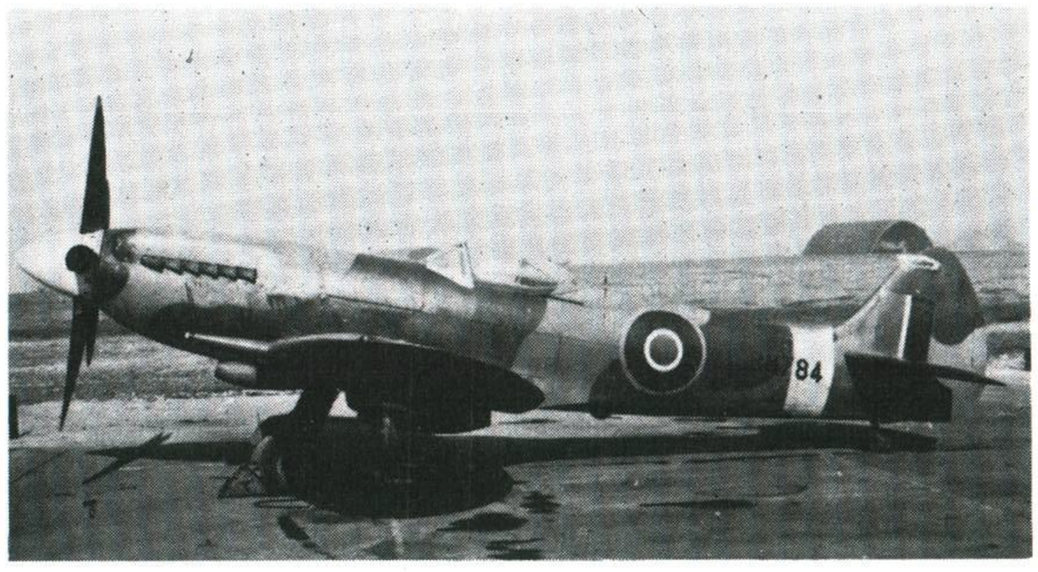
It was inevitable that the Griffon would follow suit with the Merlin and be equipped with a two-stage supercharger, and, in line with Merlin policy was given a mark number range beginning with the Mark 60. The use of the two-stage supercharger permitted the higher compression ratios necessary to obtain high-altitude flight. However, an intercooler was necessary because the fuel vapour (charge) leaving the supercharger was of such a critically high temperature.

The charge cooling was carried out after the style of the Merlin intercooled series; but differed slightly in that the intercooler—atop of the supercharger between the cylinder bank vee—was set at an angle to the centre-line of the engine. This method of mounting eliminated the sharp angle through which the mixture had to turn in passing from the volute to the intercooler. It was reasonable to suppose that in negotiating this sharp angle a loss in boost pressure, though small, would be present. Thus, by mounting it to meet the charge flow, this loss—if not entirely eliminated—would be reduced.

The Griffon intercooled series was only slightly greater in size than the Merlin counterparts. A comparison of overall dimensions shows that the Griffon Mark 65 (at an overall length of 81 inches) was only 3 inches longer than the equivalent Merlin, the Mk.66. Respective overall heights were Griffon 45 inches (Merlin 43·6 inches) and overall width 29·5 (29·8) inches. Frontal area was 7·9 sq.ft. bare and 11 sq.ft. when installed in the Spitfire XIV. Dry weight was 2,090 lb. Amazingly, despite the similarity in size, the Griffon had a swept volume (2,239 cu.in.) which was 35·9% larger than that of the Merlin.







Production Spitfire F.Mk.XIV C (RB159), coded DW-D of No. 610 Squadron, Auxiliary Air Force, RAF, shows off the two big radiators and long-range drop tank. (Photo: IWM, CH.13811)

On the continent of Europe following the invasion of June 1944. A Spitfire F.Mk.XIV E (RM792) with black propeller spinner but lacking normal RAF Fighter Command rear-fuselage "Sky"-coloured band. Suffix "C" and "E" wing cannon lengths differed. (Photo: via author's collection)

Early production Spitfire F.Mk.XIV E (RM784) in March 1945, with 360°-vision canopy transparency and cut-back, shallower rear fuselage. (Photo: IWM, MH.5272)

The two-stage Griffons were the same mechanically as the Griffon IIB except that the supercharger drive from the front end was dispensed with and the drive taken from the rear end of the crankshaft through the medium of a spring drive as in the normal Merlin practice. Instead of the usual type of S.U. carburettor, a Bendix-Stromberg fuel injection unit was fitted. The remainder of the engine assembly was similar to the Griffon II.

The first bench run of the two-stage Griffon took place on June 27, 1942; with deliveries beginning on December 12, 1942.

TEST MK.XIVs

RB141. The first "true" Mk.XIV to be tested was actually the second production aircraft (RB141). During the period of November 14-20, 1943, handling trials were carried out with RB141 when the results were compared with those obtained from similar trials with the prototype aircraft JF319. Flown at a take-off weight of 8,490 lb.—and with a 90 Imperial gallon drop-tank for part of the time—no great differences were found in the handling qualities. The revised fin and rudder decreased the change required in directional trim with speed. Fin and rudder area was 7·40 sq.ft.

RB144. The fifth production model (RB144) was flown between November 25, 1943, and March 1, 1944, for a total of 150 hours and 121 flights; with very little trouble being experienced from the Griffon 65 installed. Circular exhaust stubs were fitted to this aircraft for the last 45 hours of the trials. Starting the Griffon engine could only be achieved by loading the Coffman starter with 4-bore paper cartridges (purple in colour). Take-off weight was 8,445 lb. except for a few hours when this was increased to 8,845 lb. as a result of fitting the aircraft with a 45 Imp. gal. drop tank. Attempts were made to fit the Mk.XIV with a 30-gal. drop-tank, but were unsuccessful because—without modification—the forward cut-away fouled the air intake scoop.

Speeds of between 450 and 470 mph (limiting speed),

were reached during diving tests when the aircraft was subjected to 61 sustained dives. Oil consumption was low—an average of 2·8 pints per hour during the tests.

When ground running the engine, it was found necessary to lash the aircraft down firmly, especially at the tail. Manual holding-down was not sufficient as the lift at the tail during maximum run-up was approximately 650 lb.

One unsatisfactory feature became apparent from the initial tests with the 45-gal. drop-tank—it was discovered that the fuel pressure warning light came on shortly *after* the engine cut. This could be a disconcerting experience, particularly if the aircraft were flying at low altitude at the time. The fuel pressure warning light came on when pressure dropped to 10 lb./sq.in. The release lever was situated on the starboard side of the cockpit.

Two years later RB144 was fitted with a contra-rotating propeller by the de Havilland company. The powerplant installed was then a Griffon 85.

RB146. Gun heating trials were carried out on RB146 and found to be unsatisfactory. The position was improved not so much by additional protection but by the introduction of the "E" ("universal") wing. This resulted in the heat being fed into two bays, whereas on RB146, with the "C" wing armament, there were six bays. This aircraft was frequently flown whilst on gun heating, spinning and fuel consumption trials from Boscombe Down by the outstanding Polish fighter pilot, Jan. Zurakowski, who later became test pilot for Martin-Baker Aircraft Co. Ltd. and Gloster Aircraft Co. Ltd.

RM766. This Griffon-Spitfire was used in connection with the later gun heating trials. Other Griffon-Spitfires which were subjected to tests included the following aircraft.

MV247. FR.Mk.XIV. Trials during March and April, 1945, which included the fitting of a rear-view "tear-drop" cockpit canopy. Prefix "FR" indicated camera installation; "Fighter Reconnaissance".

RM784. Spinning, manoeuvrability and handling tests at A&AEE, Boscombe Down, in March, 1945. Frequently flown by Jan. Zurakowski.

RM929. Tests to determine efficiency of chlorobromomethane and dry powder carried out by Fire Research Board. Subsequently allocated maintenance serial 6849M.

NH706. Tests by Rolls-Royce with Griffon 65, between April 1944 and July 1947.

RM676. Tested at A&AEE in May 1945. Nature of tests not known.

RM650 and RM689. Used by AFDU—Air Fighting Development Unit—in late 1944 for testing the efficiency of a curved windscreen. Results did not show sufficient improvement of vision to justify introduction of new windsheld. RM689 went on to Rolls-Royce in March 1949, for liaison work and later became civil-registered as G-ALGT. In 1968 it participated in the film *Battle of Britain*, for which it had wing tips fitted. After "demobilization", it retained a camouflage finish and subsequently became "RM619" coded "AP-D".

RM790, NH707 and TP240 were all engaged on the testing of the Mk.IX rocket projectile installation.

TX980. Tested by Rolls-Royce with a special three-speed supercharger during period September 1945–October 1948.

TZ138. Another surviving example, this FR.Mk.XIV E shipped to Canada for winterization trials in the winter months of 1945–46. New trials were carried out from Fort Nelson, British Columbia, during the period January 15-27, 1947, and finally from Churchill, Manitoba, between February 17-28, 1948, when the tests which had continued for 95 days were concluded. During this period the aircraft was fitted with modified (de Havilland D.H.82C) Tiger Moth skis following several incidents when its wheels broke through the snow surface. However, operations of single-motor fighters on skis were not recommended and the aircraft was then disposed of; being sold to Imperial Oil Company of Edmonton, Alberta. It was issued with a civil licence and became the Canadian-registered CF-GMZ. In this guise, CF-GMZ participated in the National Air Races at Cleveland, Ohio, with racing No. "80"—and took third place in the Tinnerman Trophy Race in 1949. Between 1949 and 1960 the history of TZ138 is obscure but it was apparently at one time destined for Cuba, but following damage en route, its delivery was abandoned.

SPITFIRE XIVs IN PRODUCTION

Only the first batch of aircraft produced were fitted with the "C" wing armament. The remaining aircraft were fitted with the "E" ("universal") wing armament. The "E" wing could be identified by the 20-mm. cannon being situated in the outer bay with a faired stub plugging the inner bay.

The first production Mk.XIV aircraft—delivered to No. 39 Maintenance Unit in October, 1943—were RB142 and RB143, the former being the first to enter squadron service.

The Mk.XIV assemblies produced by the Vickers-Armstrongs (Supermarine) factories at Aldermaston, Chattis Hill, Keevil, Southampton and Winchester, appeared in two versions; the F.Mk.XIV—fighter version and the FR.Mk.XIV for fighter-reconnaissance work at low altitude. The FR version carried one F.24 camera in the fuselage behind the cockpit on the port side for oblique photography. Normal armament was retained.

The majority of Mk.XIVs appeared with the standard "balloon"-type cockpit hood. Later the rear-view hood —the 360°-vision "bubble" canopy—was introduced on to the production line.

For low-altitude work, wingtips were removed or "clipped". This was applicable to both versions; although, because of the nature of the role, all FR. variants had "clipped" wings. It was *not*, therefore, a means for establishing the identity of an individual F./FR.Mk.XIV.

External armament of the F.Mk.XIV C consisted of one 500-lb. bomb carried beneath the fuselage; while on the F.Mk.XIV E, this was augmented by one 250-lb. bomb under each wing.

The fuselage and wing bombs were released by operation of a push button situated on the top of the throttle control lever. A manual release handle was available in the event of electrical failure.

Pilots were extremely eager to fly the "new" Spitfire and were enthused by its superior performance. Inevitably, some pilots felt that this was no longer a "Spitfire" with its bigger nose, redesigned fin and rudder and larger (two) underwing radiators. A total of 957 of both variants was produced.

THE Mk.XIV IN ACTION—EUROPE

The privilege of receiving the first Griffon-Spitfires in

service, went to No. 610 (County of Chester) Squadron, R.A.F., who picked up eight of the new aircraft on arrival at Exeter Airport, South Devon, on January 6, 1944. These aircraft had previously been delivered from Nos. 33 and 39 Maintenance Units.

Within two days, Flight Sergeant White was airborne (in RB154) for just under two hours in company with a Spitfire Mk.V, the Squadron's outgoing equipment.

Familiarization with the new Griffon-Spits. by pilots through local flying interspersed with convoy patrols was the pattern throughout February—at the end of which No. 610 had 19 Mk.XIVs on strength; a full quota.

A weakness in the rear fuselage near the tail section became apparent following a test flight to 40,000 feet by RB150 on February 16. An inspection of all Mk.XIVs was ordered; and RB140 was also found to be in similar condition. The aircraft were repaired and suitably strengthened by Air Service Training Ltd. at Exeter.

No. 610 Squadron suffered its first accident with a Mk.XIV when RB156 forced landed at Harrowbeer near Yelverton (Somerset), on February 2, through excessive vibration caused by plug trouble.

Teething troubles were relatively few and seem to have created little difficulty. The Mark XIV was favourably acclaimed, particularly by the pilots who thought it to be a "marvellous plane". Ground crews had some misgivings—because of the inaccessibility of some components when servicing—but these were not of a serious nature.

Tyre changes were frequent due to the combination of the increased weight of the aircraft (up to 8,500 lb.) and higher landing speeds. Tyres had a life covering only eight to 12 landings.

The next R.A.F. Fighter Command unit to receive the Mk.XIV was No. 91 Squadron, picking up six aircraft on arrival at Castle Camps, near Haverhill, Suffolk, on February 29, 1944. However, a move north to Scotland was soon made—to Drem, near Edinburgh—by which time, March 8, there were 13 Mk.XIVs on strength.

No. 91 Squadron got off to a bad start with its first operational mission which took place on the 12th. RB172 (Flight Sergeants C. Sayer (RB172) and B. Ritchie (RB188)) were "scrambled" in order to assist an incoming Consolidated B-24 Liberator. No help was in fact required; but, because of deteriorating weather, RB188 crashed at 19:00 hours 20 miles south of Turnhouse with the loss of the pilot. Dusk flying was carried out on March 17, and everyone was pleasantly surprised to find how nice the Mk.XIV was to fly at night. No trouble being experienced from exhaust flames.

On April 10, 1944, No. 322 (Dutch) Squadron took possession of 20 Mk.XIVs on arriving at Acklington and soon found the fuel consumption to be higher than previously experienced. To quote one pilot: "You can see it go down the gauge."

A move to West Malling, near Maidstone (Kent), was made by No. 91 Squadron on April 23—the unit declaring itself to be operational by the following day.

The first No. 91 sortie over enemy territory with Mk.XIVs was permitted on April 28 when RB182 and NH697 were "scrambled" to intercept an aircraft over Rouen—this turned out to be a USAAF Lockheed P-38 Lightning.

The next day, Flying Officer J. Collis (RB187) was lost when his aircraft failed to return from a patrol over the Thames Estuary.

In its first month of operations, No. 91 Squadron recorded 132 hours 45 minutes (day) and 14 hours 55 minutes (night) of operational flying.

On May 7, No. 322 (Dutch) Squadron, now based at Hartford Bridge (later Blackbushe) in Hampshire, received and entertained a royal visitor. During his stay His Royal Highness Prince Bernhard of the Netherlands flew "C-for-Charlie" for 15 minutes.

During May, No. 610 Squadron was engaged in offensive "sweeps" and *Rodeos** over Occupied Europe. While four aircraft of this squadron were carrying out a shipping reconnaissance on the 22nd, the Flight Leader, Flight Lieutenant H. Percy (RB162), was hit by anti-aircraft fire off Plemont Point, Guernsey. Climbing to 1,500 ft., Percy baled-out but, unfortunately, his parachute failed to open.

This squadron lost another aircraft the following day when RB178 crashed on landing returning from a *Ramrod.** The pilot, Flight Lieutenant West, was fatally injured.

The first Spitfire Mk.XIV known to be lost over enemy-held territory, also belonged to No. 610. Piloted by Flying Officer Colgrave (RB175), it was hit by fire from a *flak* wagon while on a *Rhubarb**. The aircraft broke up following an attempt by the pilot to make a forced landing eight miles s.s.e. of Lamballe. Later four aircraft were sent out to destroy the wreckage, but these were driven off by a heavy anti-aircraft barrage.

To combat the V.1 Flying Bomb ("divers" as they were also called) menace, No. 91 Squadron began "anti-diver" patrols on April 16 and immediately had one success when Flight Lieutenant H. Moffett (RM617) destroyed one over Kenley (Surrey) after chasing it for 20 miles.

On June 18, No. 91 Squadron flew 53 sorties against the new German revenge weapon. On this day No. 91 Squadron was joined by No. 610 Squadron which had been moved to West Malling (Kent) to undertake similar duties. In fact, this became its sole activity until the end of July, by which time it had destroyed 43 "divers" and moved from West Malling to Westhampnett near Chichester, and to Friston near Eastbourne (Sussex). No. 610 Squadron had opened its score on June 20 when it destroyed four "divers" after 34 sorties.

After running out of ammunition on June 23, Flying Officer K. Collis (NH698) tipped over a "diver"), causing it to go out of control. This is believed to have been the first such Mk.XIV "tipping", although it became a not uncommon occurrence in the following weeks. It was not, however, without its dangers.

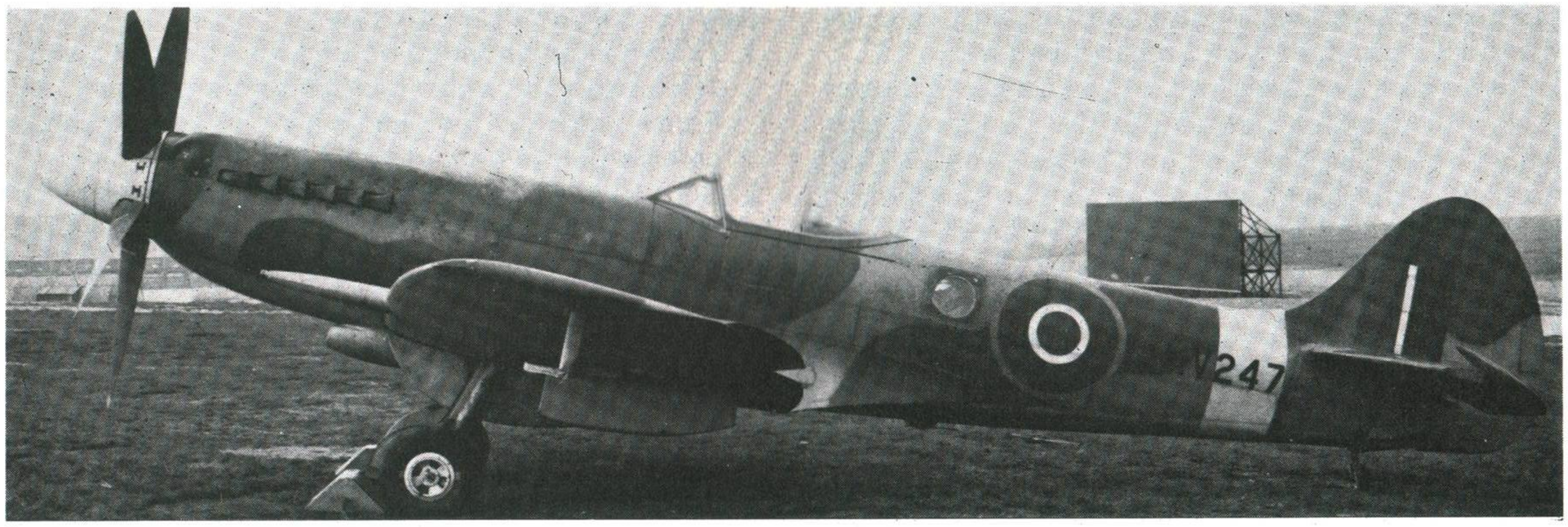
On June 29, No. 91 flew 63 sorties and destroyed 11 "divers", two falling to Flight Lieutenant Nash (RM615).

At the close of June, No. 91 had flown 1048 hr. 55 min. operationally and had destroyed 63 "divers".

All through the month of July, No. 91 Squadron kept up the hectic pace. The record book shows:

July	Sorties	Destroyed
1	24	6 divers
3	20	7 divers
4	45	7 divers
5	34	6 divers
7	46	12 divers

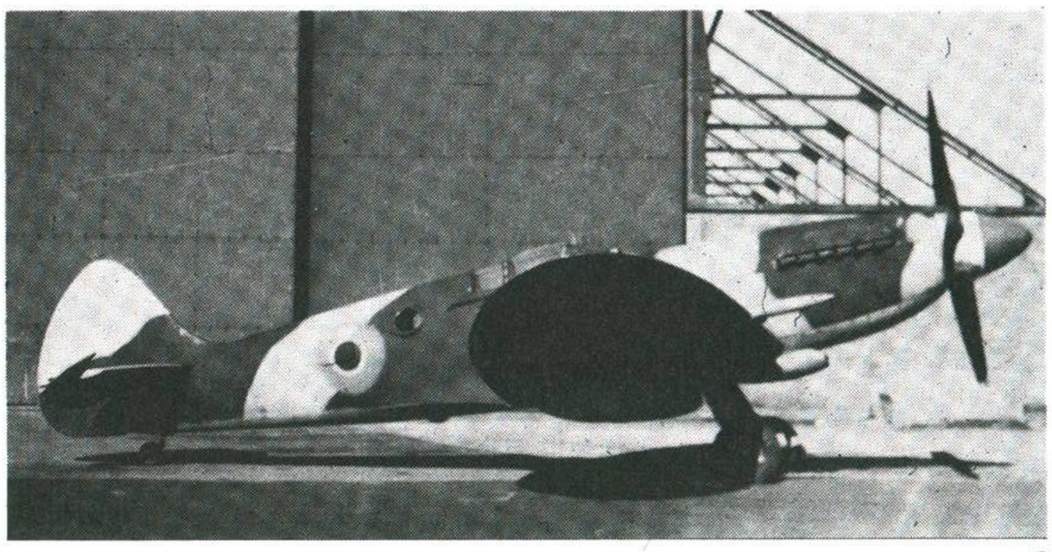
* *Ramrod* was target elimination by fighter-protected bombers. *Rodeo* was a fighter "sweep" over enemy-held territory. *Rhubarbs* were small-scale fighter ground attacks on targets-of-opportunity.



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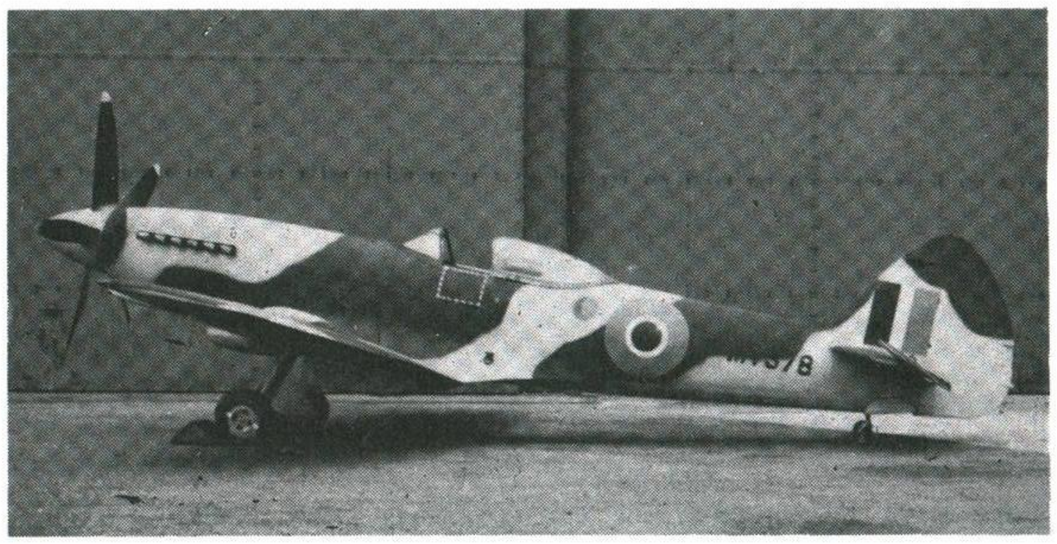
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(Photos 1–3) 5

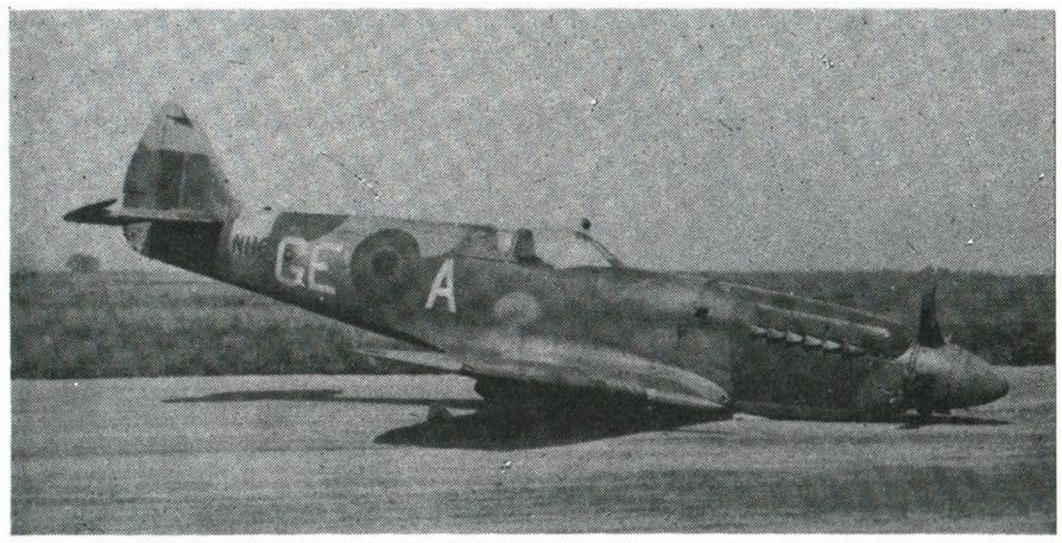
Spitfire (Fighter-Reconnaissance) FR.Mk.XIV E (MV247), with experimental long-range fuel tank.

(Photo: IWM, ATP.15083c)

In continental Europe, October 4, 1945, a Spitfire FR.Mk.XIV E (NH895) of No. 451 Squadron, Royal Australian Air Force. Over-painting of "Sky" band has partially obscured the RAF serial number.

(Photo: Frank Smith)

About to change nationality, a Spitfire FR.Mk.XIV E (RM802) at RAF Colerne in 1947 being prepared for ferrying to Belgium to serve with the 2ème Wing de Chasse *as "SG44". Spinner in white and blue later painted grey; white serial has been chalked on the Belgian Air Force fuselage roundel. With full-span wings, this is an unusual Fighter-Reconnaissance variant.* (Photo: K. Rutterford)



(Photos 4–6) 6

A Spitfire FR.Mk.XIV E (MV307) at RAF Station Tangmere, during a "summer camp" exercise by No. 600 Squadron, Auxiliary Air Force. Note that "RAG-C" (No. 600 Sqn.) has wing cannon removed.

(Photo: Peter Arnold collection)

Destined for the Belgian Air Force as "SG 50" in 1947, a Spitfire FR.XIV E (MV378; ex-No. 412 Squadron, Royal Canadian Air Force) at Colerne prior to ferrying to 2ème Wing de Chasse/1re Escadrille. *Noteworthy is the different design of camera port applied to "tear-drop" canopy Mk.XIVs.* (Photo: K. Rutterford)

Photographed on November 1, 1947, the first Belgian Spitfire F.Mk. XIV E ("SG1"), allocated to 1W/349ème Escadrille de Chasse, *still displayed its ex-RAF serial NH655.*

(Photo: via author's collection)

and so on until the end of the month, by which time 104 divers had been destroyed, bringing the total to 167.

There was a debit side, too. Flying Officer McKinley of No. 610 Squadron crashed in RB142 on July 12, after flying through the explosion of a "diver" which he had attacked. Flight Lieutenant Seghers of No. 91 Squadron collided with a V.1 near East Hoathley (Sussex) on July 26 and crashed in RM743. On July 31, Flying Officer Schade of No. 91 was killed in RM654 following a collision with a Hawker Tempest. By this time No. 91 Squadron was based at Deansland (Sussex).

In order to improve performance against the V.1, the Spitfire XIVs of No. 610 Squadron were modified, resulting in engine boost being increased from 18 to 21 lb. and the use of 150 grade octane in place of the normal 130 octane.

Further steps taken to improve speed resulted in the removal of the 0·303-inch Browning machine-guns, the cavities being filled with wooden plugs. Rear-view mirrors were also removed and the surface of the aircraft was highly polished.

Another re-equipping with Mk.XIVs began on August 3, when No. 130 Squadron received its first Griffon-Spitfires at Tangmere (W. Sussex). In just over a week it made a move to join the other R.A.F. squadrons at Lympne (Kent) engaged in "anti-diver" patrols and marked up its first success on the 16th.

These activities were, however, short lived and two days later the Squadron was transferred to offensive "sweeps" and *Ramrods*.

Then on August 9, 1944, No. 91 Squadron handed over its Mk.XIVs to No. 402 Squadron; taking in exchange the latter's Mk.IX Spitfires.

On the same day, No. 350 Squadron was taking delivery of its first Mk.XIV Es at Hawkinge in Kent. They immediately became involved in "anti-diver" patrols on the following day when 23 sorties were flown. Their first success came on August 15, when Flying Officer Van der Veken (RM655) and Sergeant Boels (RM748) jointly destroyed a "diver" near Ashford, Kent.

After running out of ammunition on August 20, Flight Sergeant Liva tipped his "diver" over causing it to crash; damaging a wing tip of RM701 in the process.

During the V.1 campaign, the Spitfire XIV Wing—as it had become—shot down 300 of the 429 "bombs" claimed by the home defence. No. 91 Squadron claimed 184 "divers" and No. 601 claimed a further 50.

During August, No. 322 Squadron relinquished its Mk.XIVs at Hawkinge for Spitfire Mk.IXs.

Spitfire Mk.XIVs were taken-on-charge by No. 41 Squadron on September 12; parting with Spitfire Mk.XIIs which had been on strength since April 1943. Two days later, the first mission using the new aircraft was carried out by Flying Officer D. E. Tebbit (RM698) and Flight Sergeant R. Stephenson (RM797). They helped to provide escort cover for a raid by USAAF Boeing B-17 Fortress bombers.

On September 16, Blue Section of No. 41 Squadron (comprising RM699, 710 and 770) attacked a secret weapon site at the Hague; while some 10 miles further n.e. and at the same time, Red Section (with RM789, 790 and 791) carried out an armed reconnaissance in the Katwijk-aan-Zee area.

Squadrons continued to move over to the Continent as the Allied advance continued; and, as part of this strategy, No. 130 Squadron made the trip across the English Channel on September 30 to become part of No. 125 Wing, 83 Group, Second Tactical Air Force. The Mk.XIV Es (including RM675, 695, 700, 738, 749, 750, 753, 756, 757, 760, 762 and 808) had been picked up at Lympne; having been left there by No. 350 Squadron.

During October, a new phase of operations was launched. This was directed against the Messerschmitt Me 262 two-jet fighter and resulted in "anti-jet" patrols. On the 11th, No. 130 carried out three dozen such sorties. The pilots on returning, although unsuccessful in achieving interception, formed the opinion that given adequate height and a reasonable position from which to attack, the new threat posed by the jet fighter would quickly be nullified.

Worth correcting at this point is an incident previously purported to give credit to a Spitfire XIV of No. 401 Squadron, RCAF, for the destruction of the first Me 262 jet fighter on October 5, 1944. A check of the squadron records shows that this enemy aircraft was in fact intercepted and shot down by five Spitfire IXs of No. 401 Squadron, which were on strength at the time. In fact, its Mk.XIVs did not arrive until May 6, 1945.

Armed reconnaissance missions were normally carried out at low level with the result that these aircraft were subjected to even small arms fire. To illustrate this, 12 Mk.XIVs of No. 130 Squadron (led by Squadron Leader Tripe, DFC) were engaged in attacks on enemy motor transport on October 24. During this time the squadron leader's Spitfire was struck in the cockpit by a revolver bullet which had been fired by an angry member of the *Wehrmacht* travelling in a bus then being attacked.

Personnel from No. 430 Squadron ferried in their first five Spitfire XIVs from No. 83 Ground Servicing Unit, Tangmere, near Chichester (Sussex), to their base at B.78 Advanced Landing Ground in the Netherlands on November 25. By the following day they were flying their first mission—with RM821: "B" and RM876: "U" —on a tactical reconnaissance mission in the Geldern area.

Two Me 262s were encountered on December 8 by Flight Lieutenant R. E. Anderson (RM769) of No. 41 Squadron and Flight Lieutenant J. G. Refshauge (RM 696) to north of Nijmegen. But no results were obtained.

Two other incidents occurred that same day, both involving No. 130 Squadron aircraft. The first arose when 10 Spitfires were engaged by 12 Messerschmitt Bf 109s and Focke-Wulf FW 190s. Three enemy aircraft destroyed plus two probables were claimed for the loss of one Spitfire (RM749).

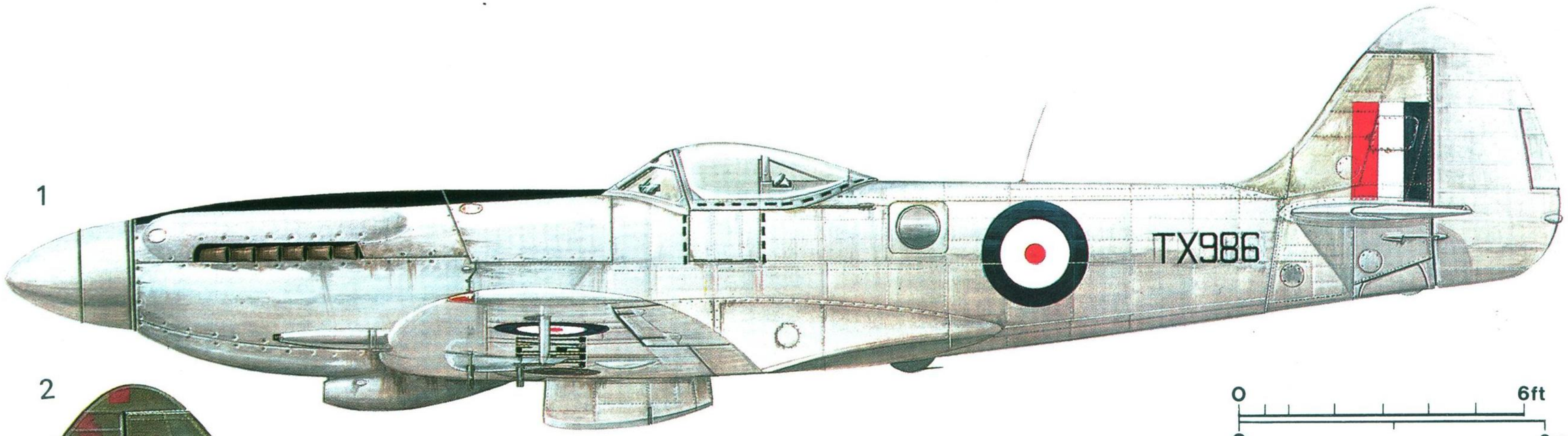
Key to colour illustrations

1 TX986—Supermarine Spitfire FR.Mk.XIV E, post-1945, serving with an unidentified Royal Air Force unit in the Far East. Reconnaissance camera port is behind cockpit.

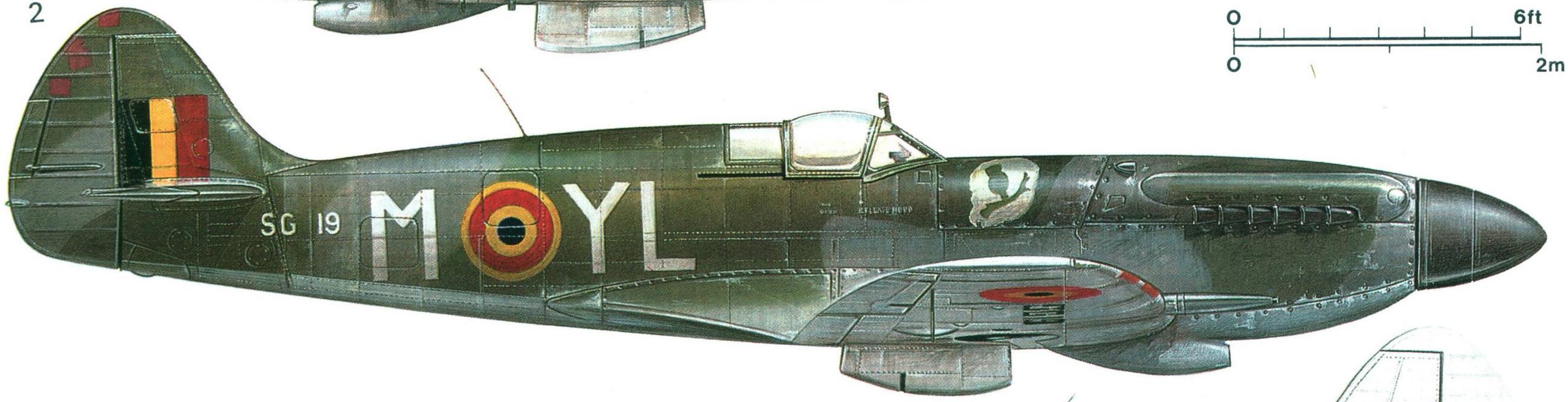
2 SG 19—Spitfire F.Mk.XIV E of the Belgian Air Force in 1950 when ex-RAF serial RM906 served with 2eme Wing/3eme Escadrille. It survived two accidents with 3 Esc. before passing on to another unit, possibly the Ecole de Chasse.

3 G-ALGT—An F.Mk.XIV E (ex-RM689) which, after RAF service, was acquired by Rolls-Royce Ltd. for liaison duties. For the "Battle of Britain" film, G-ALGT was accorded wingtips and camouflage. Currently flown with marks of No. 130 Sqn, RAF ("RM619", coded "AP-D").

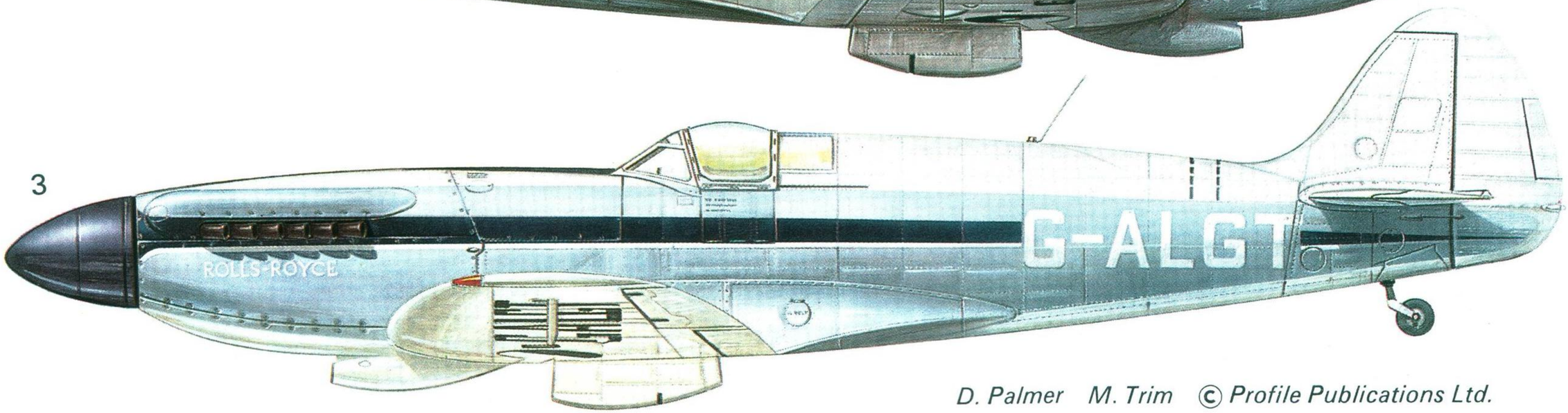
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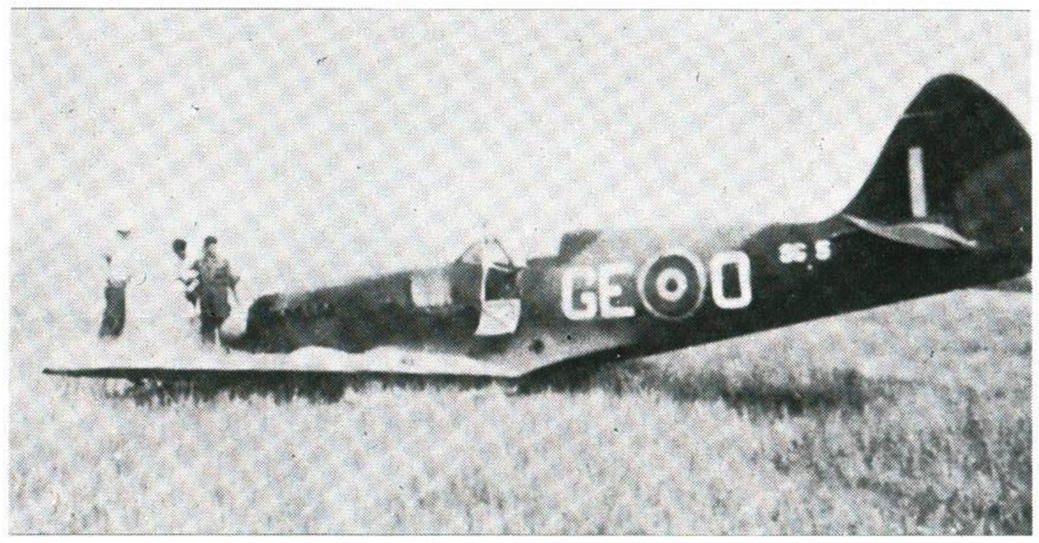
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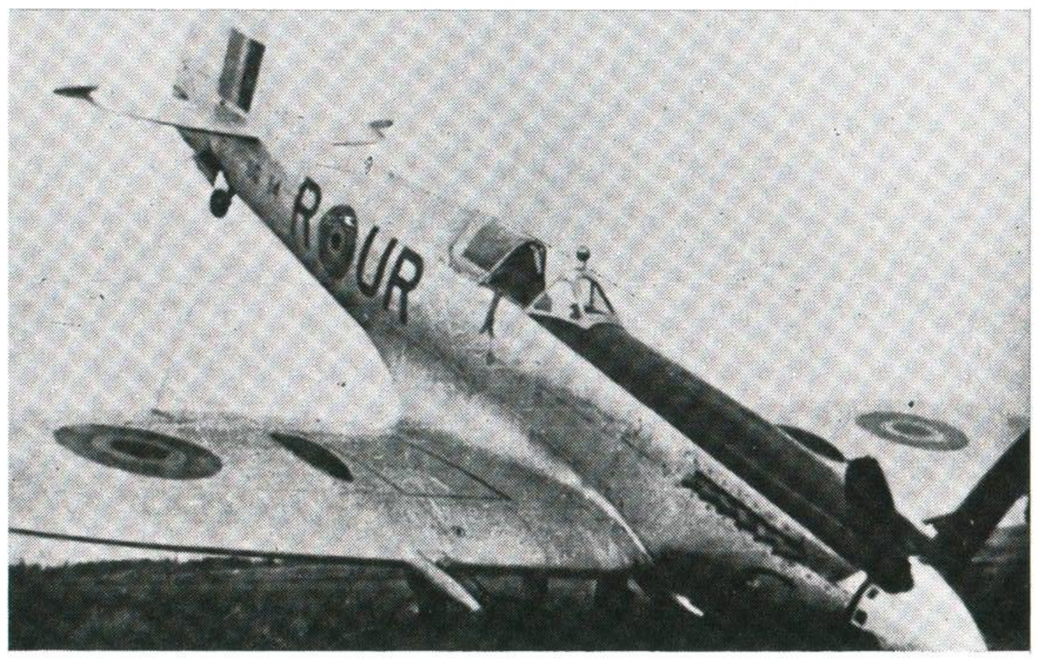


D. Palmer M. Trim *© Profile Publications Ltd.*









Two views of ex-RAF No. 610 Squadron, Auxiliary Air Force, Spitfire Mk.XIV (RB163) as Belgian Air Force "SG5"; (top left) as BAF code GE-O of 1W/349 Esc., *after it had lost a wheel on landing, and (top right) later, in natural metal finish, as IQ-E when allocated to the* Ecole de Chasse.
(Photos: via author's collection)

Former Royal Canadian Air Force No. 402 Squadron Spitfire F.Mk.XIV E (RM726) in the guise of BAF "SG14"; (lower left) while still retaining the RAF serial. Note that the windshield rear-view mirror is absent, and (lower right) as UR-R of 2W/2 Esc. *Observe that the wing cannon "blisters" are painted black and the "comet" heraldry on the motor cowling.*
(Photos: via author's collection)

The second incident concerned a flight of four aircraft, operating from Brussels, which ran into a snowstorm. Two (RB158 and 189) ran out of fuel and both crashed in fields at Moldeghem.

A loss to No. 41 Squadron occurred on December 18, when RM699 was hit by *flak* and crashed in flames while on an armed reconnaissance. The pilot, Warrant Officer Appleton, baled-out safely.

Heavy *flak* was, in fact, taking its toll—particularly on the Spitfires engaged in the low altitude missions. No. 350 Squadron was on the receiving end of a fair proportion of this, although not always originating from enemy lines.

On December 23, for example, RB169 and NH720 were both damaged by American ground batteries; while on the 24th, enemy *flak* was responsible for the loss of S/Ldr. Collignon's aircraft RM690 after he was forced to bale-out. RB161 was hit at the same time.

Christmas Day brought no respite for No. 350 Squadron, part of which was spent in attacking enemy convoys. RB189 was lost in the morning and RB169 in the afternoon when Flight Sergeant Kicq made a forced landing near base.

The first loss sustained by No. 430 Squadron occurred on December 31 when Flying Officer J. McLeod (RM818: "C") developed a glycol leak while carrying out a joint reconnaissance mission with RM852:"J". The pilot was unsuccessful in his attempts to bale-out and the aircraft crashed after the engine seized-up.

Enemy ground fire scored three successes against No. 130 Squadron on the 14th when their aircraft were operating s.e. of Liège in the Malmédy area. Fortunately, the pilots of RM655, 762 and 875 all returned safely.

Yet another loss to *flak* occurred on January 16, when RM619 of No. 350 Squadron was lost near Aachen. The pilot baled-out successfully behind enemy lines. This Mk.XIV had previously served with Nos. 91 and 130 Squadrons before being taken-on-charge on October 4, 1944.

Seven aircraft of No. 41 Squadron took off at 08:40 on an armed reconnaissance on January 23, in the Munster area where they encountered a number of long-nosed Focke-Wulf FW 190s. A successful interception resulted and two enemy aircraft were shot down by Squadron Leader Bentham (RM791) and another fell to the guns of Flying Officer Hegarty (RM698). Unfortunately, Flight Lieutenant M. Balasse (in RM765) failed to return.

On the same day, No. 130 Squadron lost RM756 in the Ardennes, after being hit by *flak*.

By the end of January 1945, No. 430 Squadron had built up its strength of Mk.XIVs to 17, during which month it had completed a total of 221 operational flying hours.

Two aircraft were lost by the squadron in February. On the 8th, RM823:"O" crashed after engine failure and, on the 14th RM824:"Z" was damaged after being hit by anti-aircraft fire.

Enemy aircraft were active on February 21, when a patrol from No. 350 Squadron encountered 20 Bf 109s. In the ensuing battle Flight Lieutenant Lavigne (RM729) destroyed one as did Pilot Officer Lambred (RM678), who also damaged another. A third was destroyed by Flying Officer Van Wersch in RM648.

No. 414 Squadron, 2nd Tactical Air Force, was based at Petit Brogel in Belgium, when it received its first FR.Mk.XIVs (with "tear-drop" canopies) on April 4, 1945. These Mk.XIVs, ferried out from the United

Kingdom, were in action within a week from their new base at B.108 airfield in Germany. The squadron did not, however, relinquish all its previous equipment—Spitfire Mk.IXs—which it continued to use in conjunction with the Mk.XIVs, until May 5, 1945.

Profit and loss entries were recorded by No. 350 Squadron on April 5, when Flying Officer Muls in RB189:("MN-G") and his number two, a Flight Sergeant, in RB181:("MN-H") took off from Airfield B.78 in the Netherlands on an armed reconnaissance mission, during which they shot down one FW 190.

In a later mission, Flying Officer Cresswell-Turner in RB185:("MN-L") failed to return after being "bounced" by a number of FW 190s.

Spitfire Mk.XIVs of No. 41 Squadron operating from Twente Airfield in Holland, scored a number of successes against enemy aircraft during April 1945. On the 11th, Flight Lieutenant F. Gaze (SM823) shot down a Junkers Ju 52/3m while patrolling the Bremen-Nienburg area. The following day, Gaze (again in SM823) intercepted an Arado Ar 234 *Blitz* over Bremen and opened fire, hitting the enemy aircraft in the starboard jet. Recovering from a spin, the Ar 234 was then attacked by Flight Lieutenant Rake (MV267). It was further damaged and blew up when attempting to make a forced landing.

On April 14, Squadron Leader J. B. Shepperd (SM826) was engaged on an armed reconnaissance when he engaged a Bf 110 towing a Me 163 (rocket-powered fighter) near Bremen. One burst sent the Bf 110 into an uncontrollable dive. The jet fighter which had broken loose, failed to regain control and also dived into the ground. Then on the 15th, an FW 190 was destroyed by Flight Lieutenant Middler (RM824:"Z") of No. 430 Squadron near Velwen.

The following day, pilots of No. 41 Squadron—now operating from Celle in Germany—encountered and destroyed three FW 190 fighters. The "kills" were made by Wing Commander Keefer (MV257), Flying Officer Withers (MV249) and Squadron Leader Shepherd (MV267).

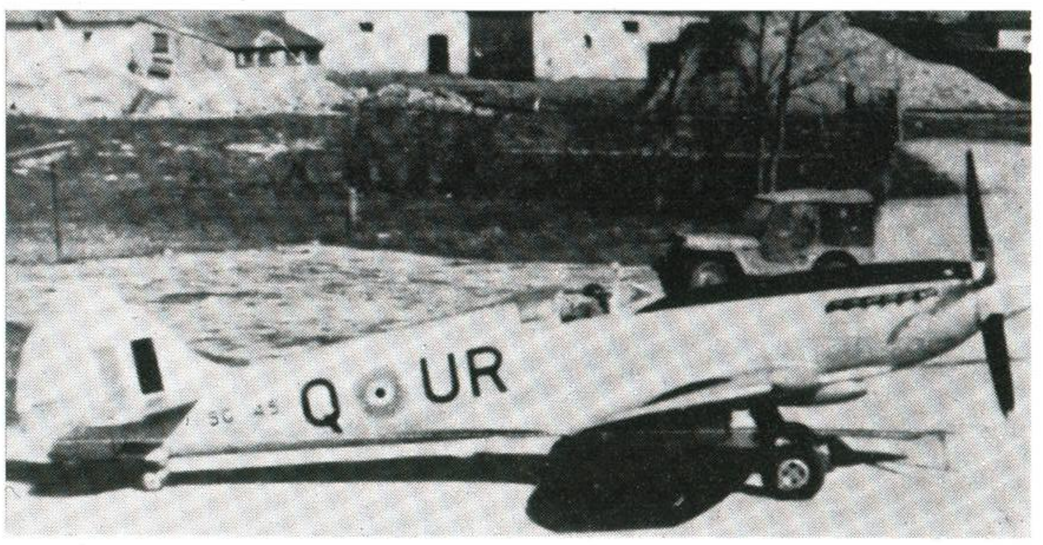
A Junkers Ju 88 was destroyed by Flying Officer Hegarty (SM826) at Lübeck on April 17.

A loss to No. 41 Squadron occurred on the 24th when NM821 was hit by *flak* while on a tactical reconnaissance from B.154 airfield. The pilot baled-out safely but the Mk.XIV crashed in flames.

Operating from Celle on the same day, Squadron Leader Walmsley of No. 350 Squadron—their new Commanding Officer—shot down an FW 190 in SM825:("MN-H"). Unfortunately, Flight Lieutenant



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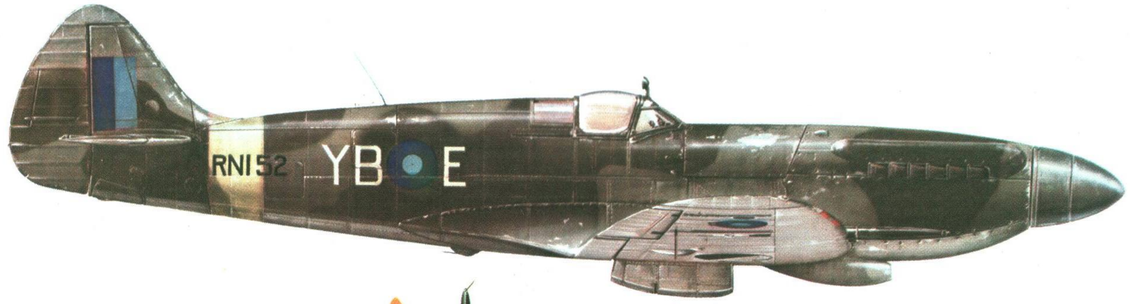
1 *On October 5, 1950, Spitfire F.Mk.XIV E (RN201; BAF "SG31") of* 2W/3 Esc. *was written-off after a heavy landing. It is now preserved as a "gate guardian" at the* Escadrille Auxiliaire *base, Beauvechain, s.e. of Brussels, as "SG3".* (Photo: via author's collection)

2 *Natural metal-finish Belgian Air Force "SG45", a Spitfire Mk.XIV (RN119) with code UR-Q of* 2W/2 Esc., *but originally with No. 412 Squadron, Royal Canadian Air Force.*
(Photo: via author's collection)

3/4 *Accident-prone "SG52", a Belgian Air Force Spitfire Mk.XIV (RM882) previously with No. 414 Squadron, Royal Canadian Air Force. On January 7, 1949 while coded IQ-S of the* Ecole de Chasse *and retaining RAF serial and "Sky" rear-fuselage band; and (below right) on March 16, 1951, as 3R-V of* 2W/1 Esc.
(Photos: via author's collection)

5 *Another Belgian Air Force Spitfire Mk.XIV (MV382) which came to grief was "SG80" of the* Escadrille Auxiliare. *This Mk.XIV, coded GV-S, crashed at Beauvechain on July 20, 1952. Cannon stubs are painted black.* (Photo: via author's collection)

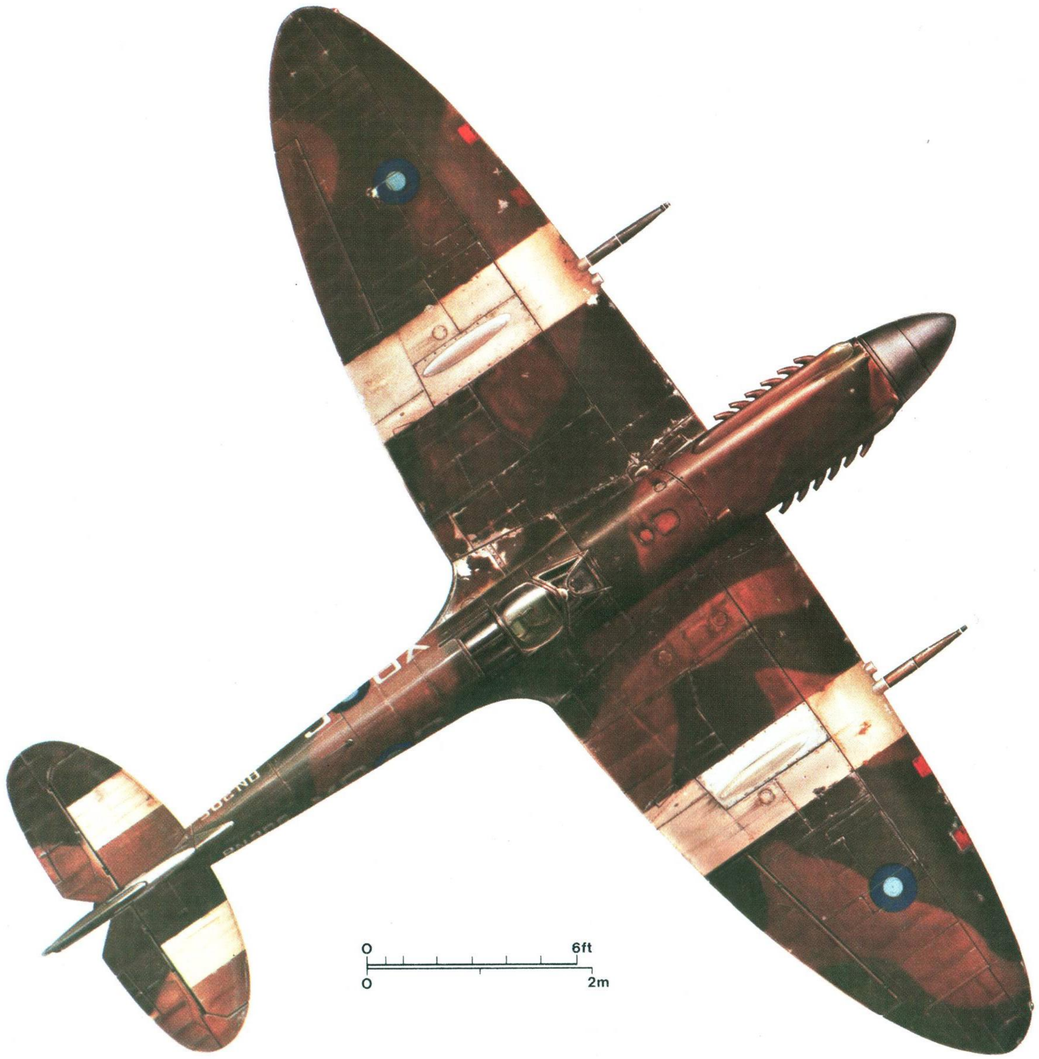


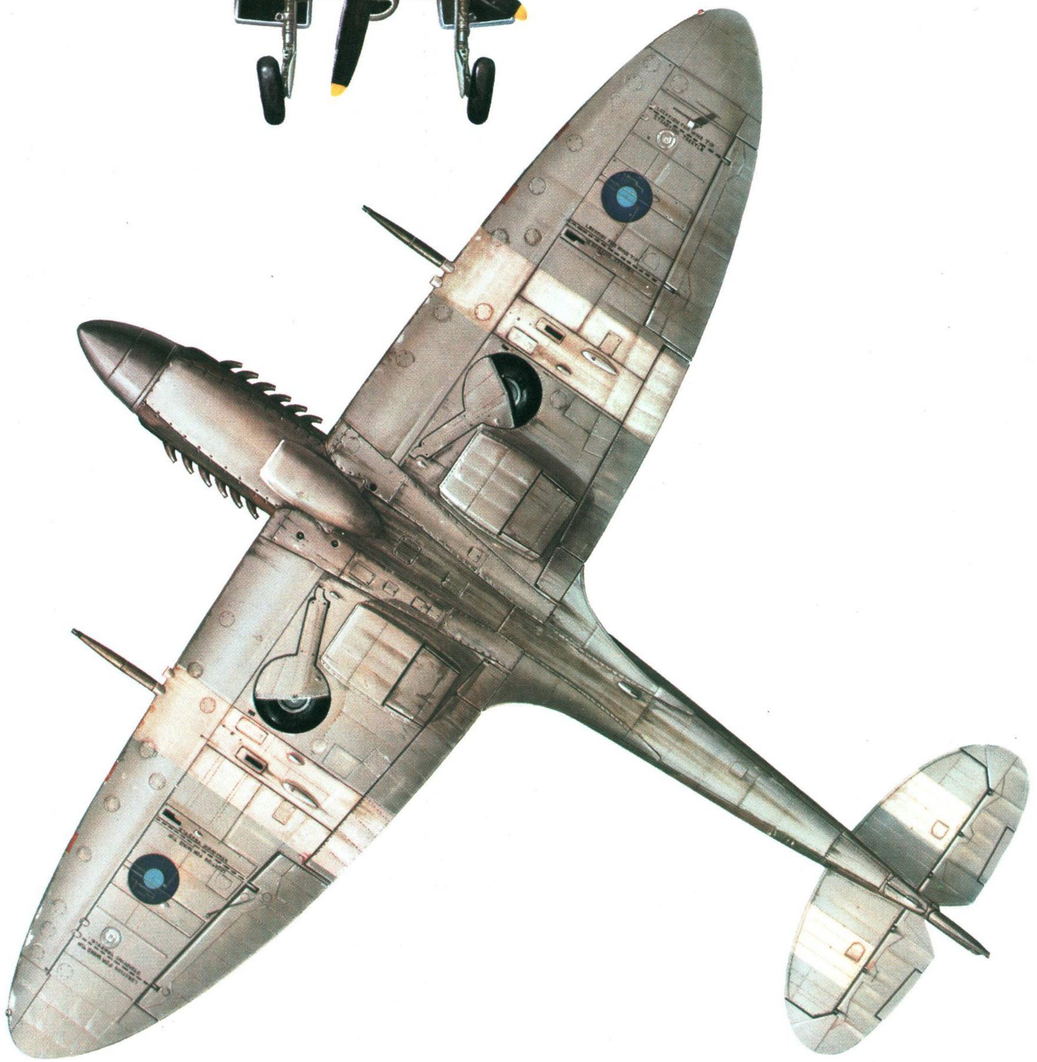


Variations on a painting theme. Two Supermarine Spitfire F.Mk.XIV Es of No. 17 Squadron, RAF, at Seletar, late 1945.

M. Trim © *Profile Publications Ltd.*

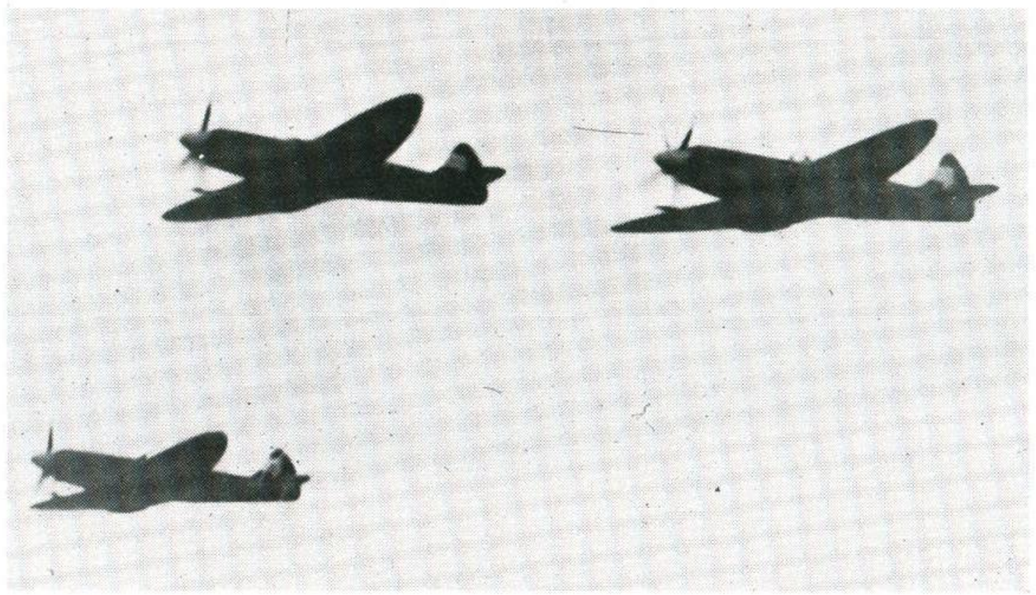




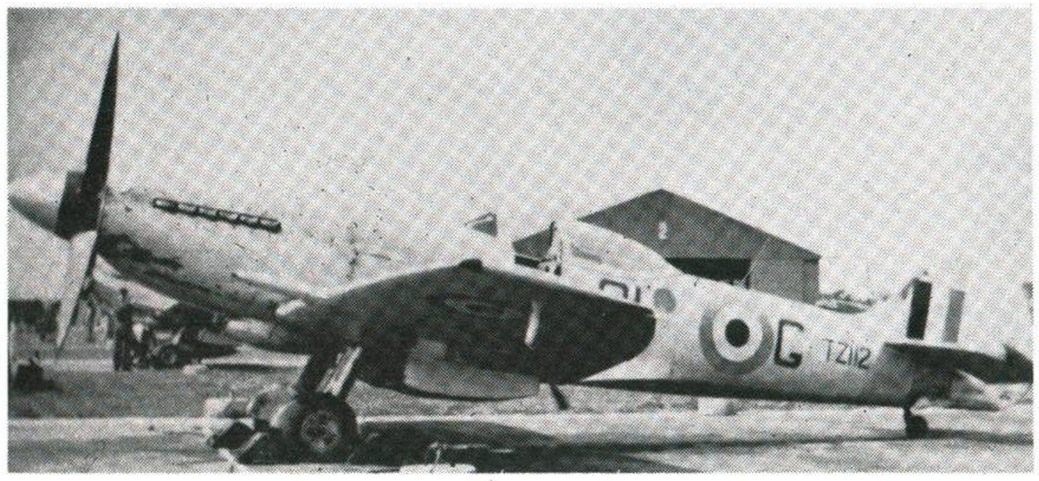




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1 *Belgian Air Force "SG64", a Spitfire FR.Mk.XIV E (TZ192) of the* Ecole de Chasse, *coded IQ-F had a nose for trouble. On March 12, 1952 it dug well into the ground as shown; and, on October 23 of the same year, this ex-No. 453 Squadron, Royal Australian Air Force Mk.XIV crashed for the last time.* (Photo: via author's collection)

2 *A trio of Spitfire Mk.XIVs of No. 17 Squadron, RAF, photographed after successfully taking-off from the carrier HMS* Trumpeter *in September 1945.* (Photo: G. E. Thomas)

3 *Spitfire FR.Mk.XIV E (TZ112) of No. 1 Squadron, Royal Air Force, photographed in natural metal finish of the post-war period.* (Photo: via author's collection)

4 *Trial take-off of F.Mk.XIV E of No. 11 Squadron, RAF, from the carrier HMS* Emperor *off Trincomalee, Ceylon, in September 1945.* (Photo: N. Spainter via M. Garbett)

5 *September 1945, aboard the carrier, HMS* Trumpeter, *manhandling Spitfire FR.Mk.XIV E (NH748) of "A" Flight, No. 11 Squadron, RAF, bound for Kuala Lumpur, Malaya. On October 18, 1945, NH748 collided with another Mk.XIV (MV356) while landing at Seletar on Singapore island.* (Photo: G. E. Thomas)

De Patoul in RM618:("MN-P") failed to return, presumably due to engine trouble, after getting a "probable". The following day No. 350's C.O. repeated his success in SM825.

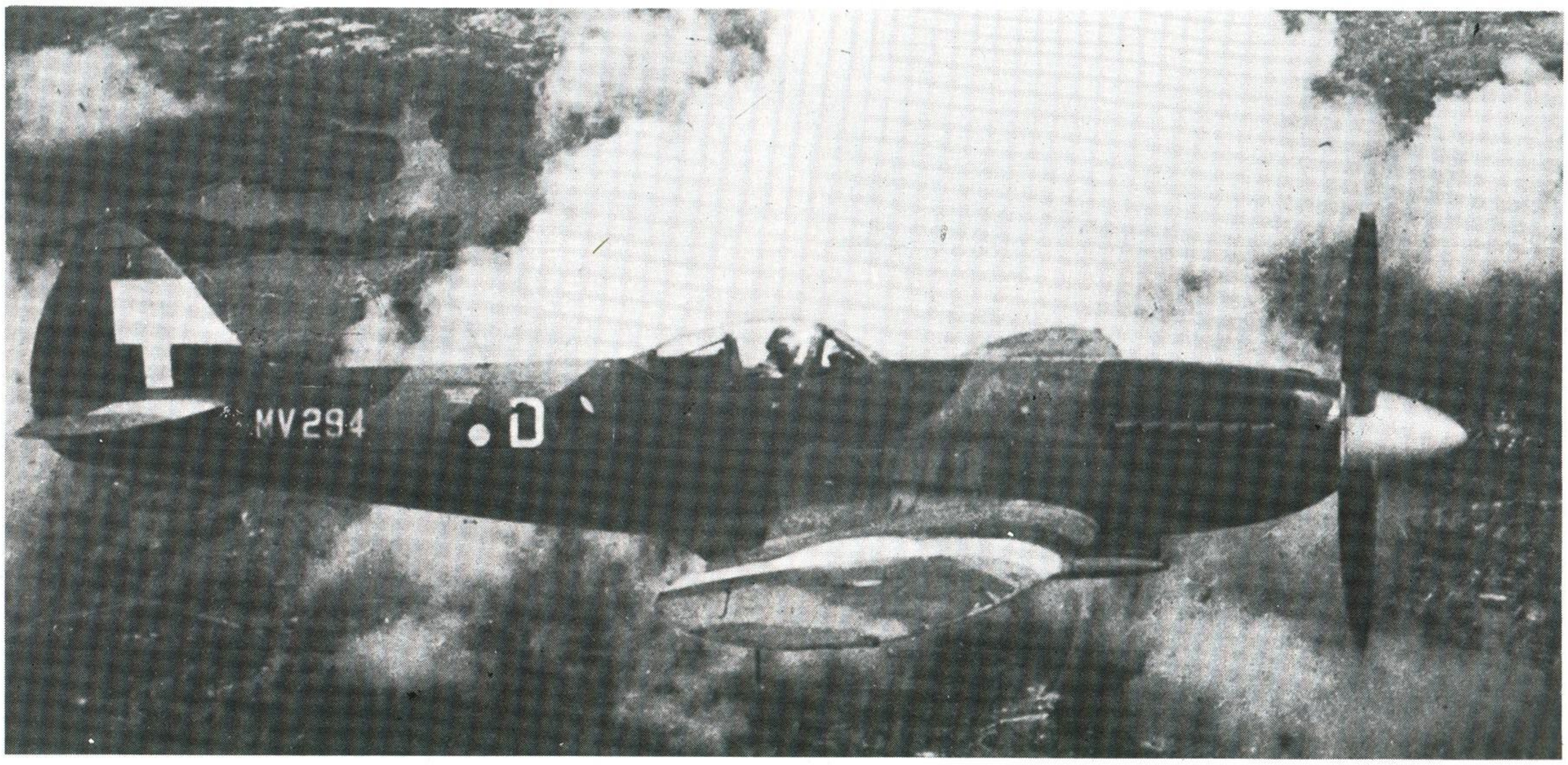
Two Me 262s were chased to Lübeck on the 25th by No. 41 Squadron, where they made panic landings from opposite ends of the runway. One enemy aircraft was destroyed by Flight Lieutenant Colwell (MV266) and the other was claimed as "damaged".

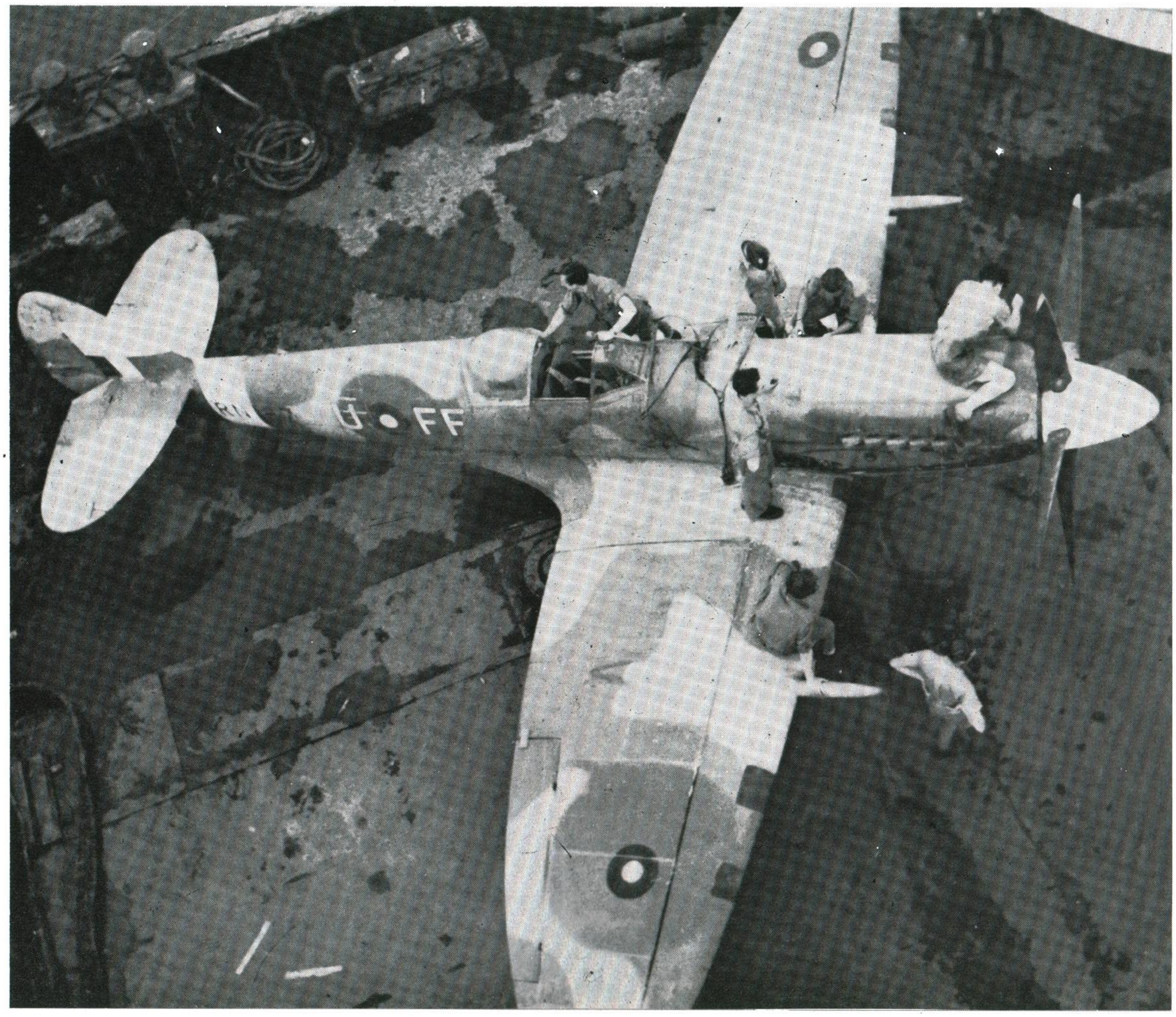
Lost by No. 430 Squadron on April 27 was RM821: "B" when the Mk.XIV dived into the ground.

Re-equipping No. 401 Squadron with Mk.XIVs began on May 6, 1945. Unfortunately, the C.O., Squadron Leader W. Klery, DFC and Bar, went missing on the 22nd, while on a training flight.

Royal Air Force No. 11 Squadron Spitfire, an FR.Mk.XIV E (MV294), flying over Singapore Island in October 1945.
(Photo: via G. E. Thomas)

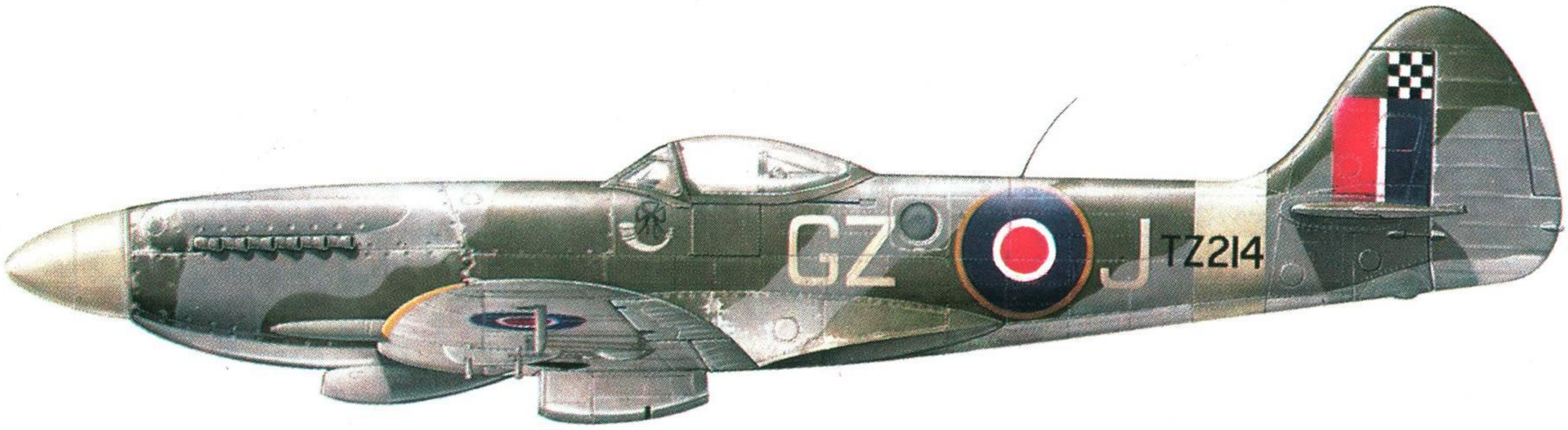
A Spitfire F.Mk.XIV E (RN137), one of 20 aboard HMS Vindex *at Iwakuni, s.e. Honshu, September 1946. They were part of the reinforcement for the Air Component, British Commonwealth Occupation Force which included Nos. 11 and 17 Squadrons, RAF. Old-size roundel appears beneath the SEAC specification which also demanded white bands on wing and tail surfaces.*
(Photo: IWM, FE.599)





A Spitfire FR.Mk.XVIII of No. 32 Squadron, RAF, which was flown by "A" Flight commander, Flight Lieutenant F. E. Dymond, Palestine, October 1947.

D. Palmer © *Profile Publications Ltd.*



On moving to Fassberg in Germany on May 7, No. 130-Squadron said farewell to its Mk.XIVs with some reluctance, since with them the squadron had destroyed 98 enemy aircraft since December 1944.

Three FR.Mk.XIVs delivered from Chilbolton (Hampshire) to No. 26 Squadron on June 1, were ready for flight operations by the 11th.

Another exchange took place on June 25, when No. 401 Squadron handed its aircraft to another Canadian unit, No. 411 Squadron.

Meanwhile, the FR.Mk.XIVs of No. 414 Squadron continued to be very active and, given favourable weather, carried out at least two dozen sorties on some days.

Following the cessation of hostilities in Europe little of interest is to be found in the squadrons' records.

However, movements of aircraft between fighter units continued. On September 13, No. 41 Squadron handed over its Mk.XIVs to No. 416 Squadron, who flew them for the first time on the 24th of that month.

ACTION IN THE FAR EAST

By December 1944, R.A.F. Maintenance Units holding new aircraft direct from the production line, received instructions to pass some aircraft to Ground Servicing Units preparatory to despatch to the Far East.

The first Mk.XIVs began their long journey by sea eastwards in January from Cardiff, Glasgow, Hull, Leith and Salford to the Indian ports at Karachi and Bombay.

No. 11 Squadron, the first to receive the long-awaited "new fighter", took delivery of three FR.Mk.XIVs at Chettinad near Bangalore, India, on June 20, 1945.

The aircraft were tested in both normal and clipped-wing configuration, when it was found that the clipped-wing version required an additional 100 ft. of runway to get airborne.

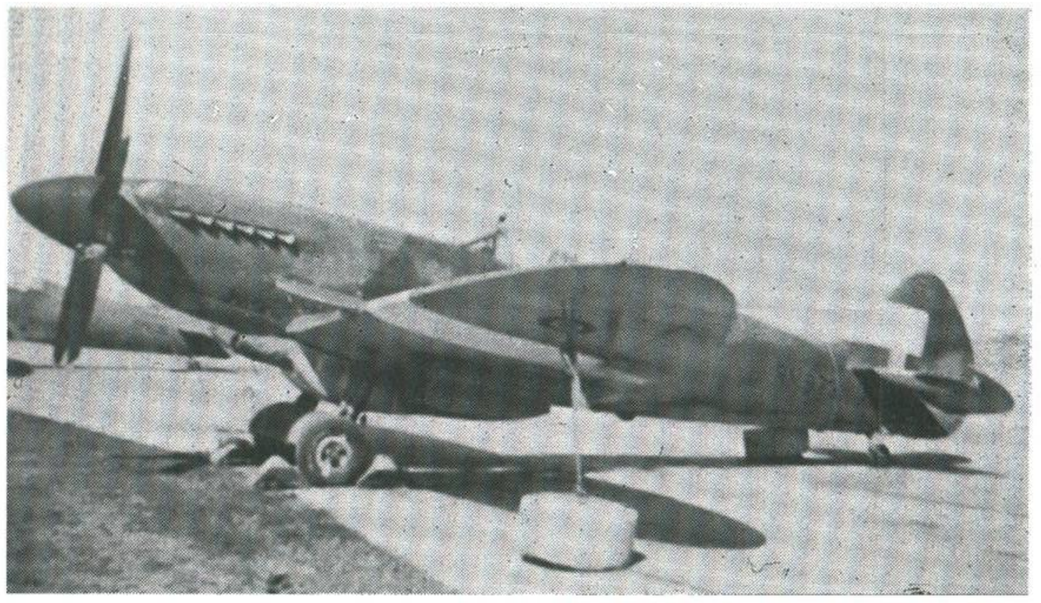
Incidents were recorded. For example, MV319 was damaged in a wheels-up landing on July 18; and, six days later, NH801 "pranged" (crashed) on take-off following an undercarriage collapse.

A move to Malaya took place during September. Aircraft from Nos. 11 and 17 Squadrons had embarked on the aircraft-carrier HMS *Trumpeter*. Leading two aircraft from No. 17 Squadron, the C.O. of No. 11 Squadron, Wing Commander Smith, took-off without trouble, exploiting a wind over deck of some 20 knots. Both squadrons were to be based at Kuala Lumpur (Malaya)—but spent four months (September 1945 to January 1946) at Seletar before returning to "KL".

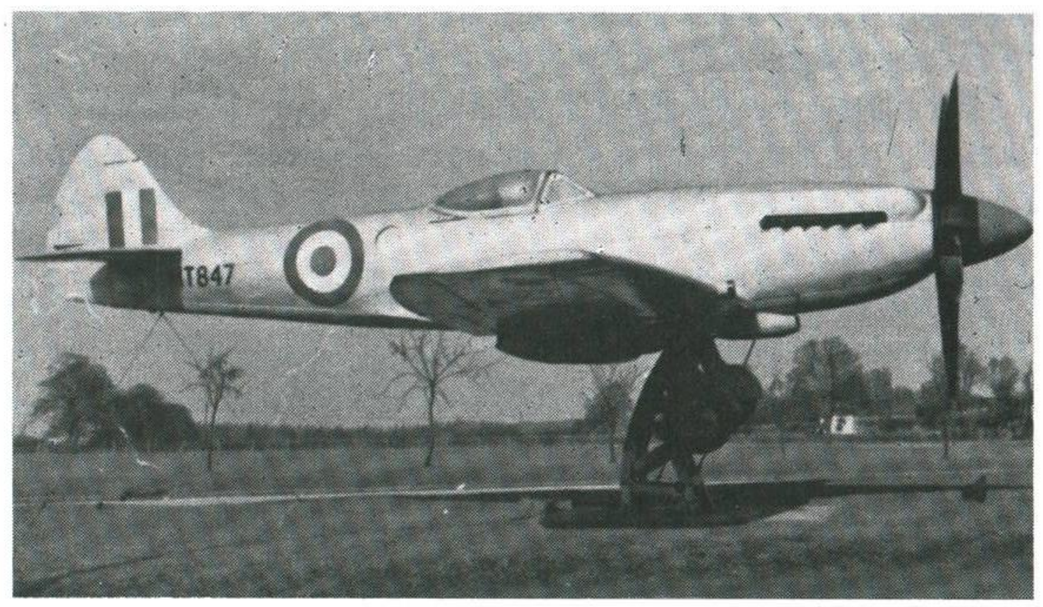
About this time No. 132 Squadron, previously based at Madura embarked on HMS *Smiter* for its journey to Kai Tak (Hong Kong) where it remained until disbandment on April 15, 1946.

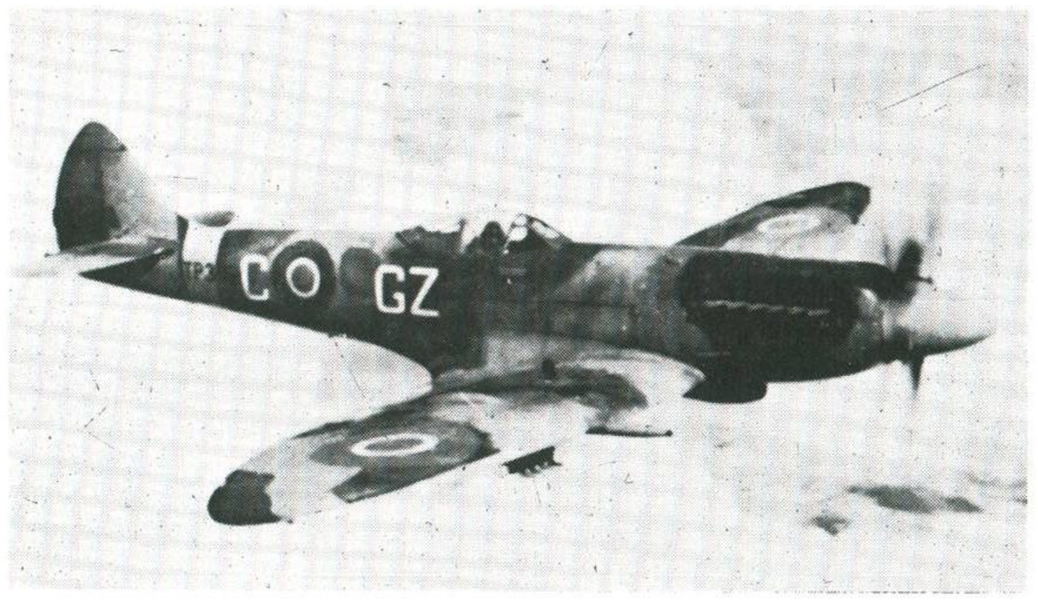
Although No. 155 Squadron had been selected for re-equipment with Mk.XIVs, this did not take place through a move of bases. Instead, the Mk.XIVs went to No. 152 Squadron who, like No. 273, were operating in Burma; transferring to Malaya, September 1945.

As part of the reinforcement for the Air Component, British Commonwealth Occupation Force, the Spitfire Mk.XIVs of Nos. 11 and 17 Squadrons, RAF, were taken by aircraft carrier to Iwakuni, s.e. Honshu, Japan. The first batch of 20 arrived at Iwakuni in September 1946 aboard HMS *Vindex*. Both squadrons remained in Japan until they were disbanded on the same date—February 23, 1948.









At No. 322 Maintenance Unit, RAF, Chakeri, near Delhi, India, April 1, 1947. In the foreground, a Spitfire Mk.XIV E (RM973) with "storm weights" in position; in the background is SM836.
(Photo: Peter Arnold collection)

Spitfire FR.Mk.XIV Es of No. 11 Squadron, RAF, at Seletar, October 1945. Variations in markings: "M" (MV357) and "J" (MV380) have wider fin flashes and white serials while "G" (NH875) and "N" (serial not identifiable) have narrow fin flash, "Sky" band and black serial.
(Photo: D. Healey via G. E. Thomas)

At least 17 Spitfire Mks. XIV and XVIII are thought to exist (see list at end of this Profile). One, an FR.Mk.XIV E (MT847), is shown here as photographed in March 1970 at Royal Air Force Station Cosford, n.w. of Wolverhampton, Staffordshire. (Photo: Stuart Howe)

A Spitfire FR.Mk.XVIII (TP373) in Palestine in late 1947. Code letters GZ-C identify No. 32 Squadron, RAF. Fin flash is absent.
(Photo: Squadron Leader F. E. Dymond, RAF)

A number of the Mk.XIVs—replaced by the newer Mk.XVIIIs—was transferred to the Royal Indian Air Force; in particular No. 4 Squadron, RIAF.

TYPE 394: SPITFIRE Mk.XVIII

Almost identical in appearance to the Mk.XIV, the Spitfire Mk.XVIII incorporated a new wing design, as opposed to the "universal" wing fitted to the interim Mk.XIV. Armament remained of the "E" wing variation.

Like its predecessor, the Mk.XVIII appeared in two versions, Fighter (F) and Fighter Reconnaissance (FR) the latter having provision for two vertical and one oblique F.24 cameras. The vertical camera port distinguished it from the Mk.XIV.

Additional fuel tankage was available in the rear fuselage although this was reduced to one tank in the FR version because of the camera installation.

Both versions were produced with a 360°-vision "bubble" canopy and, unlike the Mk.XIV, all aircraft had full span wings.

Initially the Mk.XVIII flew with a Rolls-Royce Griffon 65 engine, but later the Griffon 67 was introduced and offered an additional 300 h.p.

The first aircraft to be delivered to the R.A.F. was SM844 (FR.Mk.XVIII) on May 28, 1945, going first to No. 39 M.U. and eventually reaching No. 28 Squadron in Hong Kong.

The first F.Mk.XVIII (NH872) was delivered on June 8 to the Supermarine aerodrome at High Post (near Boscombe Down) for tests prior to being handed over to A&AEE.

Subsequent deliveries were mixed. The last one to be delivered was TP235 (an F.Mk.XVIII) which went first to No. 6 M.U., then 226 O.C.U. Bentwaters and finally to No. 60 Squadron at Seletar, Singapore Island.

Three Mk.XVIIIs were subjected to tests by the A&AEE at Boscombe Down.

NH872. Handling tests with a 90 Imperial gallon drop-tank and tests to determine the aftmost acceptable centre-of-gravity position.

TP297. Camera and gun heating trials and the installation of a F.24 camera with two split vertical and one oblique angles, were carried out.

TP423. An installation of two 20 mm. Mk.2 cannon (CGS Mk.40) was tested by TP423.

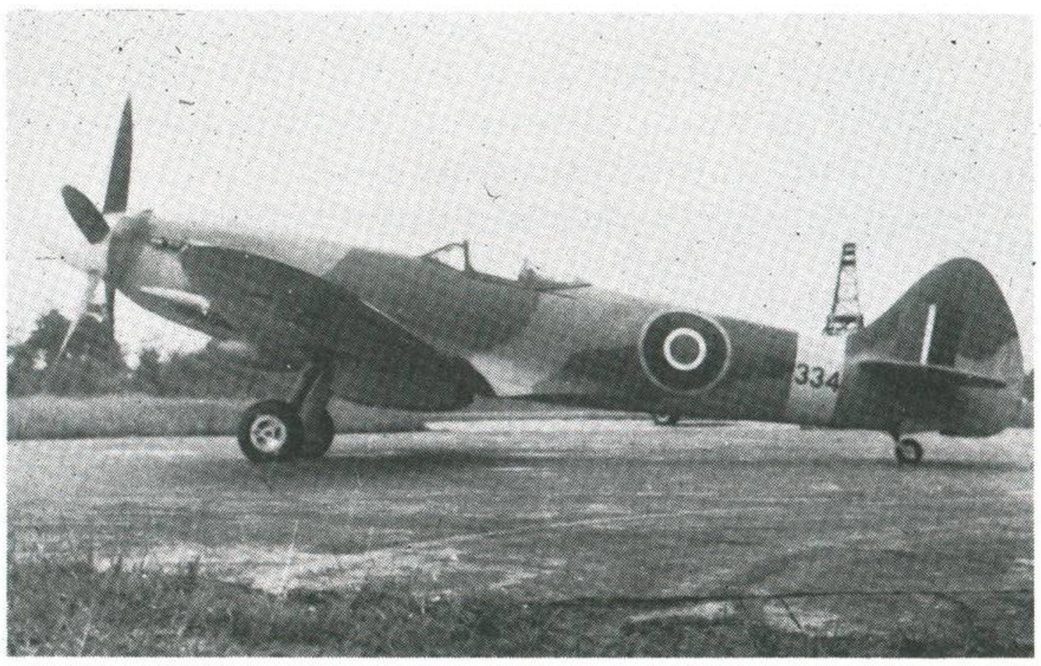
Because of its late appearance, the Mk.XVIII did not see widespread service and the majority of them went directly into storage at maintenance units.

A number, however, did serve with Nos. 32 and 208 Squadrons in the Middle East and Nos. 11, 28, 60 and 81 in the Far East.

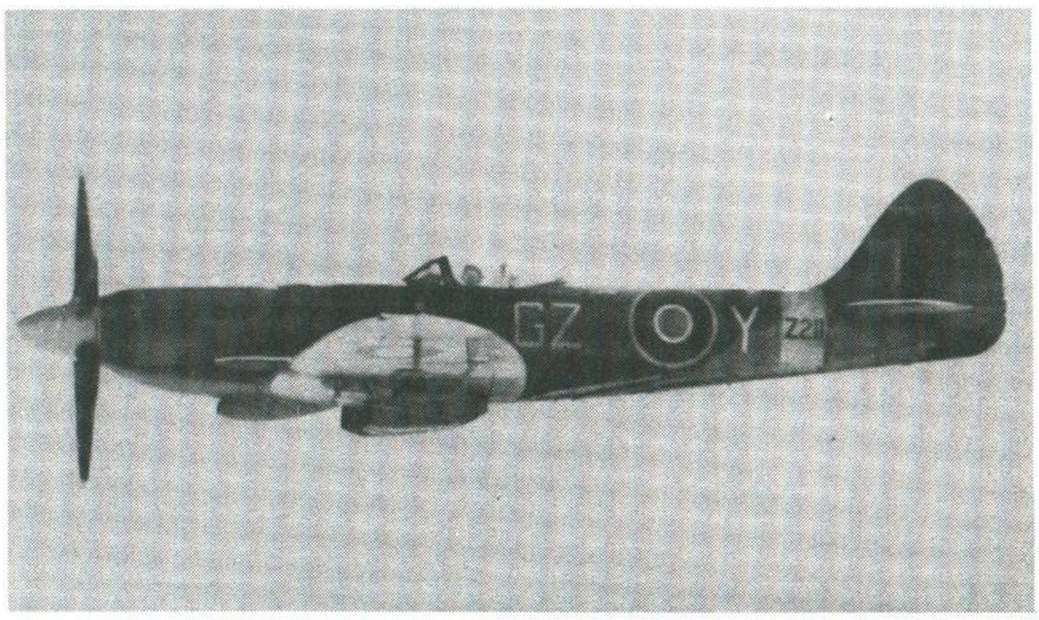
No. 60 Squadron had the distinction of flying the first and last Mk.XVIII in the Far East. It was based at Tengah, Singapore, when the first aircraft arrived in crates at Seletar on December 24, 1946. As work was being carried out on the runway at Tengah, the aircraft (including TP202:"P", TP204:"N" and TP209:"E") were assembled and flown from Seletar. First flight was on January 17, 1947.

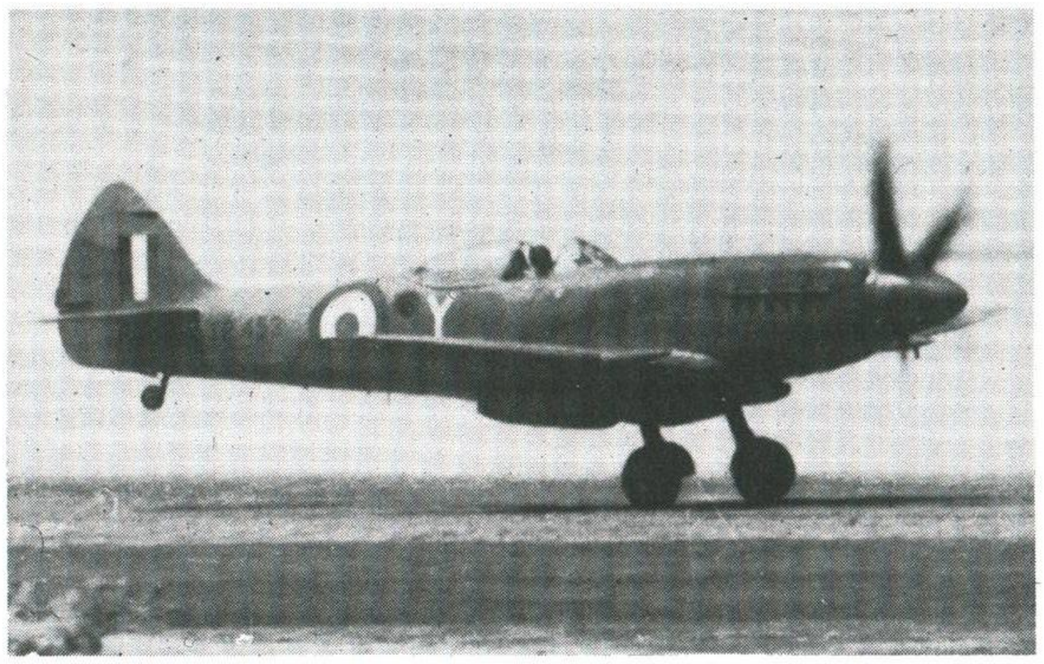
On completion of work at Tengah, on January 31, No. 60 Squadron moved back to there and was joined by No. 28 Squadron. Each Squadron had eight aircraft.

During the Malaya Emergency some of the Spitfires flown by No. 60 Squadron carried coloured bands round the nose, immediately aft of the spinner. During this









Destined for the Middle East and No. 208 Squadron, RAF, a Spitfire FR.Mk.XVIII (TP334) photographed while, presumably, still being held by No. 109 Maintenance Unit, RAF. The camera port is covered.
(Photo: Air-Britain Photo Library)

Line-up of Spitfire FR.Mk.XVIIIs of No. 208 Squadron, RAF, at Fayid in Egypt; 1949–50 period. (Photo: J. Gilkes via B. Goulding)

Camera port is covered because the Spitfire FR.Mk.XVIIIs of No. 32 Squadron, RAF, was employed solely on fighter and not fighter-reconnaissance duties. The Mk.XVIII is GZ-Y (TZ211).
(Photo: Squadron Leader Middlebrook, RAF via B. Goulding)

TP453, with individual letter "Y" was a Spitfire FR.Mk.XVIII allocated to No. 208 Squadron, RAF. (Photo: via R. C. Jones)

period, No. 81 Squadror. was also in action against the terrorists using FR.Mk.XVIIIs.

The last strike by a Spitfire of No. 60 Squadron was carried out on January 1, 1951.

In the Middle East, Nos. 32 and 208 Squadrons were both serving in Palestine before the British Mandate came to an end on May 15, 1948.

Prior to this, however, the atmosphere was to say the least "touchy" and on two occasions No. 208 Squadron suffered losses as a result of attacks by both Egyptian and Israeli aircraft.

On May 22, 1948, TP336, 364 ("RG-Z"), TP443, 446 and 450 were damaged by Egyptian Spitfire Mk.IXs.

Even after the Mandate ceased, No. 208 Squadron was still not out of danger despite having moved, like its companion Squadron No. 32, to Nicosia in Cyprus.

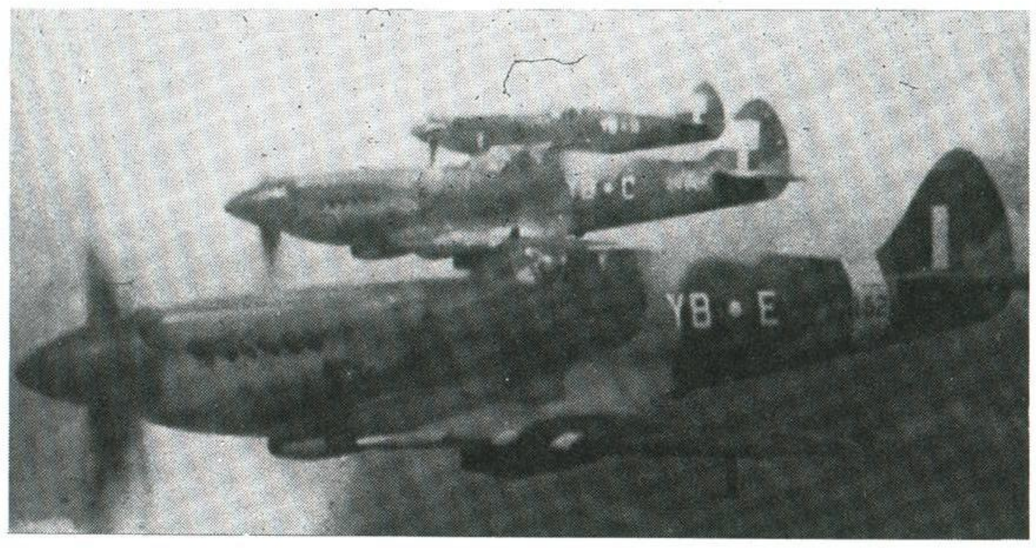
On January 8, 1949, TP340 was damaged by Israeli fighters.

Mk.XVIII: SUPERB TO FLY

The Mk.XVIII required to be handled with a degree of respect by its pilot, particularly on take-off, due to the torque from the engine. Even with full rudder applied, it was not possible to hold the aircraft on a straight course at full throttle.

An improvement incorporated into the Mk.XVIII was the automatic throttle and boost setting control.

In the air, however, it was a superb aircraft to fly and with no vices at all. At 41,000 feet, it still had power in hand.



RAF No. 17 Squadron Spitfire Mk.XIVs temporarily operating from Seletar, Singapore Island, in late 1945.
(Photo: D. Healey via G. E. Thomas)

ACKNOWLEDGEMENTS

The author wishes to record at least some names of those whose expert help and advice has made this Profile *possible. In particular, Dave Birch who supplied information relating to the Rolls-Royce Griffon engine, to Brian Goulding, Mike Garbett, Ted Hooten and Chris Shores for photographs and general information. Also to John Rawlings and Bruce Robertson for help through their own books,* Fighter Squadrons of the R.A.F. *and* Spitfire, Story of a Famous Fighter.

Thanks also due to Peter Arnold, Squadron Leader F. E. Dymond, Stuart Howe, Bob Jones, Ken Rutterford, Frank Smith, Geoff Thomas and Graham Trant who generously supplied information and photographs, and to Mr E. Munday of the Air Historical Branch, M.o.D.

Last but by no means least sincere thanks to Commandant Verelst for his exhaustive assistance on the Belgian Air Force Spitfires.

DESCRIPTION AND SPECIFICATIONS

Spitfire Mk.XIV

Fuselage

Comprising five main longerons—two bottom, one top and two datum—plus 16 oval frames. Rear end detachable—and containing retractable tail wheel—bolted to the main section.

Stressed-skin covering stiffened by intercostals. At forward end, a fireproof bulkhead, to the base of which were four channel sections with attachment points for the mainplane spars. Ahead of this bulkhead, the tubular frame on which was mounted the Griffon engine.

To the rear, the cockpit with an access door on the port side. The sliding hood and side panels of the windscreen were of Perspex. A bullet-proof panel was bolted to the front. The hood could be jettisoned in an emergency. To assist break-out, a crowbar was situated on the inside of access door. The pilot was protected by armour plate attached to the seat and top of the bulkhead.

Behind the cockpit were housed the two main fuel tanks, the upper one being self-sealing.

A bomb rack could be attached to the centre-section.

Tail unit

Consisted of fin, rudder and elevators. The rudder and elevators were horn balanced and fitted with trim tabs.

Covering, stressed-skin, apart from metal rudder, trim tabs and elevators, which were fabric covered.

Mainplane

Each mainplane consisted of two units—(i) a front spar and leading-edge; and (ii) the main unit containing a rear spar, main and trailing ribs.

The front spar, which was bolted on to the fuselage stub spar, also provided attachment for the main undercarriage legs.

The rear spar attached to the fuselage by means of a bracket, provided support for the moving surfaces.

Each mainplane provided a housing for a fuel tank, cannon and machine-gun bays. A navigation lamp was situated in the wing-tip which was detachable.

Split trailing edge flaps were metal covered, as opposed to the ailerons which were covered with stressed skin.

The lowering of the flaps was accomplished by operating a lever on the port top side of the instrument panel.

Pneumatic power was used to lower the flaps, but the raising was left to the slipstream forces. Bomb and rocket racks could be attached to the underside of each mainplane.

Undercarriage

Consisted of two cantilever main wheel units plus the self centring tail wheel, all of which were retractable. Main units retracted outwards and upwards into wells in the underside of the mainplanes. The operating lever was situated on the starboard side of the cockpit.

The tail wheel retracted backwards and was fully enclosed by fairing doors. Main wheels only partially enclosed when fully retracted. Hydraulic power was used for the raising and lowering of the undercarriage, although in an emergency the lowering could also be achieved by a stand by system fed with carbon dioxide. Visual indicator lights were situated on the instrument panel. Track of undercarriage, 5 ft. 8½ in.

SPECIFICATION Mk.XIV

Dimensions Span, 36 ft. 10 in. (FR.XIV. 32 ft. 7 in.); length, 32 ft. 8 in.; height, 12 ft. 8½ in. Tailplane span, 10 ft. 6 in.

Areas Mainplane with aileron and flap, 242 sq.ft. Incidence at root, 2°. Dihedral, 6°. Aileron, 18·9 sq.ft.; movements, up, 24°; down, 19°. Flaps, 15·4 sq.ft. Movement, 85° down.

Tailplane Area including elevators, 33·84 sq.ft. Incidence, 0°. Elevators including trimmer tabs, 13·74 sq.ft. Trimmer tabs, 0·688 sq.ft. Elevator movement, 28° up, 23° down. Trimmer tabs, 20° up, 23° down.

Fin and rudder Fin area 6·65 sq.ft. Rudder area including trimmer tabs, 10·08 sq.ft. (trim tabs, 0·7 sq.ft.). Movement, 28½° in each direction. Rudder tab setting, 0·2 in. starboard; trimming, 9° port and 13½° starboard.

Powerplant One Rolls-Royce Griffon 65 liquid-cooled engine 12-cylinder upright-Vee inline with two-speed, two-stage supercharger.

Rotol constant-speed propeller fitted with five Jablo blades. Left-hand rotation; diameter, 10 ft. 5 in.; ground clearance (tail-up position), maximum 20 in., minimum 8½ in.; (tail-down) maximum 3 ft. 2¼ in., minimum 2 ft. 3 in.

Performance Maximum speed, 450 m.p.h. at operating height. Range on normal capacity, 460 miles. Range with 90-gallon (Imperial) drop tank, 850 miles. Climb to 20,000 ft. in 7 minutes. Ceiling, 44,500 ft.

Weights Empty, 6,600 lb. Loaded, 8,500 lb.

Electrical System 12-Volt generator.

Fuel Capacities Forward fuselage self-sealing tanks, upper 36 gal. and lower, 48 gal. FR.Mk.XIV, additional 33-gal. rear fuselage tank. Wings. 12¾-gal. in each wing (self-sealing). All tanks pressurized. 100 Octane fuel. Maximum operational fuel capacity: 279½ gal. (F.Mk.XIV); 312½ gal. (FR.Mk.XIV). Auxiliary drop tanks, 30, 45, 90 and 170 gal. Oil, 9 gal. Air space, 3 gal. Cooling system, 14¾ gal.

Armament

F.Mk.XIV C Two 20-mm. Hispano cannon plus four 0·303-inch Browning machine-guns. One 500 lb. bomb beneath centre-section.

F./Mk.XIV E Two 20-mm. Hispano cannon plus two 0·50-in. Browning machine-guns. Provision for four rocket projectiles beneath each wing. One 500-lb. bomb beneath centre-section, plus one 250-lb. bomb under each wing (when modified).

Double position firing-button on control column; top portion operated machine-guns and bottom portion the cannon. Centre pressure fired all guns simultaneously (pneumatically). Reflector gun-sight with dimmer switch mounted above instrument panel.

Camera-gun Situated in starboard mainplane, operated by gun firing-button. A back up electrical push switch was sited below firing button. Camera-gun could be switched off (if desired) when guns operating.

Camera (FR.Mk.XIV) Provision for one oblique-angled F.24 camera in the fuselage.

Tropicalization Installed as standard on production line—Vokes filter.





October 1947 in British Mandated Palestine. A fighter-reconnaissance Spitfire FR.Mk.XVIII (TZ214) of No. 32 Squadron, RAF. This was the personal Mk.XVIII (coded GZ-J) of the "A" Flight Commander, Flight Lieutenant F. E. Dymond, RAF. (Photo: Squadron Leader F. E. Dymond, RAF)

Another No. 32 Squadron, RAF, Spitfire FR.Mk.XVIII (TZ232). Pilot of GZ-V took-off from Ramat David, near Haifa, in May 1948, only to find throttle jammed. Aircraft hit the ground at 70 mph and cartwheeled two times—yet the pilot escaped unscathed.
(Photo: Squadron Leader Middlebrook, RAF via B. Goulding)

SPITFIRE Mk.XVIII

Dimensions Span 36 ft. 10 in.; length 33 ft. 3¼ in.
Areas As per Mk.XIV.
Power Plant As per Mk.XIV.
Fuel Capacities Forward fuselage and wing tanks as Mk.XIV. Two rear fuselage tanks of 31 gal. each. FR.Mk.XVIII only one rear fuselage tank of 31 gal.
Armament (F. & FR. versions) Two 20-mm. Hispano cannon (120 rounds per gun) plus two 0·50-in. Browning machine-guns (250 r.p.g.). Provision for one 500-lb. bomb beneath centre-section or two 250-lb. bombs (one under each wing). Alternatively, Mk.8 or 9 rocket projectiles (four under each wing).
Weights Loaded 9,300 lb.
Camera (FR.XVIII) Two vertical and one oblique F.24 cameras in the fuselage; alternatively, one F.52 camera.
Tropicalization As per Mk.XIV.

SERIAL ALLOCATION F./FR. Mk.XIV

MT847-858	NH857-871	RM957-999
MV246-273	NH873-875	RN113-160
MV286-320	NH892-929	RN173-221
MV347-386	NM814-823	SM812-842
NH637-652	RB140-189	SM876-899
NH653-661	RM615-625	SM913-938
NH685-720	RM648-656	TP236-240
NH741-759	RM670-713	TP256,
NH775-789	RM726-770	TX974-998
NH790-796	RM783-825	TZ102-149
NH797-813	RM839-887	TZ152-176
NH831-846	RM901-943	TZ178-199

Total produced: 957

SERIAL ALLOCATION F./FR. Mk.XVIII

NH847-856(F)	SM968-997(F)	TP363-408(FR)
NH872(F)	TP195-235(F)	TP423-456(FR)
SM843-845(FR)	TP257-298(FR)	TZ200-207(FR)
SM939-956(F)	TP313-350(FR)	TZ212-240(FR)

Total produced: 300-100(F) and 200(FR) Mk.XVIII

ROYAL AIR FORCE SQUADRONS

Sqn. No.	Sqn. Code	Mark No.	Example in Squadron use	Period in Squadron use
2	OI	F.XIV	RM878 ("OI-C")	Nov. 44-May 45
	—	FR.XIV	TZ126	May 45-Jan. 51
11	—	FR.XIV	NH875 ("G")	Jun. 45- . 46
	—	F.XVIII	—	. 45- . 48
16	—	FR.XIV	NH 864 (ex-268 Sqn.)	Sep. 45
17	YB	F.XIV	RN150 ("YB-W")	Jul. 45-Feb. 48(?)
20	—	FR.XIV	—	Sep. 45- . 46
26	XC	FR.XIV	TZ103	June 45
28	—	FR.XIV	SM888 ("B")	Oct. 45-Dec. 47
	—	FR.XVIII	TP423 ("A")	Apr. 47-Feb. 51
32	GZ	F.XVIII	TP270 ("GZ-F")	Jun. 47-May 49
41	EB	F.XIV	RM653 ("EB-U")	Sep. 44-Sep. 45
60	—	FR.XIV	NH850 (Z)	. 46-Jan. 51
60	—	FR.XVIII	TP209 ("E")	. 46-Jan. 51
65	—	F.XIV	TZ114 ("L")	1946
81	FL	FR.XVIII	TP407 ("FL-D")	Aug. 47
91	DL	F.XIV	RB174 ("DL-T")	Mar. 44-Aug. 44
130	AP	F.XIV	RM619 ("AP-D")	Aug. 44-May 45
132	FF	F.XIV	RM905 ("FF-J")	May 45-Apr. 46
136	HM	F.XIV	RN193 ("HM-A")	Nov. 45-May 46
152	UM	F.XIV	RM908 ("UM-G")	Jan. 46-Mar. 46
208	RG	FR.XVIII	TP295 ("RG-M")	Oct. 46- 51
268	—	FR.XIV	NH864 (ex-16 Sqn.)	Apr. 45-Sep. 45
273	MS	F.XIV	RN218 ("MS-F")	Nov. 45-Jan. 46
322	VL	F.XIV	RB160 ("VL-B")	Apr. 44-Aug. 44
350	MN	F.XIV	RB154 ("MN-K")	Aug. 44- . 46
401	YO	F.XIV	RM935	May 45-Jun. 45
402	AE	F.XIV	RN119 ("AE-J")	Aug. 44-Jun. 45
411	—	FR.XIV	TZ193	June 45
412	—	F.XIV	RM935	Jun. 45-Mar. 46
414	RU	FR.XIV	RM921	Apr. 45-Aug. 45
416	DN	F.XIV	NH692	Sep. 45-Mar. 46
	—	FR.XIV	TZ112	1945
430	G9	FR.XIV	RM910 ("Y")	Nov. 44-Aug. 45
443	—	FR.XIV	NH779	Oct. 45
451	NI	FR.XIV	TZ130 ("NI-B")	Sep. 45-Feb. 46
453	FU	FR.XIV	TZ137 ("FU-C")	June 45
600	RAG	FR.XIV	TZ141 ("RAG-E")	. 46- 47
602	RAI	F.XIV	TX985 ("RAI-B")	Aug. 46-Aug. 47
607	AF/RAN	FR.XIV	TZ116 ("RAN-D")	—
610	DW	F.XIV	RB159 ("DW-D")	Jan. 44-Mar. 45
	RAQ	F.XIV	SM829 ("RAQ-U")	—
	—	FR.XIV	TZ144	June 47
611	RAR	FR.XIV	RM792 ("RAR-J")	Jun. 46- . 49
612	RAS	F.XIV	NH800 ("RAS-K")	. 47- . 48
613	RAT	F.XIV	TX983 ("RAT-J/W")	. 47- . 49?
	—	FR.XIV	TZ125	Mar. 47
615	RAV	F.XIV	NH785 ("RAV-V")	Nov. 46- . 47
	—	FR.XIV	TZ139	Sep. 47- . 48
616	—	FR.XIV	TZ139; (ex-615 Sqn.)	Sep. 47

EXISTING Mk.XIV and Mk.XVIII AIRFRAMES

MT847	FR.XIV	R.A.F. Museum. Stored at R.A.F. Cosford.
MV262	FR.XIV	National Cadet Corps. Calcutta, India. (Code "G").
NH904	FR.XIV	W. J. D. Roberts. Flimwell, Sussex.
RM689	F.XIV	Rolls-Royce (1971) Ltd. Bristol. (ex-G-ALGT now as RM619: "AP-D")
RM694	F.XIV	J. Lowe. Riverside, Illinois, U.S.A.
RM860	F.XIV	Musée Royal Militaire, Brussels, Belgium. (as SG37, parts of SG37, 46 and 55).
RM921	FR.XIV	Force Aérienne. Florennes, Belgium. (as "RL-D").
RM927	FR.XIV	J. Lowe. Riverside, Illinois, U.S.A. (as SG25: "IQ-W").
RN201	FR.XIV	Force Aérienne. Beauvechain, Belgium. (ex-SG-31 now as "SG-3").
SM986	F.XVIII	Indian Air Force Museum. (as HS986).
TZ138	FR.XIV	M. Hoffman, Fort Collins, Colorado, U.S.A. (as N5505A; ex-N20E)
——	XIV	National Cadet Corps. Sanganer, India. (as T-17).
——	FR.XIV	Indian Air Force. Ambala. (as HS365: "NM").
——	FR.XIV	Royal Thai Air Force Museum, Bangkok. (as U.14.1/93).
——	FR.XIV	Indian Air Force Technical College. Jallahalli, India. (as T-20).
——	XIV	Chandigarh Engineering College. Punjab, India. (as HS674).
——	XVIII	Doon School. Dehra-Dun, India.

ROYAL THAI AIR FORCE

Thirty aircraft purchased from Vickers-Armstrongs. Contract signed on April 18, 1950. The first was delivered on December 13, 1950 and the last on July 4, 1951. Aircraft initially assigned to 1st Fighter Squadron (1st Wing) and Special Squadron (4th Wing). On April 6, 1954, all aircraft reassigned to 12th Fighter Squadron. Phased-out of service on April 26, 1955.

The R.T.A.F. Spitfires were allocated markings U.14.1/93 to U.14.30/93 inclusive, but unfortunately the previous R.A.F. identities are unknown.

ROYAL INDIAN AIR FORCE

A number of Mk.XIVs previously based in India was handed over to the R.I.A.F. after the end of World War Two. Neither the number nor the identities of all the aircraft supplied are known, but they served with Nos. 1, 2, 3, 6, 8, and 9 Squadrons.

Aircraft serving with No.6 Squadron at Ranchi in 1947, included MT848; MV 304, 305, 372 and 377.

The R.I.A.F. also received a number of Mk.XVIIIs in 1947 which served with Nos.14 and 15 Squadrons. Aircraft included NH848, 855; TP296, 298, 319, 326 and 339.

As far as is known the R.I.A.F. retained the R.A.F. serials on their aircraft; some were later sprayed silver overall.

SPITFIRES IN SERVICE WITH BELGIAN AIR FORCE

A total of 132 Spitfire F. & FR.Mk.XIVs sold to Belgium in 1947. Deliveries to *Aviation Militaire* later *Force Aérienne*, were made by a team under the control of Major Avi. Legrand, Captain Avi. Eyskens and Lieutenant Avi. Blanco, who ferried the aircraft out from the U.K. (frequently Manston in Kent) over a period of two years. The Spitfires were given new serials ranging from SG1 to SG132 inclusive. From SG106 onwards only nine BAF serials can be identified against BAF units. The aircraft were "second-hand" and overhauled before delivery.

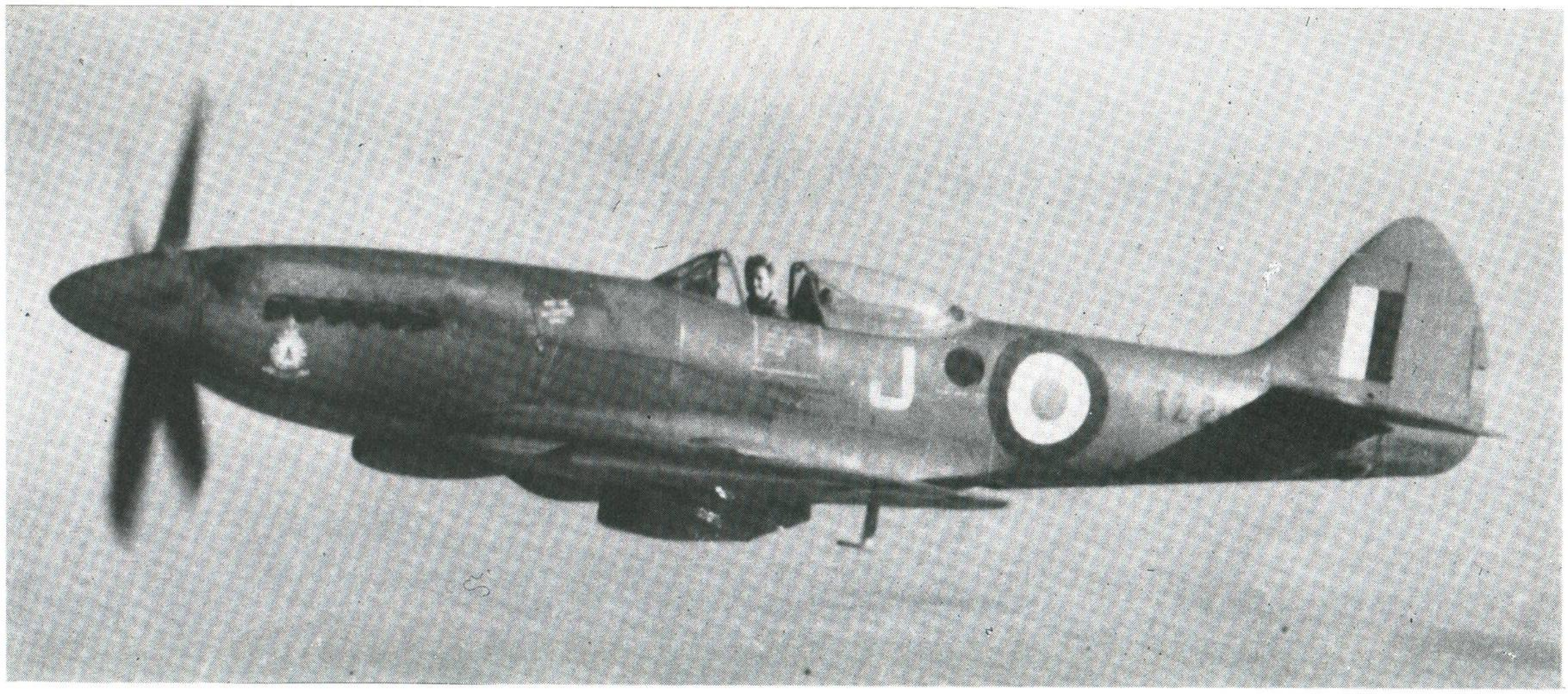
349 Sqn. (GE) 1st Wing de Chasse —1W/349 Esc. Base Beauvechain.
350 Sqn. (MN) ,, ,, ,, ,, —1W/350 Esc. ,, ,,
1 Sqn. (3R) 2nd Wing de Chasse—2W/1 Esc. Base Florennes.
2 Sqn. (UR) ,, .. ,, ,, —2W/2 Esc. ,, ,,
3 Sqn. (YL) ,, ,, ,, ,, —2W/3 Esc. ,, ,,

31 Sqn. (8S) 10th Wing de Chasse Base Petit-Brogel.
Ecole de Chasse (IQ) —Ec.Ch. Base Brustem & Coxyde.
Escadrille Auxiliare (GV) —Esc.Aux. Base Beauvechain.

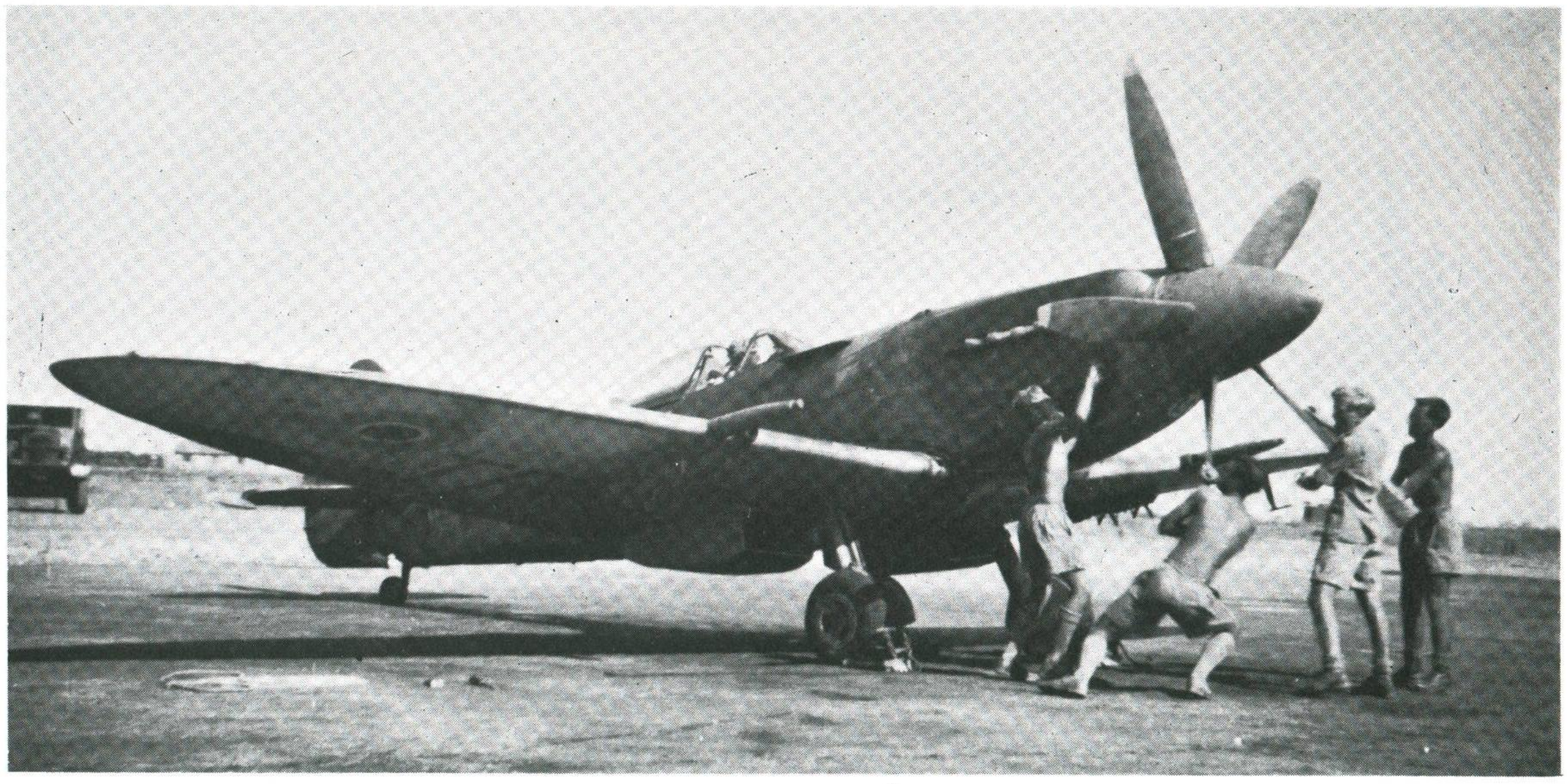
BAF serial	Ex-RAF serial	Last RAF Squadron	BAF units and codes
SG1	NH655	322	1W/349 Esc. GE-A. GE-N. Ec.Ch.IQ- Crashed 7.11.49.
SG2	RB166	610	1W/349 Esc.GE-B.
SG3	RM916	41	1W/349 Esc.2W/2 Esc. UR-M. Ec.Ch.IQ-
SG4	MV248	430	1W/349 Esc.Ec.Ch.
SG5	RB163	610	1W/349 Esc.GE-O. Ec.Ch. IQ-E.
SG6	RM701	41	1W/349 Esc.GE-E. 2W/3 Esc.YL-
SG7	RN121	130	2W/1 Esc.3R-G. Crashed 15.3.51.
SG8	NH654	350	1W/ 2W/2 Esc. UR-O. Heavy landing 28.10.50.
SG9	SM938		1W/349 Esc.GE-O. Es.Ch.IQ-S. Crashed 12.5.50.
SG10	RM768		1W/ Ec.Ch. IQ-G. Crashed 14.4.48.
SG11	RM672	350	2W/1 Esc.3R-T. Crashed 5.8.53.
SG12	RM870		1W/350 Esc.MN-H. Es.Ch. IQ-Z. Crashed 5.1.50.

BAF serial	Ex-RAF serial	Last RAF Squadron	BAF units and codes
SG13	RB154	350	1W/350 Esc.MN-K. 1W/349 GE-E.Es.Ch. IQ-V. Preserved.
SG14	RM726	402	2W/2 Esc. UR-R. Esc. Aux. GV-R. Crashed 9.9.52.
SG15	RM685	402	2W/2 Esc. UR-B. Es.Ch.
SG16	NH688	610	1W/- : 2/W- Ec.Ch.IQ-L. Crashed landed 3.7.50.
SG17	RM935	411	Ec.Ch.IQ-E.
SG18	RM741	416	1W/350 Esc.MN-A. 2W/3 Esc. YL-T.
SG19	RM906	402	2W/3 Esc. YL-M. Es.Ch.
SG20	NH712	41	/1Esc. Crashed 16.1.48.
SG21	RM676	350	1W/-. Crashed 16.3.48.
SG22	RM791	611 RAR-U.	2W/-. Ec.Ch.IQ-O.
SG23	RM679	610	1W/-. Ec.Ch.IQ-C.
SG24	RM876		2W/2. Esc.UR-B. Ec.Ch. IQ-B. Crashed 27.12.50.
SG25	RM927	2 OI-C.	2W/1. 3R-A. Ec.Ch. IQ-W. Preserved.
SG26	NH643	268	Esc. Aux. GV-. Crashed 23.7.51
SG27	RB161	350	1W/350 Esc.MN-P. Ec.Ch.IQ-O. Crashed 31.7.52.
SG28	RM787	130	1W/-. Destroyed by fire 17.3.48.
SG29	RN113	2	
SG30	MV288		Ec.Ch.IQ-K. Crashed 10.8.51.
SG31	RN201	350	1W/350 Esc.MN-L. 2W/3 YL-B. Crashed 5.10.50. Now GE-A.
SG32	RM759	41	1W/349 Esc.GE-M. 2W/3. YL-C.
SG33	TZ137	453 FU-C.	1W/350 Esc.MN-B. 2W/ Crashed 5.6.51.
SG34	MV381	451	1W/349 Esc.GE-B. Es.Ch.
SG35	RM770	41	1W/350 Esc.MN-G. 2W/3 Esc.YL-F. Crashed 5.6.51.
SG36	MV302	412	2W/-. Ec.Ch. IQ-
SG37	RM860	130	2W/-. Ec.Ch. IQ-. Collided with SG46 14.1.49.
SG38	RM794	350	1W/349 GE-A. Esc.Aux.GV-. Crashed 24.2.52.
SG39	MV256	412	1W/-.
SG40	RB186	350	2W/3 Esc. YL-S
SG41	RM866	2	2W/ Crashed 30.4.48.
SG42	RM697	350	1W/349.GE-D. Ec.Ch.IQ-Z. Crashed.
SG43	RM920	2	1W/350.MN-C.2W/1 Esc. 3R-J.2W/3 Esc.YL-. Crashed 20.2.51.
SG44	RM802	350	2W. Ec.Ch. IQ-U. Crashed 23.12.53.
SG45	RN119	412 AEJ	1W/350.MN- 2W/2 Esc.UR-Q. Ec.Ch.IQ-Q and IQ-W. Never had code UR-G nor t/drop hood.
SG46	RM625	402	2W/2.UR-G. Collided with SG37 21.4.49.
SG47	RN117	130	Ec.Ch.IQ-J. Crashed 9.8.51.
SG48	TZ132	443	Ec.Ch.IQ-
SG49	TX995	453	10th Wing de Chasse 8S-
SG50	MV378	412	2W/1 Esc.3R-A. 10th Wing 8S-R. Ec.Ch.IQ-BB.
SG51	SM821		2W/2 Esc.UR-F. Crashed 5.5.49.
SG52	RM882	414	Ec.Ch.IQ-S. 2W/1 3R-V. Crashed 16.3.51.
SG53	RM857	430	2W/1 Esc.3R-O. Collided with SG53 30.6.49.
SG54	RN215	130	Ec.Ch.IQ-K.
SG55	MV246		1W/-. Crashed 11.10.48. Rebuilt with parts of SG37 and SG46 for exhibition as SR111. GD-A. To Musée Royal de l'Armée. 25.2.51.
SG56	NH754	451	1W/350 Esc.MN-W Ec.Ch.IQ-D. Crashed 5.6.50.
SG57	RM921	414	2W/1 Esc.RL-D. C.O.s aircraft. Maj. Avi. Raymond Lallemand. Now at Florennes.
SG58	RM680	41	Ec.Ch.IQ-DD.
SG59	RM710	350	1W/350 Esc.MN-V. 2W/1 Esc.3R-N. Crashed 6.4.51.
SG60	RM933	402	1W/349 Esc.GE-S. 2W/1 Esc.3R-V. Ec.Ch.1Q-
SG61	RM822	2	Ec.Ch.
SG62	RM913	610	1W/349.Esc.GE-P. 10th Wing 8S- Ec.Ch.IQ-
SG63	RN115	414	Ec.Ch. Towing Flt. GV-R. Crashed 31.7.51.
SG64	TZ192	453	1W/349.GE-P. Ec.Ch.IQ-F. Crashed 23.10.52.
SG65	NH892	453	1W/350 Esc.MN-X. 2W/1 Esc.3R-C. Ec.Ch. Towing Flt. GV-X. Ec.Ch.IQ-M. Crashed 14.12.53.
SG66	RM705	41	1W/350 Esc.MN-V. Ec.Ch. IQ-Q. Crashed 24 or 31.3.53.
SG67	NH864	16	1W/350 Esc.MN-Y. 2W/3 Esc.YL-D. Crashed 28.3.51.
SG68	RB156	610	1W/349 Esc.GE-F. Crashed 14.5.52.
SG69	RB182	91	Esc.Aux.GV-F. Ec.Ch.IQ-U.
SG70	RM683	402	2W/2 Esc.UR-C.
SG71	NH718	350	Ec.Ch.IQ-A.
SG72	RM841		2W/- Crashed 30.6.49.
SG73	NH720	350	2W/1 Esc.3R-A. 2W/2 Esc.UR-A. Crashed 14.6.51.
SG74	NH780	451	1W/349 Esc.GE-R. Ec.Ch.
SG75	NH797	451	1W/350 Esc.MN-N. Ec.Ch.
SG76	RM917	610	2W/- Crashed 25.2.53.
SG77	MV263	443	Ec.Ch.IQ-T. Crashed 18.7.50.
SG78	RM703	414	2W/2 Esc.UR-E. Esc.Aux.GV-E. Crashed 27.10.50.
SG79	TZ166		2W/- Crashed 20.9.50.
SG80	MV382	350	1W/350 Esc.MN-T. Esc. Aux. GV-T and GV-S. Crashed 20.7.52.
SG81	TZ127	453	
SG82	RM937	414	
SG83	RM820	430	1W/350 Esc.MN-E.
SG84	NH857	430	2W/1 Esc.3R-0.
SG85	TZ193	411	
SG86	RM863	41	1W/349 Esc.GE-K.
SG87	NH807	16	
SG88	TX989	451	1W/349 Esc.GE-C.
SG89	TZ111	453	1W/350 Esc.MN-M.
SG90	MV369	16	Ec.Ch.IQ-B.
SG91	NH775	453	2W/3 Esc.YL-G.
SG92	RM938	2	
SG93	NH863		1W/350 Esc.MN-G. Ec.Ch.IQ-D.
SG94	NH894		1W/350 Esc.MN-L.
SG95	MV383	430	2W/3 Esc.3R-D.
SG96	RN124	41	
SG97	TZ154		
SG98	NH831	16	
SG99	MV312	453	
SG100	RM784		
SG101	NH922	443	
SG102	RN116	430 UX-R.	Ec.Ch.IQ-C.
SG103			2W/Fac.B.
SG104			Ec.Ch.IQ-N.
SG105			Ec.Ch.IQ-R.
SG108	NH789		Ec.Ch.IQ-V.B2-K.
SG112			Ec.Ch.IQ-Y.
SG114			Esc. Aux. GV-R.
SG117			Ec.Ch.IQ-M.
SG120			/3 Esc. YL-P. Ec.Ch.IQ-D.
SG121			Ec.Ch.IQ-S.
SG123			/3 Esc.YL-.
SG125			Ec.Ch.IQ-W.
SG127			Ec.Ch.IQ-Z.

Series Editor: CHARLES W. CAIN

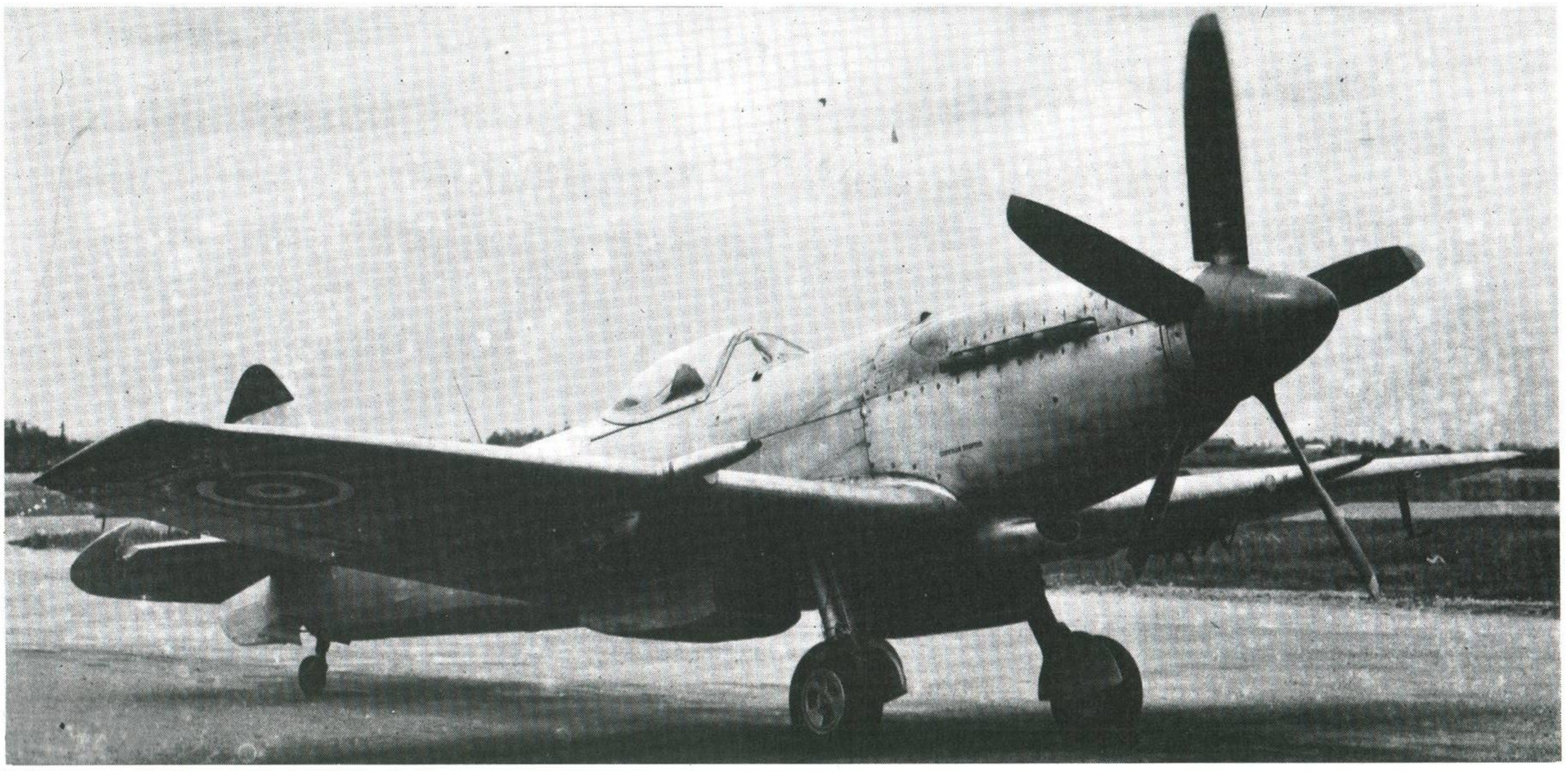


Squadron badge on the nose identifies this Spitfire FR.Mk.XVIII TZ203; (individual letter "J") as belonging to No. 208 Squadron, RAF.
(Photo: via R. C. Jones)

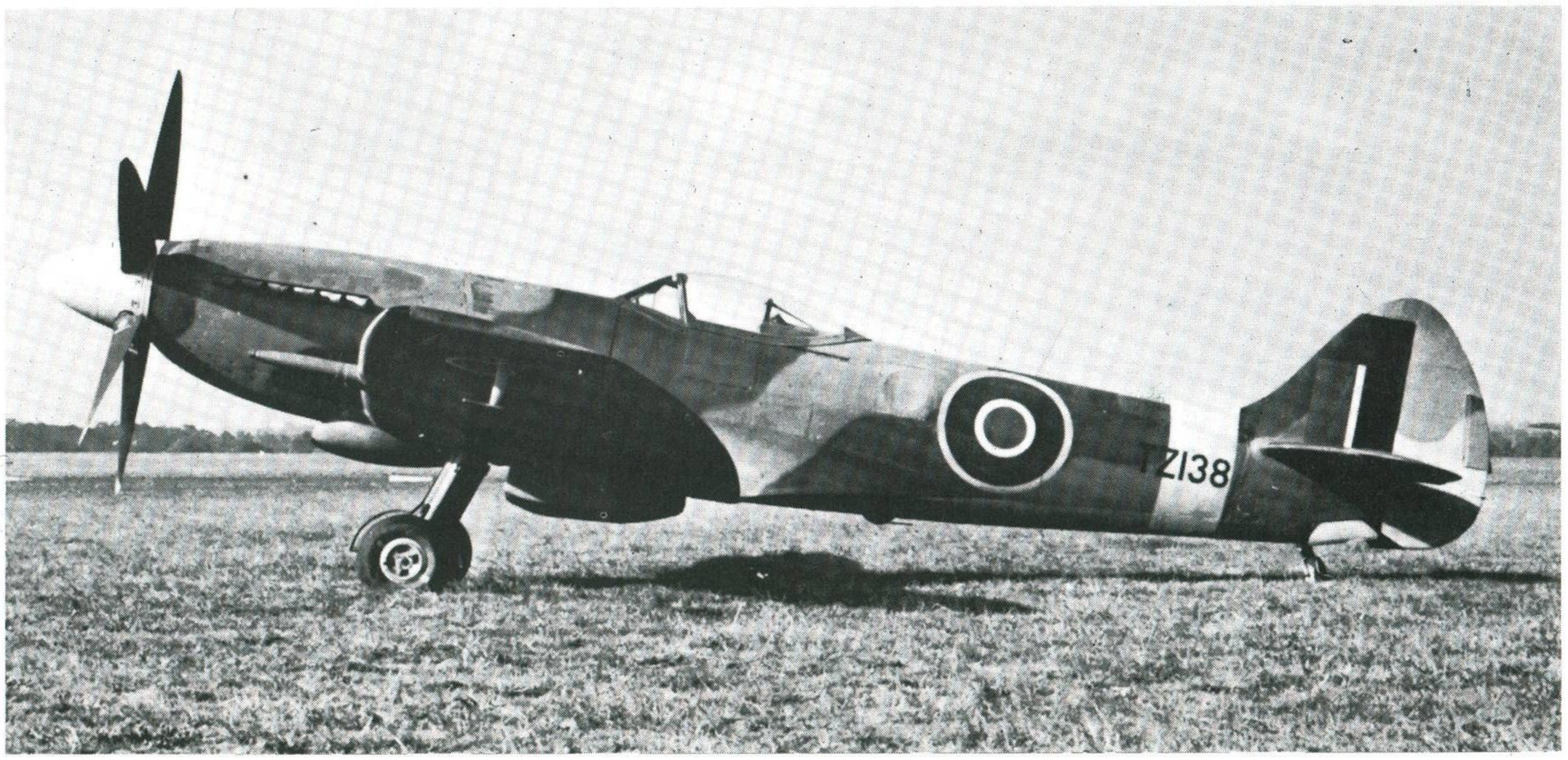


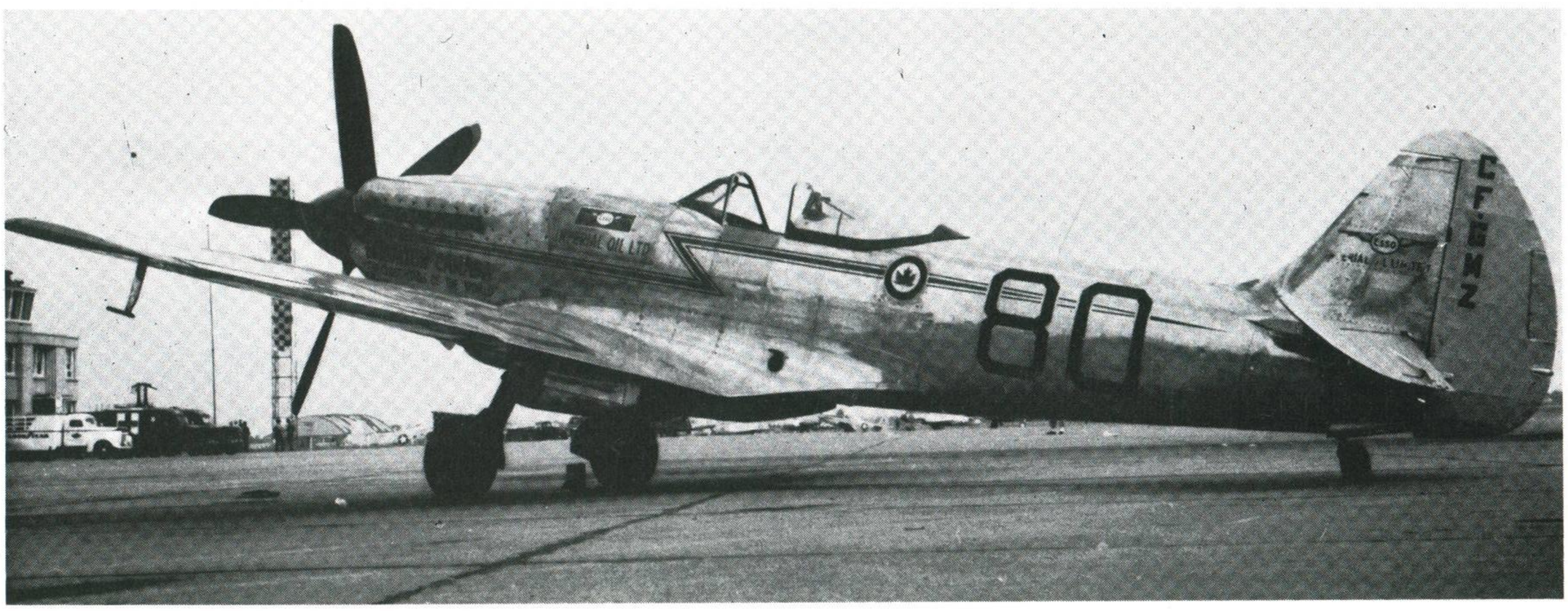
Two more views of Spitfire FR.Mk.XVIIIs belonging to No. 32 Squadron, RAF, taken when the unit was at Nicosia, Cyprus, in late 1948, subsequent to Mandated Palestine becoming the State of Israel in that year. Bomb racks under the wings are in evidence. (Photo: via author's collection)





Royal Thai Air Force Spitfire Mk.XVIII. Between December 1950 and July 1951, a batch of 30 purchased from Vickers-Armstrongs was delivered to Thailand.
(Photo: via author's collection)





A test Spitfire FR.Mk.XIV E (TZ138) which has spent well over 25 years on the North American continent is shown in two of its three roles; (above) in immaculate condition prior to departure for Canada and winterization trials of 1945–46, and (below) as Canadian civil-registered CF-GMZ entered for the Tinnerman Trophy, Cleveland (Ohio) Air Races in 1949. Currently, privately-owned by an American in Colorado and USA-registered N5505A, and ex-N20E.
(Photos: Rolls-Royce (1971) Ltd. and Harold G. Martin)

Aircraft Profiles

The new series of Aircraft Profiles was launched with No. 205 and now, either as separate parts or in beautifully-bound companion volumes (currently up to Vol. 10 including No. 222: Aircraft in Profile), the unique series continues towards and eventually beyond No. 250.

Aircraft Profiles are designed for an international readership. The Publishers have been encouraged by the growing support of the ever-increasing worldwide readership to provide the facilities for the creation of the most outstanding colour art-work presentations. Up to No. 211, the number of editorial pages was 20 per Aircraft Profile. The great reception accorded the enlarged, 24-page No. 212 prompted the Publishers to repeat the experiment with No. 214 and to retain the 24-pp. (including four full-colour artwork pages) format from No. 216 onwards.

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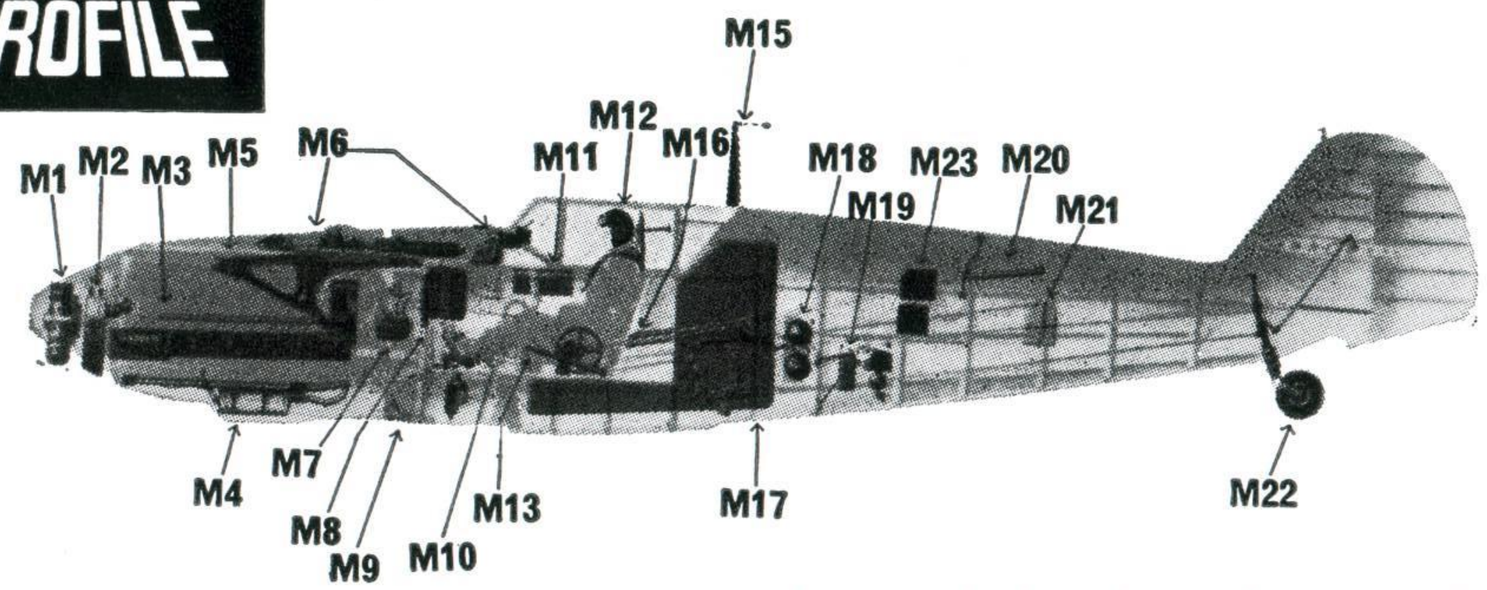
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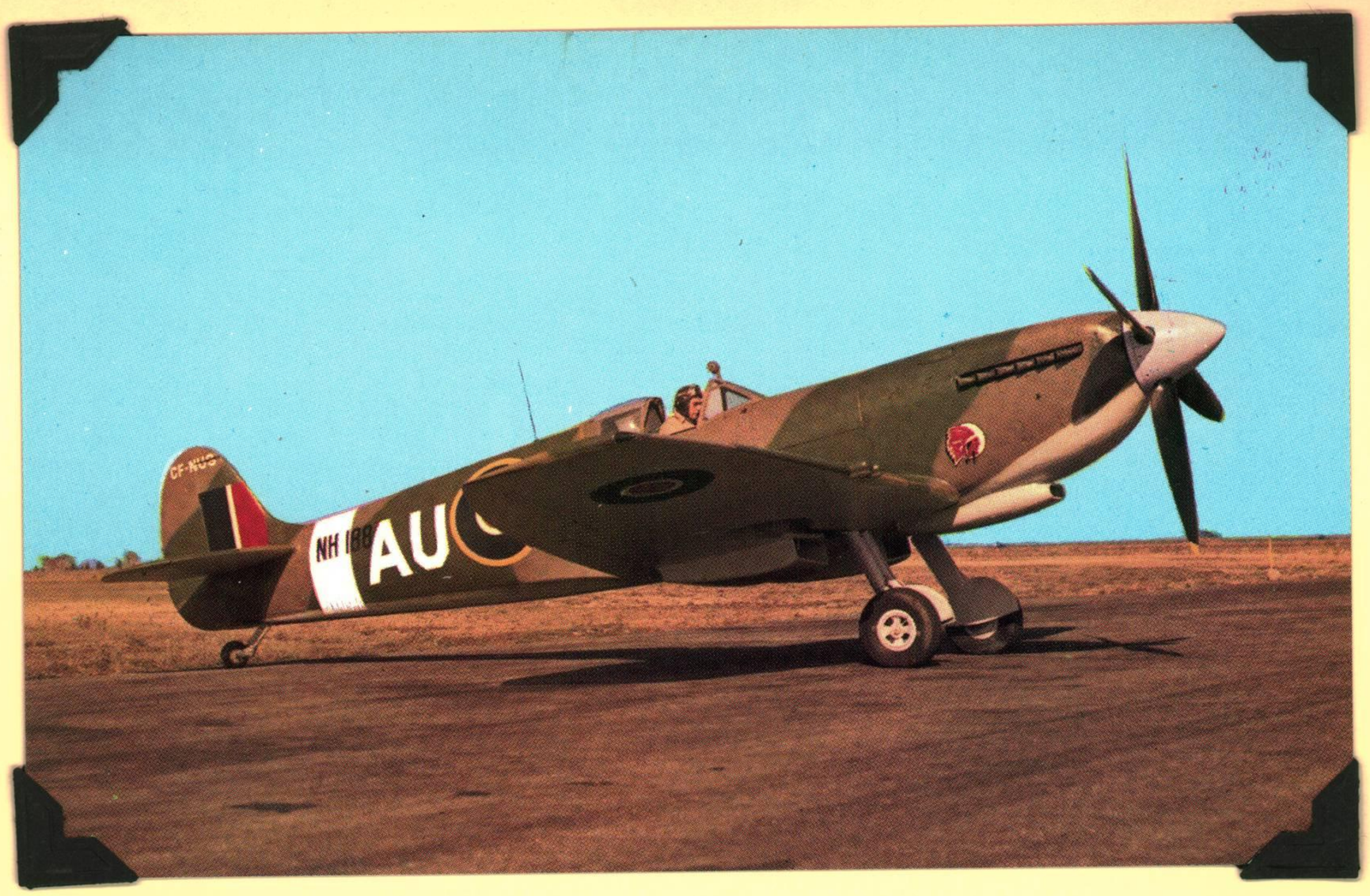
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SIRES OF THE SWIFT . . .

cover whether the boats could accompany a fleet to sea and be refuelled by Naval craft, they despatched four of them on a 10,000-mile cruise in the Irish Sea during September, 1925. This not only proved that they could look after themselves while working with the Navy, but that they could be relied upon to operate in foul weather. Meanwhile a metal-hulled version of the Southampton—the Mk II—was being designed by Mitchell and his staff.

The single-engined Seagull was still in demand, and six were delivered to the Royal Australian Air Force during 1926. They equipped a special flight, which had been formed for the photographic survey of the Great Barrier Reef, and their amphibious qualities were, of course, of immense value.

In July, 1926, a pair of Southamptons flew from Plymouth to Egypt, Cyprus and back; but this was a small undertaking compared with that of the historic Far East Flight of four Southampton IIs, commanded by G/C. T. R. Cave-Brown-Cave. Their historic voyage began from Plymouth Harbour on October 17th, 1927, with the four gleaming white boats in formation. First they flew across France and Italy to Athens, then headed south to Aboukir. Thereafter they alighted at the Syrian port of Alexandretta, before striking inland over the desert to the Euphrates; and thence they droned on at their 70-80 knots to Basra, and down the Persian Gulf to Karachi. Their ensuing journey round the coast of the Indian Peninsula blazed a new air trail, and the crews took note of the suitability of the harbours for flying-boat work. Though even at that date the next long stage—from Calcutta through the East Indies—was comparatively well known, the coast of Australia had only once been circumnavigated by a seaplane. First the four boats headed down the west coast, and at length, after circling the entire continent, returned to Singapore. It was not long before they were on their way north to Hong Kong; but eventually their wanderings brought them back to Singapore, and there they took up station.

"So far as dangers were concerned," runs a contemporary account, "the cruise was as prosaic as that of a P. and O. steamer plying between Tilbury and Bombay." The Southamptons, it is noted, were plagued by barnacles which collected on the hulls in some harbours; by tar oozing from fuel lighters and fouling their white hulls; and once by a faulty Primus stove. One or two of the crews had slight attacks of fever, and when the men had to clean hulls below the water-line they suffered temporarily from earache. But of real troubles there were none.

For identification, incidentally, the hulls were painted with black stripes, and these were the means of discovering a curious phenomenon: whereas barnacles would attach themselves to the stripes, they left the white paintwork severely alone.

The Far East cruise was followed during the same year by others of high merit and the Royal Australian Air Force was sufficiently impressed to acquire two wooden-hulled Southamptons.

It was in 1927, too, that the Schneider success, for which Mitchell had striven in designing the ill-fated S.4, came to pass. His new racer, the S.5, was of somewhat similar appearance, though it had a low-mounted, wire-braced wing, and the cockpit was placed further forward. To balance airscrew torque all the fuel was carried in one float.

Three S.5s were built for the Air Ministry's high-speed development programme and two of them represented Great Britain in the Schneider race at Venice on September 26th, 1927. The pilots were F/L. O. E. Worsley and F/L. S. N. Webster. Webster's machine had a geared Lion, while the Lion in Worsley's mount drove the airscrew direct. Of the two, Webster's was the faster, and he won at a speed of 281.65 m.p.h., exceeding the world's record for landplanes by 3 m.p.h. During the race he had, incidentally, set up a record over 100 km of 283.66 m.p.h. Worsley was second at 273.07 m.p.h.

Our Italian hosts paid handsome tribute to the victorious team. Thus Prince Scalea, President of the Aero Club of Italy: "The Venetian sky has seen many noble sights and valorous deeds in the past, and it is indeed fit that in this same Venetian sky English pilots should have won a victory which has stirred the imagination of the whole world."

The two S.5s were later used by the High Speed Section of the Marine Aircraft Experimental Establishment at Felixstowe, and on one of these, during November, 1928, F/L. d'Arcy Greig set up a new British speed record of 319.57 m.p.h. But though he had probably flown faster than any human being before him, he had failed to beat the standing record of Colonel the Marquis de Bernardi by the required 8 km/hr.

The period 1927/28 saw important changes within the Supermarine organization. In 1927 (by which time Mr. Scott-Paine had resigned to become a director of Imperial Airways) Cdr. Bird turned the firm into a public company, and in the following year the great Vickers group, through their subsidiary, Vickers (Aviation), Ltd., acquired the entire share capital. A condition of purchase was that R. J. Mitchell was to be bound to the company without option of terminating his agreement before December 5th, 1933. At the time of the take-over there were approximately 750 employees.

Throughout 1928 the Southampton continued in production, not for the R.A.F. alone, but for Japan and Argentina also. As a torpedo-carrier for the Danish Navy a three-engined development, called the Nanok, and having a redesigned wing cellule, was put in hand. The engines were Siddeley Jaguars and one torpedo was carried under each lower wing. As things transpired, the machine was never taken over by the Danes, and it was afterwards converted into a civil air yacht and sold to the Hon. A. E. Guinness. In its civil form it was known as the Solent.

A new type of three-seater military amphibian, powered by two Armstrong Siddeley Lynx engines and resembling a miniature Southampton, was turned out in 1929, but the year was chiefly notable for the introduction of a new type of Schneider racer, the S.6. Two examples were ordered and each was powered by one of the magnificent new Rolls-Royce R-type racing engines. The airframes bore a general resemblance to the S.5 but incorporated several innovations, including radiators in the floats as well as in the wings.

The race of 1929 resolved itself into an Anglo-Italian duel at Spithead. The S.6 pilots were F/O. H. R. D. Waghorn and F/O. R. L. R. Atcherley, and it was Waghorn who proved victorious at an average speed of 328.63 m.p.h. Atcherley was disqualified for missing a turning point, but he completed the course and, incidentally, set up world's records over the 50 km and 100 km distances at 332.49 m.p.h. and 331.75 m.p.h. Only a few days after the race S/L. A. H. Orlebar, A.F.C., flying the winning S.6, raised the world's speed record first to 336.3 and later to 357.7 m.p.h.

Thus did the record-breaking, war-winning, world beating partnership of Supermarine and Rolls-Royce have its true beginning, though, as we have seen, certain of the early Supermarine flying-boats were powered by the famous Eagle.

For the Southampton Mk X prototype flying-boat of 1930 three Armstrong Siddeley Panthers (and later three Bristol Jupiters) were chosen. Retention of the name Southampton was misleading, for this boat was of entirely new design, having a sesquiplane superstructure and a flat-sided hull, to facilitate production in metal. The under-water portion of the hull was planked with stainless steel. Even less conventional was the three-Jaguar parasol monoplane Air Yacht, likewise tested in 1930, and acquired, as was the earlier Solent, by the Hon. A. E. Guinness.



Inside the Swan amphibian—largest of its kind.

Hitherto we have made no reference to the many remarkable designs which never materialized, though, did space permit, a great deal could be written concerning these. Among documents and photographs, formerly the property of Cdr. Bird, and kindly placed at the writer's disposal by his son, Mr. J. S. Bird, we find, for example, designs for a triplane flying boat powered with Rolls-Royce Condors and designed for operation as a torpedo carrier. A feature of this craft was to have been a water propeller. Another projected type, called the Sea Hawk, was a civil development of the Southampton Mk X; but most significant of all, perhaps, was the great six-engined flying boat, somewhat resembling the Dornier Do X and designed in 1930. This was



Prototype Swift and Spitfire 24.

SIRES OF THE SWIFT

A FORTY-YEAR RECORD OF SUPERMARINE ACHIEVEMENT

Part 1. The Pattern of Progress

BY H. F. KING, M.B.E.

(*With a contribution by Jeffrey Quill, O.B.E., A.F.C.*)

A MAN who helped to keep things lively in the early days of British flying (indeed, throughout his career) was Noel Pemberton Billing, and when he died in 1948 he was remembered and respected for a wide variety of ideas and achievements. We are concerned with him here as the founder of the great Supermarine organization, whose fortieth birthday is honoured this year.

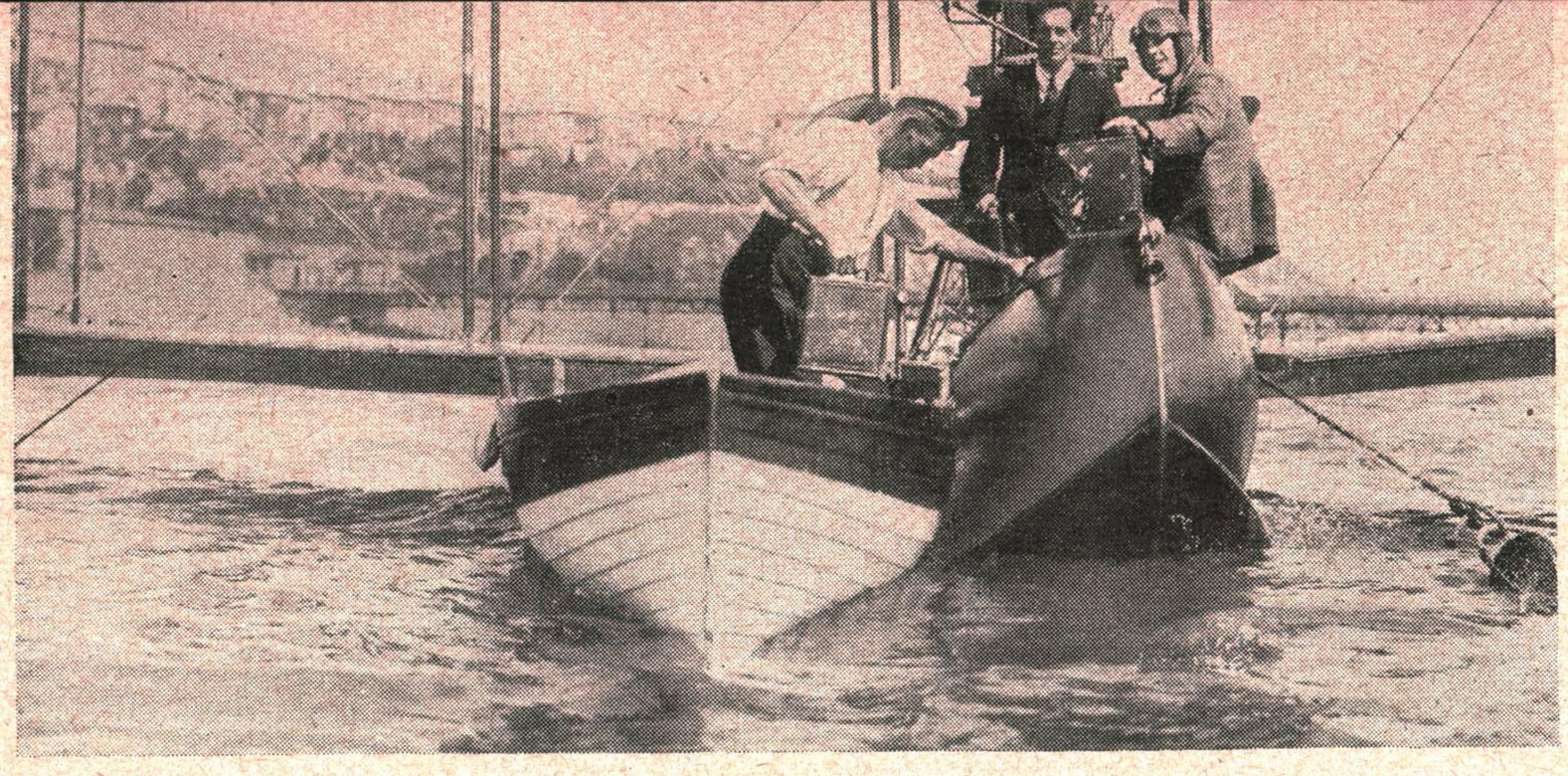
P.B.'s enthusiasm for aeronautics dated from the early 1900s, and in 1912, while he was dwelling aboard a three-masted schooner moored in the Itchen, he took over premises at Woolston for the construction of aircraft—especially those of the marine persuasion.

One of P.B.'s resolutions being to build "a boat that will fly rather than an aeroplane that will float," he registered the name Supermarine as his telegraphic address, and the remarkable tractor flying-boat which he exhibited at Olympia in March 1914 was styled Supermarine P.B.1. It was acclaimed as one of the cleanest aircraft, irrespective of class, constructed up to that time and the workmanship was exquisite. The circular-section hull had steps built on as separate units.

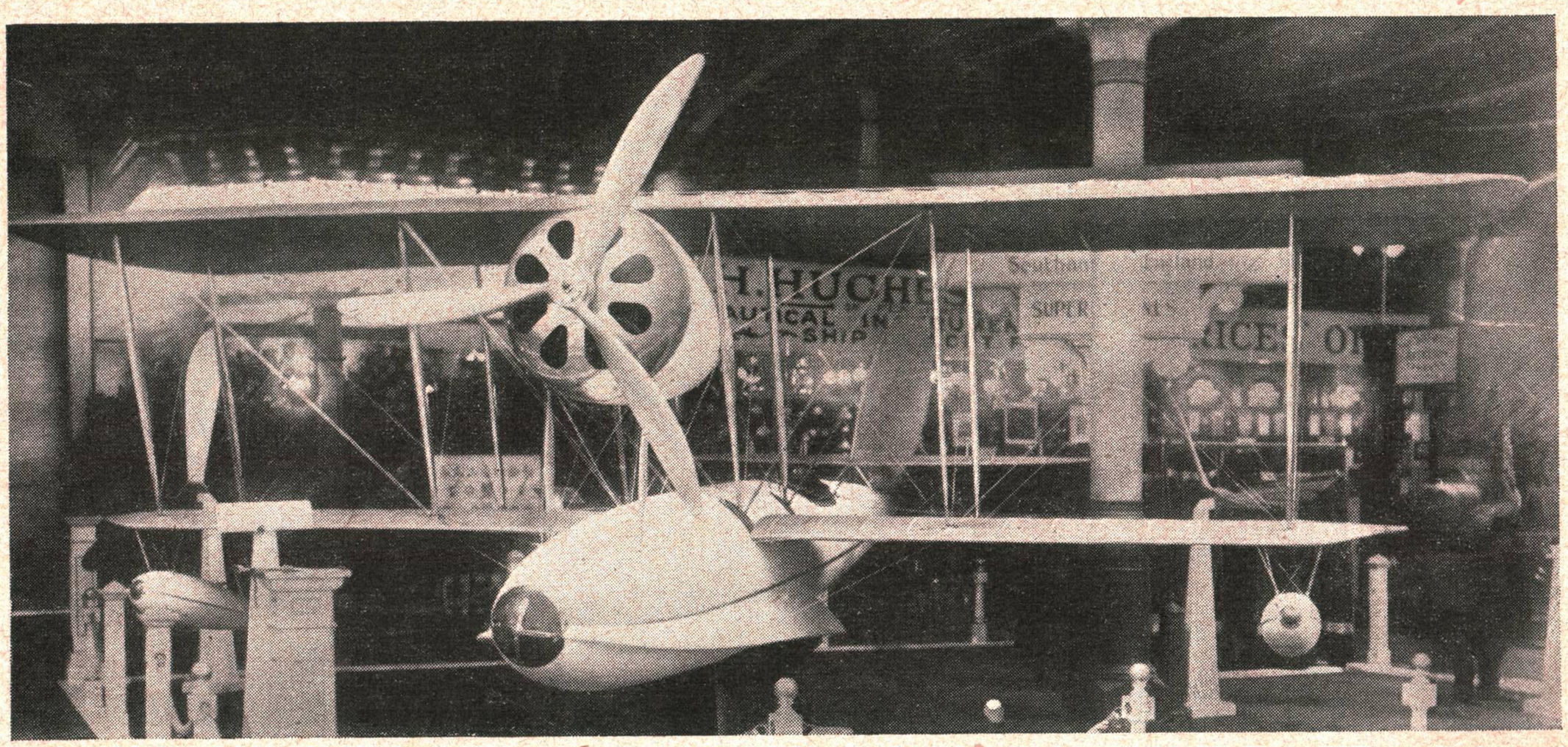
June 1914 saw the business transformed into a limited company—Pemberton Billing, Ltd.—with an initial nominal share capital of £20,000. The two subscribers were P.B. himself and Alfred de Broughton, and hardly had the business been reconstituted under their directorship when Britain went to war. Thus, *Flight* of August 14th, 1914:—

"'Hustle' is the order of the day at the Supermarine works at Southampton just now, and the latest product is a small scouting biplane. In his breezy way Mr. Pemberton Billing has given the timetable of the progress of the first P.B.9, as these machines are to be known. The decision to turn out the scout was not come to until Monday, when the draughtsmen attacked the problem of forthwith getting out the designs. To such effect did they work, that by Tuesday actual construction was commenced, and by the following Tuesday the machine was ready to take the air."

A full description of the little scout appeared in the following issue, so that something of a record for aeronautical journalism, as well as for aircraft construction (and perhaps for security laxness also), seems to have been established. Which leads us to reflect that, in present circumstances, a full description of Supermarine's latest fighter, the Swift, or of its Rolls-Royce turbojet, is unlikely to be authorized for many months, or even years, to come.



Refueller alongside a Channel flying-boat. Petrol was handled in two-gallon cans.



(Below) Pemberton Billing P.B.1 photographed by "Flight" at Olympia in 1914.

SIRES OF THE SWIFT . . .

To Mr. R. H. Bound, F.R.Ae.S., M.I.Mech.E., A.M.I.A.E., who assisted Pemberton Billing, and is now technical director of Dowty Equipment, Ltd., we are indebted for the following note on another of P.B.'s projects: "A very interesting type of aircraft," he writes, "was a flying-boat specifically designed to overcome the destruction which might result if it were forced into the sea. P.B. realized that under those conditions it was essential to discard the wings. His flying-boat was very ingenious; the hull was shaped like an ordinary speed motorboat with a sloping deck down to the stern. The engine was mounted in the hull, and the biplane wings, which carried tail booms supporting the tailplane, fins and rudder, could be discarded in a few seconds by undoing two breech blocks, thus allowing all the superstructure to slide off backwards into the sea. This superstructure carried the mounting for the propeller, which was chain driven from the engine in the hull. Unfortunately, the two boats of this type under construction were never completed owing to the exigencies of the war (I believe they were on order from Germany). However, the hulls saw a great deal of service afterwards as speedboat tenders for subsequent flying-boats used on Southampton Water." Mr. Bound also recalls that the "Seven-Day Bus" which he believes was the result of a bet between Pemberton Billing and Gordon Bell, was towed through the streets and used by P.B. as an electioneering platform when he decided to stand for Parliament.

Hubert Scott-Paine, who was to remain a guiding power in the Supermarine organization until 1923, was appointed manager on December 10th, 1914. The following year saw a new fighting scout, dubbed "Push Proj.," or Pusher Projectile (its streamlined nacelle being of circular section), in the air. But, like the "Seven-Day Bus" before it, this effort came to nought, though it did have the somewhat academic distinction of being one of the earliest fighters with swept-back wings. The engine was a Mono-Gnome.

The accessibility of the Supermarine works from the Continent was a factor which caused them to be used, during a considerable period of the war, for the repair and maintenance of aircraft from France. They were engaged, too, on the construction of some fifty Norman Thompson flying-boat trainers for the Admiralty and for a time were sub-contracting on the famous Short 184, or "225," floatplane.

In 1915 Pemberton Billing was granted indefinite leave from the R.N.A.S. (which he had joined soon after war began) to design a mighty "Zeppelin killer." This materialized as the phenomenal Night Hawk quadruplane—cannon-armed, searchlight-equipped, and supposedly capable of hovering in a 28-m.p.h. breeze to lie in wait for its prey. It was never to see service, though it is commended to the student of military-aircraft design as an object-lesson in precocity. The Night Hawk was tested in 1916, and in the same year a youth named Mitchell—R. J. Mitchell—joined the company. It was in 1916, too, that Pemberton Billing sold his interest, whereupon the name of the company was changed to The Supermarine Aviation Works, Ltd.

Thereafter the factory came under Government control and the twin-float Navyplane and A.D. flying-boat were constructed to Admiralty designs. Both were of uncommon interest, yet hardly as noteworthy as a third officially-sponsored machine known as the Baby, or by its specification number, N.1B. To this compact little scout the Schneider victors and fighters of later years owed a heavy debt.

The war was not long over when Scott-Paine was joined by Sqn.-Cdr. James Bird, who, like himself, was a lively protagonist of the flying-boat. To stimulate interest the co-directors sent a Channel-type boat, with 160-h.p. Beardmore engine and open seats for three passengers, on a propaganda-*cum*-joy-riding campaign along the south coast. Experimental services from Southampton to Le Havre and the Channel Islands were run with the same type of machine, but base rumour had it that, in all but ideal conditions, the take-off performance was such that it was often simpler to taxi. A Mk II Channel was later developed and had the 240-h.p. Siddeley Puma and a re-designed front

step. It lived down the scurrilous stories concerning its predecessor's reluctance to leave the water by rendering valuable service in many parts of the world.

The year 1919 saw Supermarine's first participation in the Schneider Trophy Race, with which they were to be closely and victoriously associated over a period of several years. Their entry was the Sea Lion I, a little pusher boat capable of 149 m.p.h. and developed from the Baby. The engine was a "broad arrow" Napier Lion, then embarking on its own splendid career in military, civil and sporting flying. As the old-timers will remember, the race took place at Bournemouth, and proved a complete fiasco. Only the Italian pilot Janello completed the course, and even he was disqualified as the judges had not observed him at the Swanage turn. The acrimony which ensued left a slightly unpleasant taste in everybody's mouth. To make things worse, the Sea Lion had been damaged by an obstacle while taking off after a precautionary alighting in mist. The pilot was Sqn.-Cdr. Basil Hobbs, and Capt. John Hoare was the engine-starter. In this capacity he was responsible for setting the Lion roaring and then taking a header.

At the Olympia Show of 1920 (during which year Mitchell was appointed chief engineer and designer) Supermarines showed not only a Channel boat, but a new amphibian fighter called the Sea King I, powered with a 160-h.p. Beardmore. In that year also they entered an Eagle-powered commercial amphibian for an Air Ministry competition at Martlesham Heath and Felixstowe. The winner proved to be a Vickers Viking, but the Supermarine machine was placed second and was awarded a prize (specially increased in recognition of its peculiar merits) of £8,000. Witnesses of the trials recall how, as soon as the wheels touched the ground, the tail would come up and the bows would slide along the ground, exerting a useful braking effect.

On the military side, in 1920-21, the company evolved the Seal deck-landing amphibian fleet spotter. This was notably more efficient than the Competition amphibian, which, having been designed and built in a few weeks, was somewhat handicapped by unnecessary weight. A developed version of the Seal, re-named Seagull, was put into production during 1922 for the Air Ministry and was successfully operated from aircraft-carriers and shore bases. Like its predecessors, it was of wooden construction.

A resounding Schneider success at Naples crowned the same year. The races of '20 and '21, it should be mentioned, had both degenerated into fly-overs for the Italians, and a third win would mean that the trophy would become Italy's permanent possession—as it is now our own. In the absence of Government backing, therefore, Mr. Scott-Paine and Cdr. Bird decided to finance a private venture. This materialized as the Sea Lion II, a development of the 1919 Sea Lion I, cleaned up under the direction of Mr. Mitchell and flown by the redoubtable Supermarine chief test pilot Henri Biard.

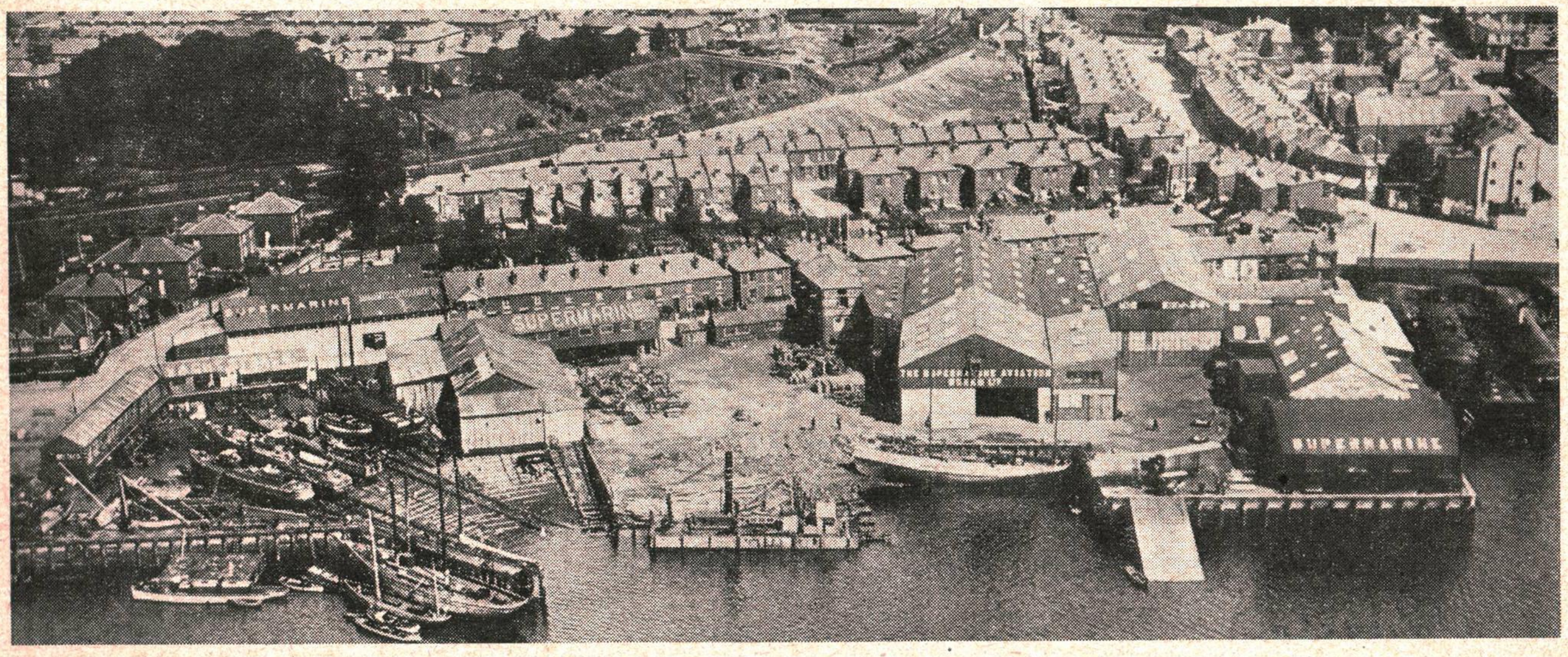
This time the race was no fiasco. The Sea Lion was off first, and when the Italians compared Biard's time for his first lap with that of their own machines they were a trifle saddened. What they did not know was that the little Supermarine had never been opened up to its full speed on the trials they had witnessed and that Biard had deliberately turned in a clumsy fashion on his practice runs. The betting, of course, was heavily against him.

Biard's lap-time actually worked out at over 160 m.p.h.—an astonishing figure—and he maintained it for six laps, easily overhauling two of the Italians in the meantime. Then he throttled the Lion back a little and, as his speed slackened, the faster of the Italians began to reduce his lead; still he was lapping in over 20 seconds better time than the best of his rivals. Came the thirteenth lap and Biard opened up again to full bore, to win by 2 min 3 sec, at an average speed of 145.7 m.p.h. for the distance of 200.2 miles.

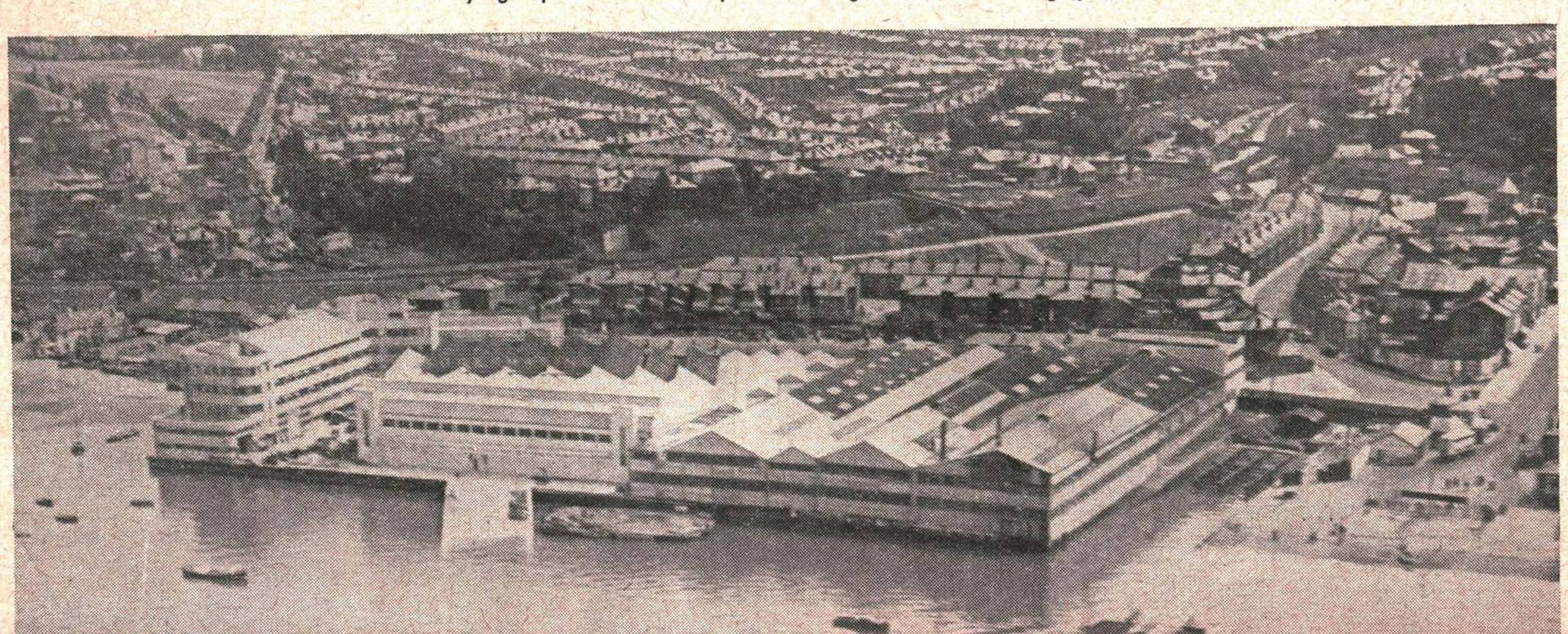
When Mr. Scott-Paine and Capt. Biard returned to Southampton a few days later they were accorded a civic reception, and *Flight's* report avers that "remarkable scenes" were later witnessed at the Supermarine works. That we may believe, for the works were noted for the friendly relationships of management and staff.

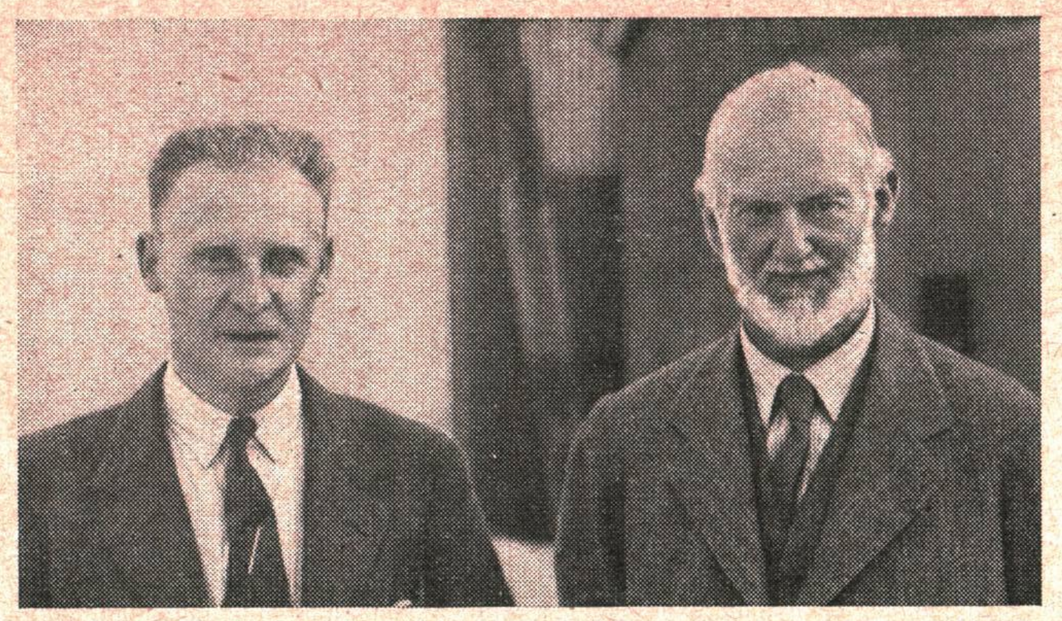
The next Schneider contest—flown at Cowes in 1923—was a palpable defeat for Supermarine and for Britain; but it was also a salutary lesson, and one which was put to good account. For this race the Sea Lion was brought out once again, now in its third form, with clipped wings, more cleanly cowled engine and modifications to the hull. Originally there were ten entries—three British (with Biard again on the Sea Lion), four French and three American, the latter sponsored by the U.S. Navy. A succession of mishaps, however, reduced the field to the Sea Lion, a C.A.M.S. 38 and two Curtiss C.R.3 Navy Racers.

Biard put up his usual fine show but the Sea Lion was no



Supermarine's Woolston works in 1919/1920 and in 1937. A distinct "tidying up" had taken place during the interviewing years.





Two great men—R. J. Mitchell (left) and Sir Henry Royce.

SIRES OF THE SWIFT . . .

match for the very clean, twin-float Curtiss seaplanes, with the new, compact, D.12 engine of the same manufacture. Lt. David Rittenhouse, U.S.N., won easily at 177.38 m.p.h.

It is recorded that Biard finished the race in a zoom climb to several thousand feet, and that zoom may be considered to have carried the classic type of pusher biplane boat clean out of the Schneider picture. At an official banquet after the race Mr. Scott-Paine admitted that the Sea Lion had lost to better machines and men, and apologized to Capt. Biard for not having given him a good enough mount.

No one was less surprised by the result than Mitchell; but while he frankly admitted that the Curtisses had provided some valuable design wrinkles, he pointed out that they were still biplanes. His own dream racer was a monoplane—and a cantilever at that.

The Schneider Trophy contests were eagerly awaited diversions from ordinary business, which was progressing sufficiently well for Messrs. Scott-Paine and Bird to form the British Marine Air Navigation Co., Ltd. The purpose of this company was to operate flying-boat services between Southampton and such places as Cherbourg and the Channel Islands, and the intended aircraft, the first of which was tested in the summer of 1923, was the Sea Eagle. Three Sea Eagles were eventually put into operation and they were well liked by passengers, six of whom were accommodated in the forward cabin, while the pilot sat aft and above. The engine was a Rolls-Royce Eagle IX of 360 h.p. When the newly-formed company was amalgamated in 1924 with Handley Page Transport, Instone Airline and Daimler Airways, to form Imperial Airways, the Sea Eagles continued in service. A related type, developed for military purposes, was the Scarab amphibian bomber, twelve of which were supplied to Spain. They were used in the Moroccan war. Far larger than the Scarab, though on somewhat similar lines, was the twin-engined amphibian built in 1924 and known as the Swan. In an incomplete state this—the largest amphibian built up to that time—was Supermarine's showpiece when the Woolston works were visited by H.R.H. the Prince of Wales. This honour he had not conferred on any other aircraft factory since 1918.

Ordered by the Air Ministry as a passenger carrier the Swan was not initially fitted for the work, and Felixstowe trials proved so satisfactory that the Air Ministry decided that a modified version would make a suitable replacement for the old F.5. Thus from the Swan was evolved Supermarine's flying boat masterpiece, the Southampton, a type of which we shall have much more to say. But first we must place on record the almost forgotten fact that for the 1924 Light Aeroplane Contests at Lympne a dainty little sesquiplane called the Sparrow was built by Supermarine round a three-cylinder Blackburne engine. In 1926 it turned up at Lympne again—this time as a parasol monoplane.

Truly, it seemed, Mitchell could design any sort of machine required of him.

His "hush-hush" Schneider Racer of 1925 was the S.4, and it was a cantilever monoplane, as he had foreseen. The mid-position wing was faired with the outer cylinder blocks of the 700 h.p. Lion and twin floats were mounted on carefully faired cantilever struts. Construction was of wood, but a modern touch was the fitting of trailing-edge flaps interconnected with "drooping" ailerons.

The S.4 was built as part of an Air Ministry programme of high-speed development and was loaned to the builders for entry in the 1925 Schneider race. "Instructions to proceed" were issued on March 18th of that year and the machine first flew on August 25th. On September 13th Henri Biard put it over a 3-km straight course at Calshot at the world record speed of 226.752 m.p.h. Following this achievement Napiers increased the engine power and a more efficient airscrew was fitted in preparation for the race, to be flown near Baltimore.

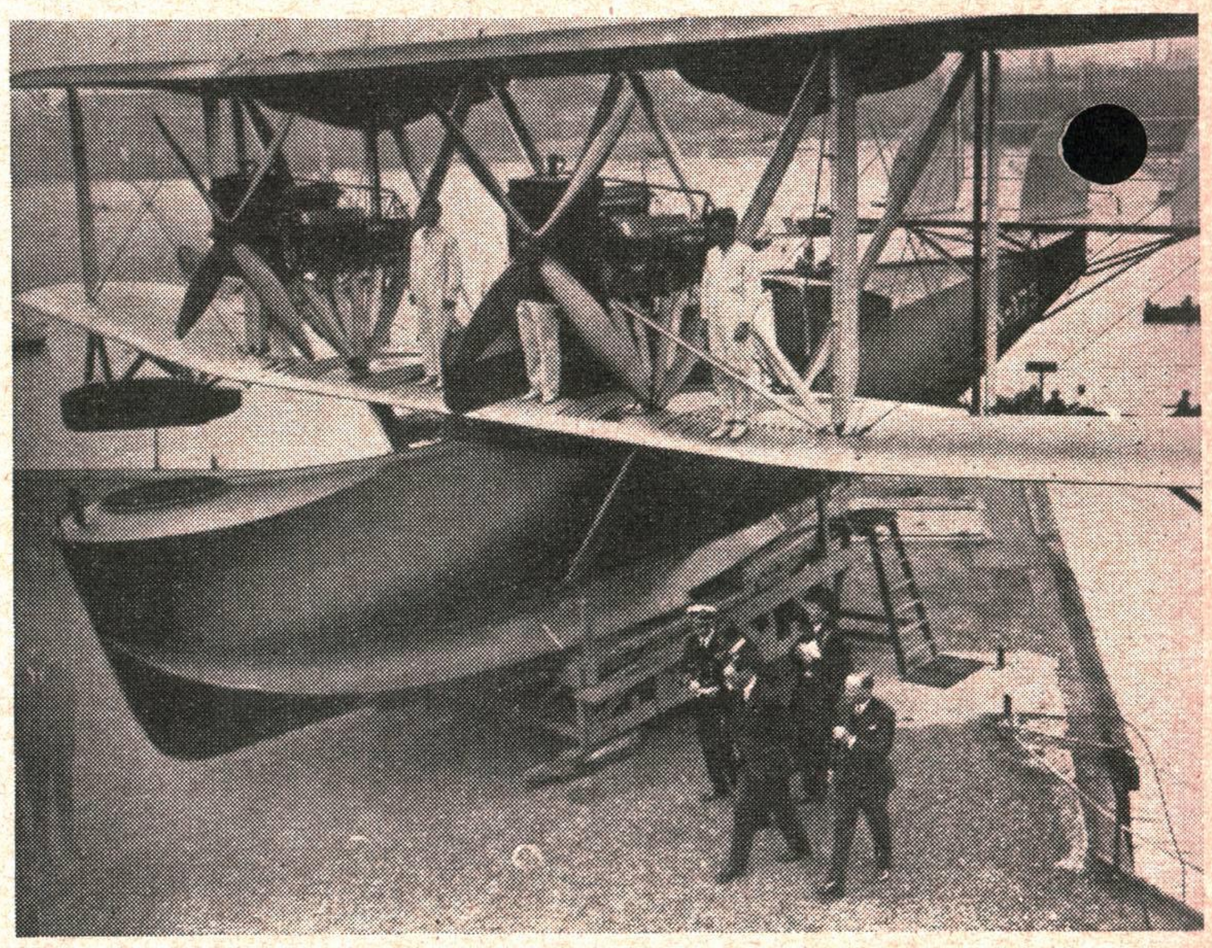
But when the British team sailed for America ill-luck went with them. First, Biard slipped on the deck of the liner and seriously injured his wrist. Then, on arrival he went down with 'flu and, while recovering, was brought the news that the tent housing the S.4 had blown down in a gale and that a tent pole had fallen across the tail. Mitchell was on the spot, however, and it was possible to effect repairs. Biard soon had the racer in the air, and when, at about 800ft, he was seen to make a steep turn, the machine behaved in such a manner that spectators thought that he was "stunting." The appalling fact was, however, that the S.4 was in grave difficulty with wing flutter, concerning which very little was known at the time. Somehow Biard managed to flatten out just before touching the water, but the floats struck hard, the undercarriage collapsed and the S.4 went under. By astonishing luck (at last) the fuselage broke at the cockpit and Biard escaped with his life.

From this ill-starred, but courageously designed, racer we turn again to the Southampton—a flying boat of uncommon character, all of it good. Who would disagree that, despite the maze of interplane struts, despite the gap between the wings and the hull (for the complete wing cellule, with two Lion engines, was lowered bodily on to the pick-up points) the "Soton" had a queenly grace hardly surpassed by any later craft of its class.

The prototype was a wooden-hulled machine, as were the first production machines, and it was designed, built, tested and delivered in $7\frac{1}{2}$ months. Felixstowe and Calshot enthused about its handling qualities in the air and on the water, and visitors to the Woolston hull shop who were privileged to see the new boats under construction were charmed by the workmanship. One of them writes that he will never forget "the pleasure of watching these wooden hulls being made, the thrill of running one's fingers over the smooth surface and the scent of the wood planks, fitted together with such loving care by the real craftsmen whom Scott-Paine employed."

Coastal Area of the R.A.F. lost no time in trying out its first Southamptons under operational conditions. Wishing to dis-

His Royal Highness the Prince of Wales inspects the Swan.



(Below) The Sea King II fighter (left) and Seal fleet spotter.





The four Southamptons of the Far East Flight at Singapore. These were metal-hulled machines with Napier Lions.

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to have six 900 h.p. Rolls-Royce Buzzard engines and to carry forty passengers. Construction was already under way when the order was cancelled by the Government in a spasm of economy. A Condor-engined single-seater designed in the 1920s was called the Sea Urchin.

The Schneider victories of Webster and Waghorn in 1927 and 1929 meant that Britain had only to win the race of 1931 for the trophy to remain in her permanent possession; but in the absence of a Government subsidy the prospect seemed hopeless. Suddenly the late Lady Houston made her magnificent offer of £100,000 to finance a British team. Only about six months remained before the race, but Supermarines set to and built two S.6 developments, known as S.6Bs. At the same time they modified the original S.6s to S.6As—these to be kept as reserves.

The S.6Bs carried more fuel and oil than the original type and the floats were redesigned and enlarged. Dimensions were, in fact, slightly increased all round and various parts of the structure were stiffened. The engine was a Rolls-Royce R of greater output than formerly.

As it happened, the Italians were not able to prepare their defending racers in time and F/L. J. N. Boothman (now Air Marshal Sir John Boothman, Controller of Supplies (Air)), won the trophy outright in a fly-over in an S.6B at 340.08 m.p.h. On the same day the second "B", flown by F/L. G. H. Stainforth, put up a world's speed record of 379.05 m.p.h.; whereupon Rolls Royce proceeded to excel themselves by producing a "sprint" engine developing 2,600 h.p. With this installed in a 6B George Stainforth straightway set up a new world's speed record of 407.5 m.p.h., in the course of which he became the first man to fly at over 400 m.p.h.

The Schneider Trophy now rests in the Royal Aero Club—a permanent reminder of the great days when the fastest machines in the world were pitted against each other under the most exciting and picturesque circumstances.

It was not to be expected that Supermarine's unbeatable partnership with Rolls-Royce would be confined to the racing field, and in 1931 two standard Southamptons were adapted to take two steam-cooled Kestrels in place of their Lions, with a notable improvement in performance. These boats provided valuable experience for the design of a Southampton replacement, which, though known as the Southampton Mk IV, was, in fact, totally new. When the first photograph appeared in *Flight* in February, 1933, it was seen that the wing cellule had been very much cleaned up, the hull redesigned, the pilots' cockpit enclosed, and the twin Kestrels attached beneath the top planes. Under the name Scapa the new boat was adopted by the R.A.F. and proved a wholly worthy successor to the Southampton II.

Just as the so-called Southampton IV was only distantly related to the original Southampton design, so the metal-constructed Seagull V single-engined amphibian, first flown in 1933, was a very different machine from the wooden Seagulls of earlier years. It was, nevertheless, intended for similar duties, and there was no surprise when it was learned that the first batch was for Australia. Though the designation Seagull V was retained for the Australian machines, a similar aircraft, when adopted for service with the R.A.F., was renamed Walrus.

Although, as we have intimated, the Scapa was a very fine craft indeed, it was on the small side for Service requirements, and towards the end of 1934 an enlarged development, along somewhat similar lines and designated Southampton Mk V, was launched. The engines were two Bristol Pegasus IIIs and performance tests at Felixstowe during 1935 gave exceptionally fine



(Above) Southampton hull-shop, Woolston. (Below) The finished product, with another fine piece of engineering.



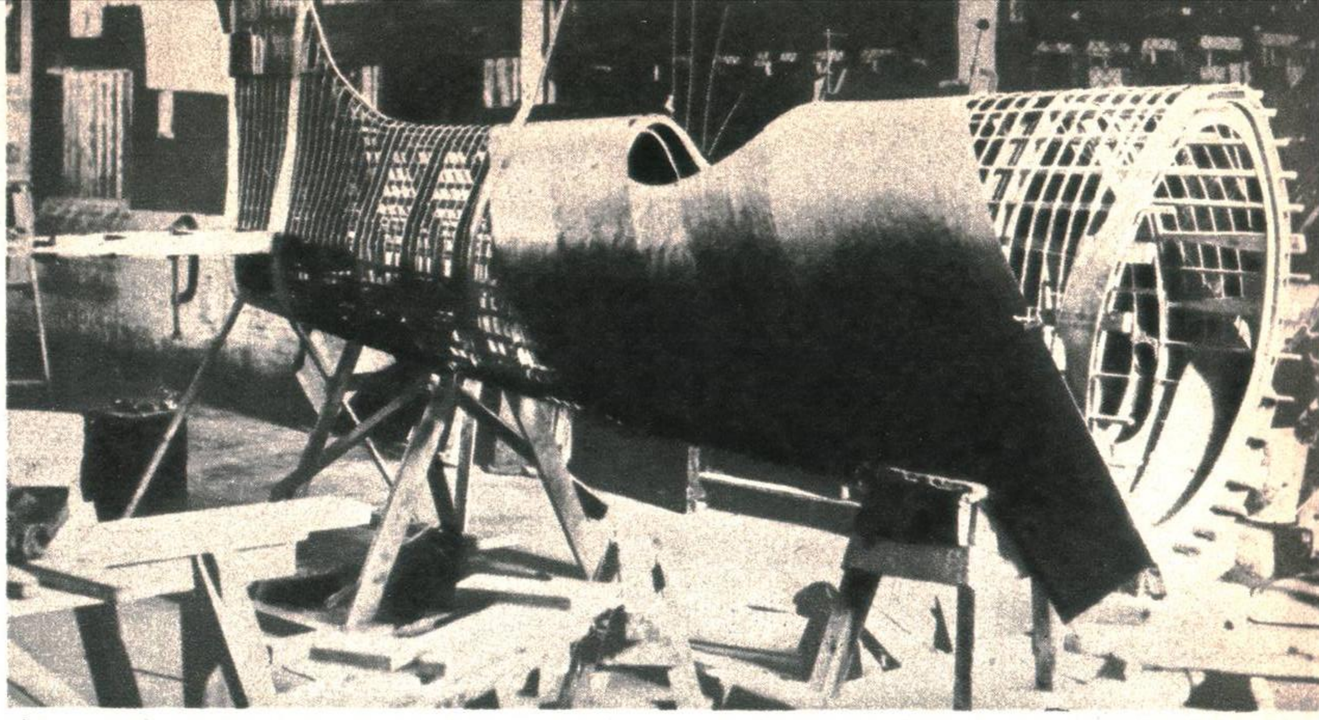
results, the maximum speed being 153 m.p.h. Pegasus Xs, later installed in the production version, named Stranraer, added 12 m.p.h. Stranraers were also built by Vickers in Canada, and as late as 1951 examples were still operating on the Canadian Lakes.

Mitchell's progressive cleaning up of his flying boats was a natural process and owed little to the Schneider seaplanes; but in the design of a new landplane fighter a degree of Schneider influence was discernible. This new four-gun fighter appeared in 1934; it was known by its specification number F.7/30, and unofficially as the Spitfire. To be truthful, the name was hardly merited, for the machine was a somewhat clumsy-looking cranked-wing cantilever monoplane of no less than 46ft span and having a fixed, "trousered," undercarriage. Even a neatly installed Rolls-Royce Goshawk of 600 h.p. failed to propel it at more than 230 m.p.h.

The F.7/30 having come to nought, Mitchell next envisaged a much smaller and neater machine with a retractable undercarriage and an enclosed cockpit, but retaining the Goshawk engine. While this was still on the drawing-board the Air Ministry specification F.5/34, calling for eight wing-mounted Browning 0.303in guns, was put out, and at about the same time Rolls-Royce came forward with their P.V.12 engine (later to be known as the Merlin) of about 1,000 h.p. Now, at last, Mitchell brought all his Schneider experience into play, and round a new private-venture design of his the historic F.37/34 specification was virtually written. The prototype machine bore the Service number K5054 and was certainly the prettiest military aircraft of that—or perhaps of any other—period. It was finished in pale blue and was characterized by a thin wing, of elliptical plan form, into which the very clean single-strut units of the undercarriage retracted laterally. The radiator for the Merlin C engine was placed under the starboard wing and the airscrew was a fixed-pitch, wooden two-blader of impressive dimensions.

The Spitfire I, as the new type was officially named, was first flown on March 5th, 1936, by J. ("Mutt") Summers, chief test pilot of the Vickers group. In June—by which time the Spitfire had proved itself the fastest fighter in the world, with a speed of 349.5 m.p.h.—the Air Ministry placed an order for 450; but before the first Spitfire Is could enter service R. J. Mitchell, who had been seriously ill for many months, died. It was written of him in *Flight:* "It was perhaps the ability of 'R.J.' to weigh the pros and cons quickly and to arrive at a decision which made him the great designer he undoubtedly was. His versatility will be appreciated when it is pointed out that his productions ranged from heavy long-range flying boats to tiny single-seater landplane fighters, and on more than one occasion he had two or three very different types of aircraft passing through the design stage at the same time, so that he frequently had to switch his mind from one problem to another of a totally different character. The success of Supermarine aircraft is proof that he was able to do this without losing that perfect judgment which is the essential of good compromise."

It was evident that the Spitfire was capable of being developed further (though at the time the great number of successive variants which eventually materialized were certainly not envisaged), and the great responsibility for modification and re-design then passed to the hands of Mr. J. Smith, who continues today as Supermarine's chief designer.



The wooden fuselage of the S.4 racer under construction.

The production form of the Spitfire I was a trifle less easy on the eye than the prototype, though its speed had risen to 362 m.p.h. The first R.A.F. squadron to be re-equipped was No. 19 and in the same year—1938—Supermarine Aviation Works (Vickers), Ltd., as the company was then known, together with their parent company, Vickers (Aviation), Ltd., were taken over by Vickers-Armstrongs, Ltd.

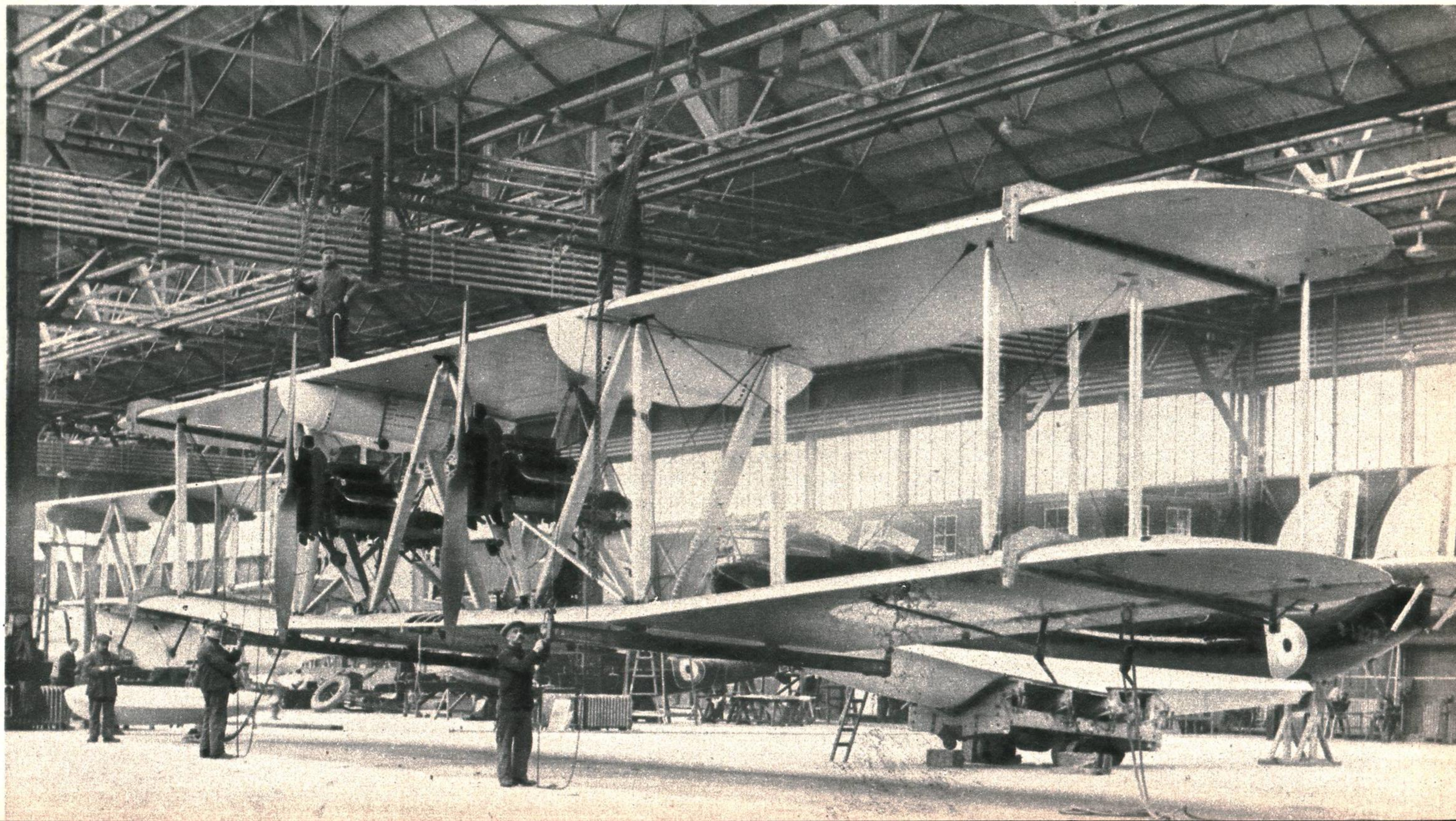
It was in 1938, too, that the "Speed Spitfire" made its unpublicized appearance. This had a special Merlin of 2,150 h.p. and was capable of well over 400 m.p.h. Eventually it was modified for an attempt on the world's speed record, but development work had not been completed when war broke out, whereupon a standard Merlin was installed and the machine was used for P.R. development work.

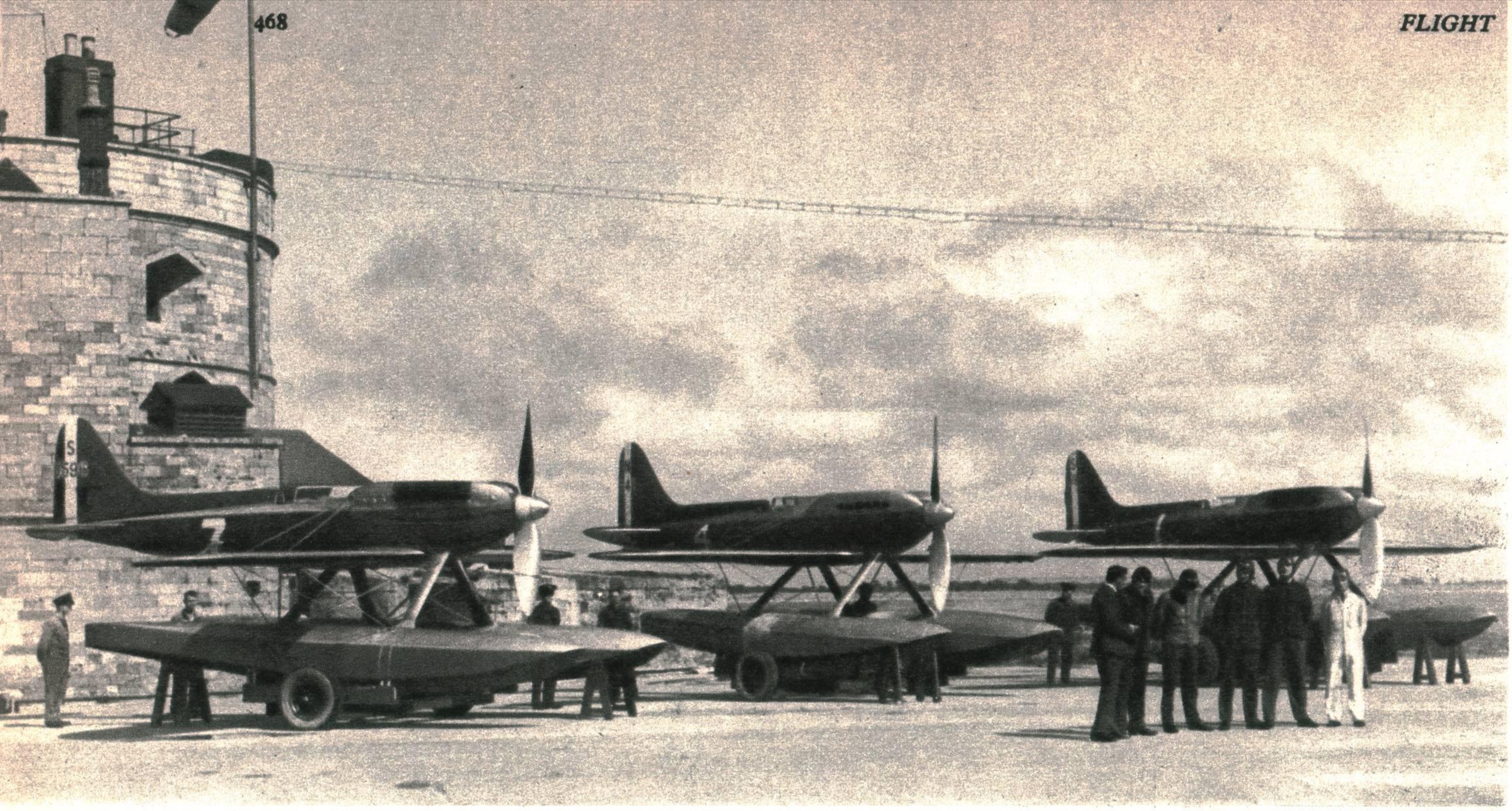
Throughout the year 1939 Supermarine's own production of their splendid new fighter was mounting, and a great shadow factory was being erected at Castle Bromwich for the Nuffield organization. Still, the marine aircraft side was far from being neglected, and it was during 1939 that the Sea Otter amphibian, with Bristol Mercury engine driving a tractor airscrew, was tried out as a successor to the Walrus. Spitfire production commitments were such, however, that Sea Otters for the Fleet Air Arm had to be sub-contracted to Saunders-Roe.

It is little known even today that on the outbreak of war there was under construction at Woolston a four-engined Supermarine bomber, to Specification B.12/36. Work was well advanced when the factory was severely bombed in 1940 and further work on the prototype was called off.

Henceforward our story is largely that of the Spitfire—that epitome of stubborn defiance and technical resourcefulness. Its deeds, and those of its companion-in-arms the Hawker Hurricane,

Hoisting the superstructure of a wooden Southampton, complete with twin Lion engines, prior to lowering it bodily on to the hull, seen in the background.





The British Schneider Cup team at Calshot in 1931, with the two Supermarine S.6Bs (right and left) and an S.6A, developed from the 1929 S.6.

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form one of the most glorious chapters of the history of the air war. They remain—and will continue to do so for many a year—fresh in our memories, so that we may concern ourselves here with technical characteristics, rather than combat achievements. We merely remark in passing that the Spitfire saw action in Great Britain, Europe, the Middle East and the Far East; that it was flown—and loved—not only by pilots of the R.A.F. and Commonwealth Air Forces, but by those of America, Poland, Czechoslovakia, Free France, Holland, Belgium, Norway and Yugoslavia; and that over 22,000, in thirty-three main variants (including Seafires), were built.

These we review in some detail later; but our present theme of Supermarine development demands a résumé of evolution and of conditioning factors.

The first enemy aircraft to fall to the guns of Spitfires were among those which sporadically raided our shores in the "phoney" war; but the supreme trial and proving of the "Spit" came in the Battle of Britain. Then it was that, alongside the Hurricanes, the Spitfire Is and IIs (the second mark had a Merlin XII engine in place of the Merlin III) tore the great, contrailing, formations of Heinkels, Dorniers and Junkers apart and lashed their escorting Messerschmitts till the onslaught faltered and ceased. Then the Spitfire achieved as great a measure of immortality as an aircraft ever could.

The earliest Spitfires had been fitted with fixed-pitch, two-blade, wooden airscrews, and later with two-pitch, three-blade de Havillands; but these did not allow development of full performance and, while the Battle of Britain was being fought, D.H. or Rotol constant-speed airscrews were being fitted. Many of these were field-modifications of earlier types. Latterly, on a number of machines, the eight machine-guns were replaced by a pair of 20-mm Hispano cannon in order to penetrate the German armour plate.

As was to be expected, the Woolston factory came under heavy attack and the fine buildings which had grown round the site of P.B.'s sheds suffered grave damage. But loss of life was relatively small, and most of the Spitfire production line survived or was salvaged, together with the vital machine tools. After a visit by Lord Beaverbrook, the resolute Minister of Aircraft Production, came the order to disperse; whereupon the headquarters of the company, together with the design staff, were transferred to a stately country house at Hursley Park, near Winchester. Workshops were set up in various southern towns, and by 1944 Supermarines were established in 61 dispersals.

All the time modifications and innovations were being introduced to meet specific requirements; thus, when the Woolston works were bombed, a Spitfire I was being mounted on Blackburn Roc floats with a view to its employment in the Norwegian campaign, though the collapse caused the scheme to be shelved. The Spitfire floatplane was, however, revived in 1942, and three Mk Vs (this time with specially designed floats) were formed into a section and operated in the Mediterranean. A Mk III Spitfire was built, as a private venture, with a two-stage Merlin 20 and cropped wing-tips, and two Mk Is were modified at Farnborough for high-altitude photo reconnaissance.

One of the most famous variants of all was the Mk V—first-string of Fighter Command in 1941 and 1942. Tropicalized versions of the V served extensively abroad and it was a Mk V which was first adapted to take a Rolls-Royce Griffon in 1941. This was originally called Spitfire IV, though the mark number was later changed to XX to avoid confusion with the P.R.IV. The Mk VI was a long-span high-altitude version of the Mk V, hastily improvised to tackle Ju 86P nuisance raiders, and it was, incidentally, the first British fighter to have a pressurized cockpit. An even higher-flyer was the Mk VII, with Merlin 61. The Mk VIII was virtually an unpressurized version of the VII and it appeared after, perhaps, the most successful Spitfire of all—the Mk IX. This was Britain's considered reply to the Fw 190 and 5,609 examples were built. The pressurized Mk X was a P.R. development of 1944—far less common, this, than the Mk XI.

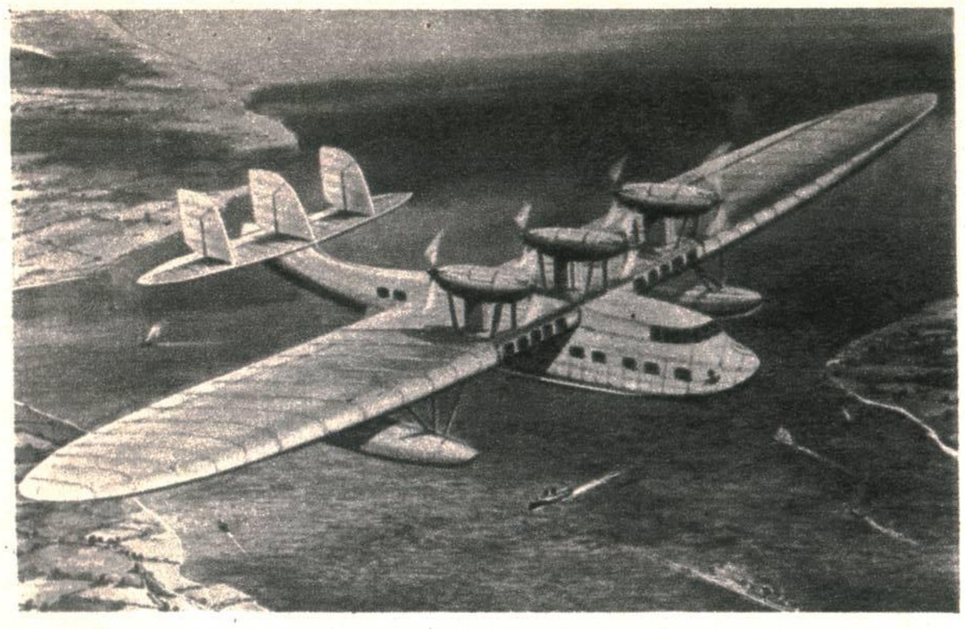
As in the frozen heights so at "deck-level" did the "Spit" achieve supremacy. Thus, to counter low-flying tip-and-run fighter/bombers a hundred strengthened Mk V airframes were fitted with Griffon III low-altitude engines, the resulting machines being designated Spitfire XII. For low-level photographic reconnaissance there was the Mk XIII.

When the Griffon became available in quantity the Spitfire XVIII was designed for that magnificent engine; so urgent was the need for such a fighter, however, that an interim type, the Mk XIV, was evolved. Mks XV and XVII did not materialize.

The Mk XVI was a version of the IX with the American Packard-built Merlin. Over 1,000 were built at Castle Bromwich. The Mk XVIII resembled the XIV, but had strengthened wings and increased tankage, and the P.R.XIX had "Bowser" wings and a Universal camera installation. Last of the great line of wartime Spitfires were the 21 and 22. They were distinguished by a wing of completely new design and of greater strength and area, and some examples had six-blade Rotol counter-rotating airscrews. There was no Spitfire 23 and the 24 was a strengthened 22.

Should the more studious reader seek first-hand enlightenment regarding this evolutionary complex, he is commended to a paper delivered by Mr. J. Smith before the Royal Aeronautical Society on December 19th, 1946, and paraphrased in *Flight* a week later. Therein, too, he may trace the lineage of the Seafire, which was to the Fleet Air Arm what the Spitfire was to the R.A.F. Briefly, this was the way of its development:

The prototype Seafire was really a "hooked" Spitfire, but the production Mk I had catapult spools in addition. The Mk II was similar, though with two 20-mm guns and four .303in guns instead of the 8 × .303 armament; and the Mk III had folding



Impression of the six-engined flying-boat project of 1930.



Seafires and a Sea Otter aboard H.M.S. "Vengeance."

wings. Next came the Mk XV, with Griffon engine; then the Mk XVII, with rear-view canopy and sting-type arrester hook. The Mk XVIII had an engine change and the Mk 45 was really a Naval version of the Spitfire 21. A rear-view hood characterized the Mk 46, and the 47 (which, like some 46s, used contra-rotating airscrews) had folding wings and other improvements.

The main volume of Spitfire and Seafire experimental flying was the responsibility of Supermarine's Experimental Flight Test Department at Worthy Down, and later at High Post. Here as many as 30 aircraft, engaged on various forms of experimental flight-test work, were sometimes to be seen together.

Space does not allow a detailed citation of the war record of the Sea Otter and Walrus, though this was a fine one, as many a ditched crew-man will bear enthusiastic testimony. It would, of course, be an overstatement to assert that the Sea Otter was a lineal descendant of Pemberton Billing's P.B.1; but it is certainly true to say that this machine (and, for that matter, the later Seagull monoplane also) can trace its ancestry directly back to the old A.D. boat and biplane Seagull.

Affectionately known to all at Supermarines as "Dumbo," and built to Air Ministry Specification S.24/37, a torpedo/bomber/reconnaissance machine was tested during 1943, completion of the two prototypes having been delayed by Spitfire and Seafire development and production. The most remarkable feature of this wooden monoplane was a variable-incidence wing, from which a wealth of flight data—invaluable in the development of the Seagull monoplane—was forthcoming.

Though diving tests had shown that the Spitfire possessed remarkably good Mach number characteristics, it was considered that a new wing would be advantageous. Thus the Spiteful was created—a strikingly handsome machine, though lacking some of the Spitfire's daintiness. It used a deeper, stiffer fuselage, conferring improved pilot-vision and—of greater importance—incorporated a tapered, laminar-flow wing.

Production of the Spiteful was in hand when the war ended, but the type never saw active service, nor indeed was it ever issued to a squadron. It made its mark, however, in 1947, by achieving 494 m.p.h. on the level—the highest speed recorded under such circumstances by a piston-engined machine in this country, or possibly in the world. The Seafang was the Naval version, almost identical in appearance.

So promising were the high-speed qualities of the Spiteful that Specification E.10/44 was issued for a Nene-turbojet fighter to use a similar wing. The first flight of this projectile-like machine was made by Jeffrey Quill in July, 1946. Two further examples were built to Specification E.1/45 and flown in 1947, and, after searching trials with these, the Attacker (as the new type was eventually named) was ordered for service with the Royal Navy. Equipment of the first squadron began in August, 1951—some 3½ years after M. J. Lithgow (who was appointed chief test pilot during 1948) had taken the first prototype round a 100-km closed-circuit at the record speed of 564.881 m.p.h.

Post-war development was not concerned with jet fighters alone; an appealing two-seater trainer variant of the Spitfire was developed, and the Sea Otter was converted for civil use. Both types were exported. Intended to succeed the "Otter" in the Naval air/sea rescue rôle (though helicopters eventually took over the commitment), the Seagull monoplane amphibian was test-flown in 1948. Griffon-powered, it embodied a variable-incidence wing and demonstrated the remarkable speed range of 54-260 m.p.h.

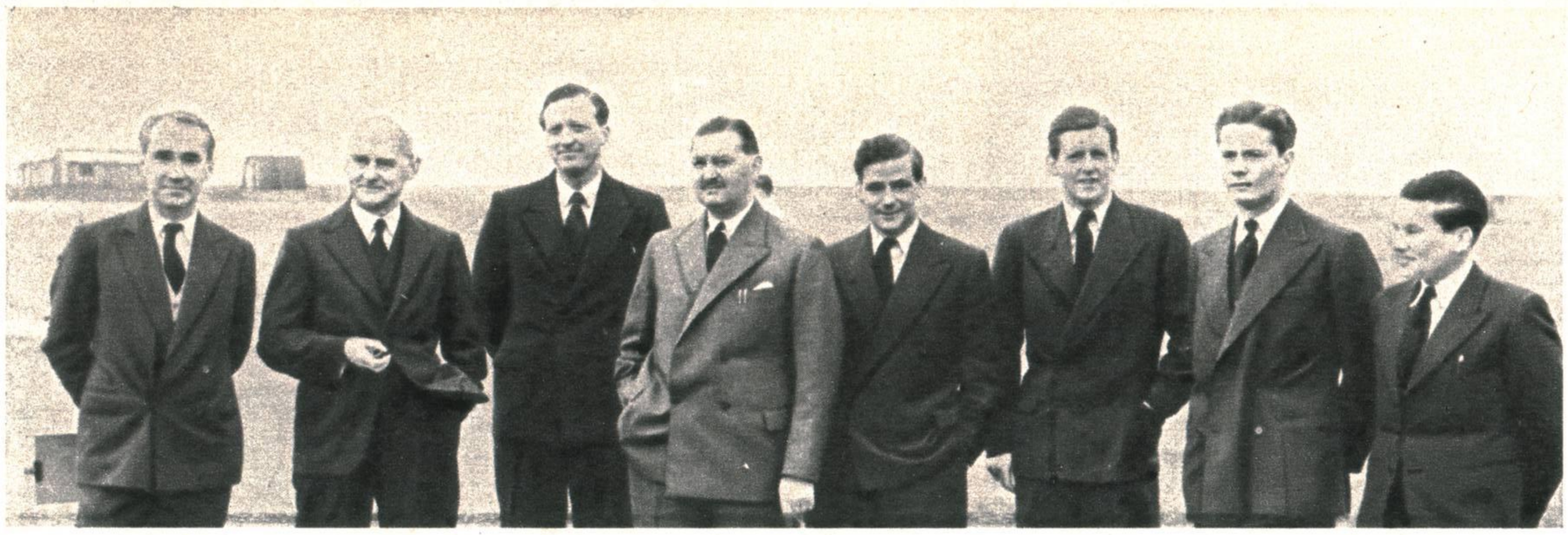
In 1950, L. R. Colquhoun, flying a Seagull, set up a 100-km closed-circuit record for amphibians at 241.9 m.p.h. This record still stands.

Not unnaturally, having regard to past achievements, jet fighters became the company's main line of business. It soon became clear that, efficient as was the Spiteful/Attacker wing, further increases in speed must be sought with the aid of sweepback, so new designs were put in hand and in December, 1948, a "swept Attacker," bearing Supermarine Type Number 510, took the air. In "navalized" form this was to become the first swept-wing fighter to land aboard an aircraft carrier. The date was November 8th, 1950, and the ship H.M.S. *Illustrious*. With an afterburner the 510 became the 528, and with a nosewheel undercarriage (in which form it appeared at the S.B.A.C. Display of 1950) the 535.

In the 535 is seen the last link in the chain before the 541, or Swift, the maiden flight of which took place on August 1st, 1951. Differing from its forerunner in having a Rolls-Royce Avon axial-flow unit in place of the centrifugal Nene, the first Swift was prevented by bad luck and a belly-landing (made by test pilot "Dave" Morgan, under the most creditable circumstances) from appearing in the S.B.A.C. Display of 1951; thus, it could not be compared with its rival, the Hawker P.1067—now famous as the

Spitfire IXs operating from a newly occupied airfield in the Naples area.





Seen on the occasion of the visit of His Royal Highness the Duke of Edinburgh to the Supermarine airfield at Chilbolton earlier this year are, left to right: Jeffrey Quill, O.B.E., A.F.C. (chief liaison officer); J. Smith, C.B.E., F.R.Ae.S., A.M.I.Mech.E. (chief designer); M. J. Lithgow (chief test pilot); S. P. Woodley, M.B.E. (superintendent, Supermarine Works); and test pilots L. R. Colquhoun, G.M., D.F.C., D.F.M., D. W. Morgan, G. J. Horne and J. W. C. Judge.

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Hunter. Some months earlier, however, an order was placed "off the board," and so it is that the first production Swifts are now about to enter service with the R.A.F.

With its supersonic capabilities, an armament of four 30-mm cannon and obviously large fuel stowage, the Swift is the sort of machine that pilots of Fighter Command have pined for too long. The signs are that it will prove itself a second Spitfire—and could anything augur better for the Command and for Supermarine?

Born in salty air, Supermarines are staunch supporters of the Royal Navy, and development on behalf of that Service has not ceased with the Attacker, for this April brought news of a substantial order for carrier-based fighters "developed from the Type 508." The first 508—a straight-wing single-seater with two Avons—appeared at the S.B.A.C. Display of 1951, and, restricted in speed though it then was, it showed phenomenal climbing powers. The second example—Type 529—has since been flown, but appears to differ little from the first. Production versions will have swept surfaces, and from this advantage, in concert with two high-thrust Avons, another great Supermarine fighter must surely result.

Our last word, for the present, is for the Swift F.4, positioned as we write in North Africa for an assault on the 727-m.p.h. record of its formidable rival, the Hunter. Whatever the outcome of this sporting venture, "Joe" Smith can be sure of one thing: that his old chief, R. J. Mitchell, would have been well pleased. The Swift is his sort of aeroplane.

Swift F.4, holder of the London-Paris record—212.5 miles in 19 min 5.6 sec (669.3 m.p.h.).

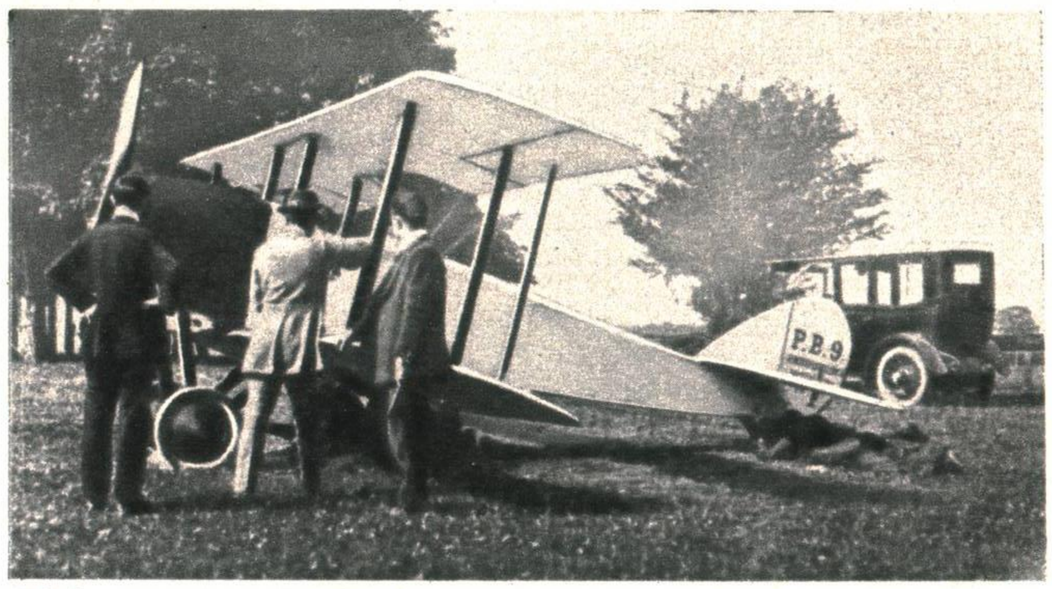


SIRES OF THE SWIFT

PART II: THE FAMILY ALBUM

HAVING traced the growth of Supermarine, and placed the company's products and achievements in chronological order insofar as this has proved practicable, it remains to give some more detailed description of the aircraft types and certain of their variants. (It must be recognized, of course, that variations on the Spitfire theme alone could easily fill the entire space at our disposal.)

As we have seen, a number of designs underwent a lengthy period of development, and sub-types of these appeared at long or short intervals over many years—often interspersed with totally new machines. To enable the development of a particular design to be more readily followed, therefore, it seems convenient to group the various types according to period or class. The fact that the Navyplane, Sparrow and Dumbo do not fall into any of the six main categories is further indication of Supermarine versatility.

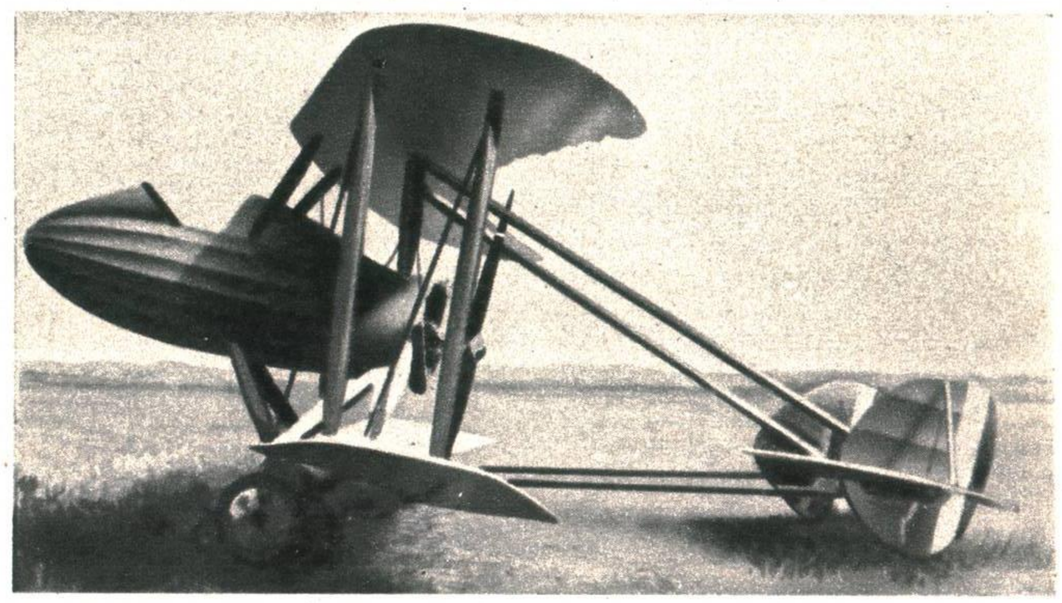


P.B.9.

The P.B. Days

P.B.I.—When this little tractor flying-boat was shown at Olympia in 1914 *Flight* remarked that it differed radically from any machine of the type hitherto turned out in this or any other country. A cleanly installed 50 h.p. Gnome drove a three-blade tractor airscrew, and the outboard stabilizing floats were sprung to adapt themselves to undulations of the water. The pilot's seat, behind the wings, was quickly detachable so that in case of accident the pilot could throw it overboard. We read that "as it possesses sufficient buoyancy to keep a man afloat, it serves the purpose of the lifebelt frequently worn by pilots of waterplanes." Construction of the cigar-shaped hull was ingenious: the upper part consisted of two layers of spruce and the thickness of the lower portion was carefully proportioned according to the loads imposed upon it. The step formed a separate structure, riveted to the main hull. The P.B.1 was never flown.

P.B.9.—The only engine available when this tiny biplane scout (the "Seven-Day Bus") was built soon after the outbreak of war in 1914 was an old 50 h.p. Gnome, which is said to have developed no more than 18 h.p. on the bench. Yet the machine attained 78 m.p.h. and climbed at over 500ft/min. Until the time that the R.N.A.S. became part of the R.A.F. it was serving as a trainer at Hendon.

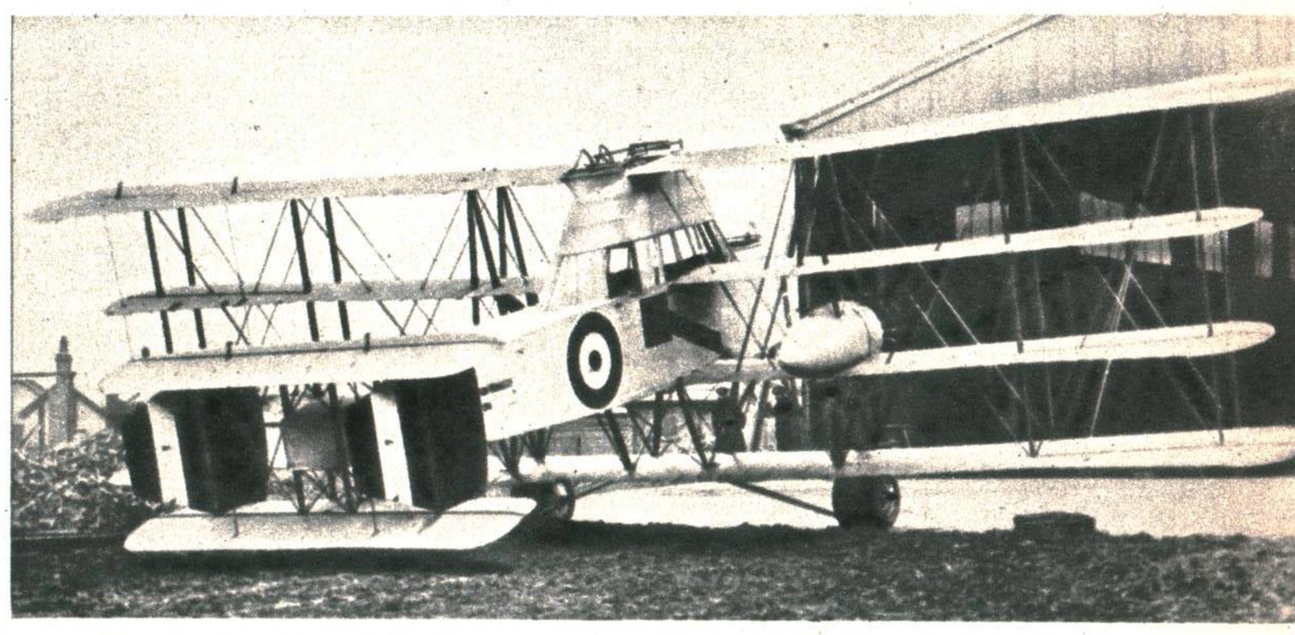


Push Proj.

Push Proj.—Originally built with straight wings, this little pusher scout later had sweepback. The engine was a 100 h.p. Monosoupape, the armament a Lewis gun, and the speed 98 m.p.h.

Night Hawk.—Best described as a "patrol fighter", the Night Hawk was a massive quadruplane, built for the R.N.A.S. and powered with two 90 h.p. Austro-Daimler engines fitted with silencers. A Davis recoilless gun firing a 1 lb shell was fitted in the uppermost position, and four machine guns were disposed round the fuselage. Equipment included a searchlight and incendiary flares, carried in a revolving chamber, which enabled them to be dropped in a stick across a Zeppelin. Two Night Hawks were built—the first in seven weeks from commencement of design.

Night Hawk.



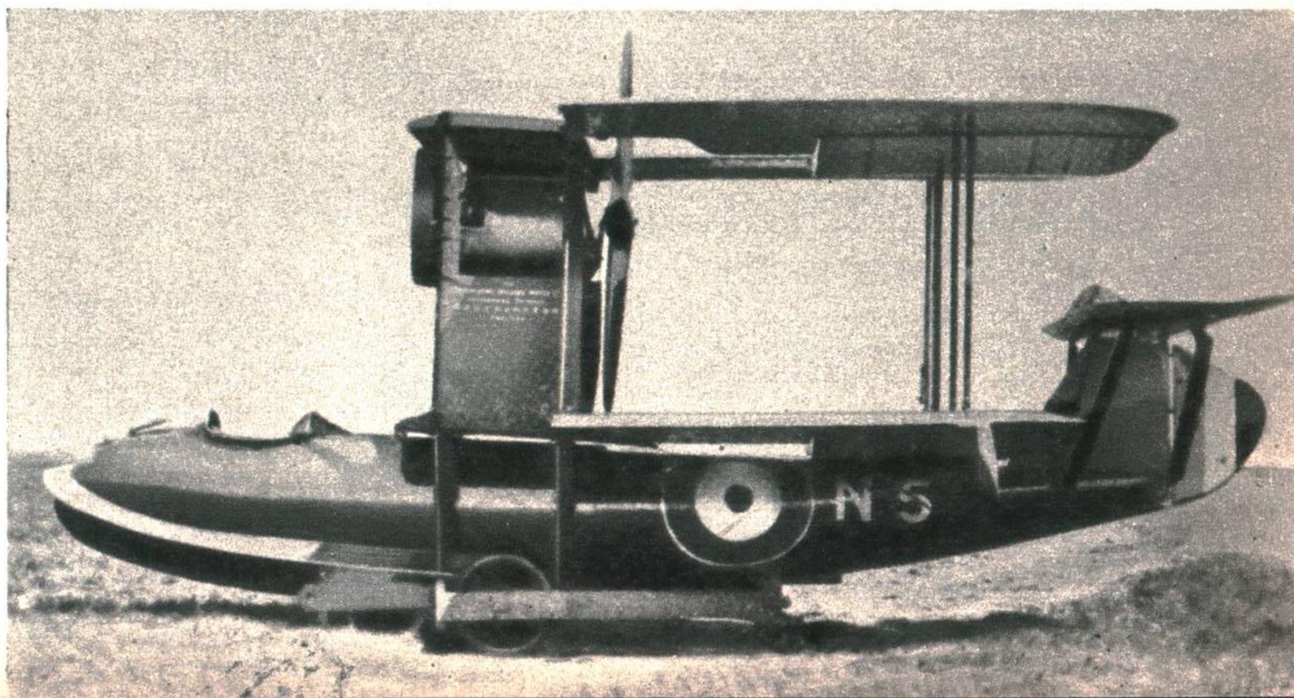
Amphibians and Little Boats

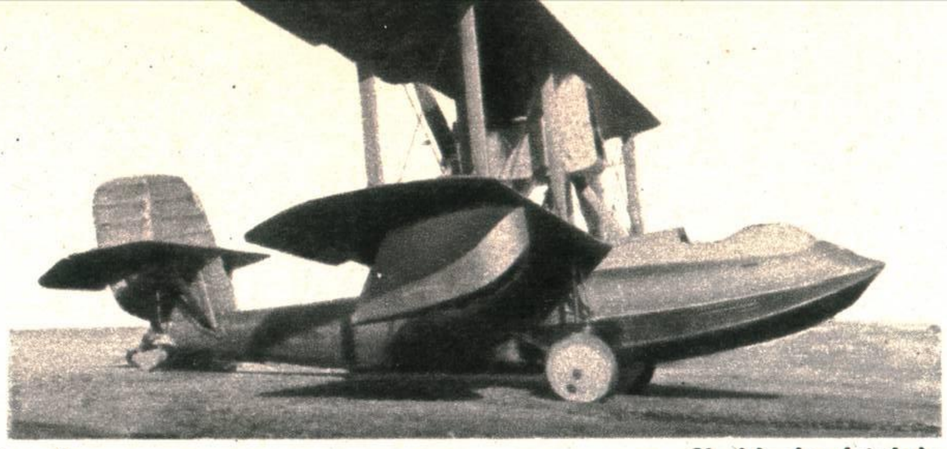
A.D. Boat.—This pusher flying-boat was sponsored by the Admiralty and, though the letters A.D. are said to connote "Admiralty design," the whole machine, with the exception of the hull, was redesigned by Supermarine. Built on the Linton Hope "flexible" system of construction, the hull accommodated a crew of two, one of whom had a Lewis gun. The 200 h.p. Suiza engine had fuel for 4½ hr and the service load included wireless. Jettisonable wheels were fitted for taking off from land or ship launching-platforms, and a curious feature was the biplane tail, with reverse camber on the upper plane. The lower mainplane was watertight, as it was largely submerged when taxying. Span was 50ft 4in and length 30ft.

Baby (N.1B).—The Baby was Supermarine's first single-seat fighter flying-boat and it was built to Admiralty requirements. The wings, of 30ft 6in span, were arranged to fold for shipboard stowage, and the engine was a Hispano-Suiza of 150 or 200 h.p. With the former a top speed of 117 m.p.h. was attainable. Flying at its gross weight of 2,326 lb the Baby was highly manoeuvrable, and there is a record of it having been looped twice during February, 1918. The pilot had an excellent fighting view and was armed with a single Lewis gun.

Sea King.—Slightly larger than the Baby, this amphibian was built in two forms—the Sea King I, having a 160 h.p. Beardmore engine, and the Mk II with a 300 h.p. Hispano Suiza. The first was shown at Olympia in 1920 and on that occasion a speed range of 59 to 110 m.p.h. was claimed. *Flight* described the Mk II in detail during April, 1922. It was remarked that the machine should have a performance equal, or nearly so, to that of a land machine of the same power; thus the Sea King may be considered as the S.R./A.1 of its day. It could be looped, rolled and

Baby (N.1B).

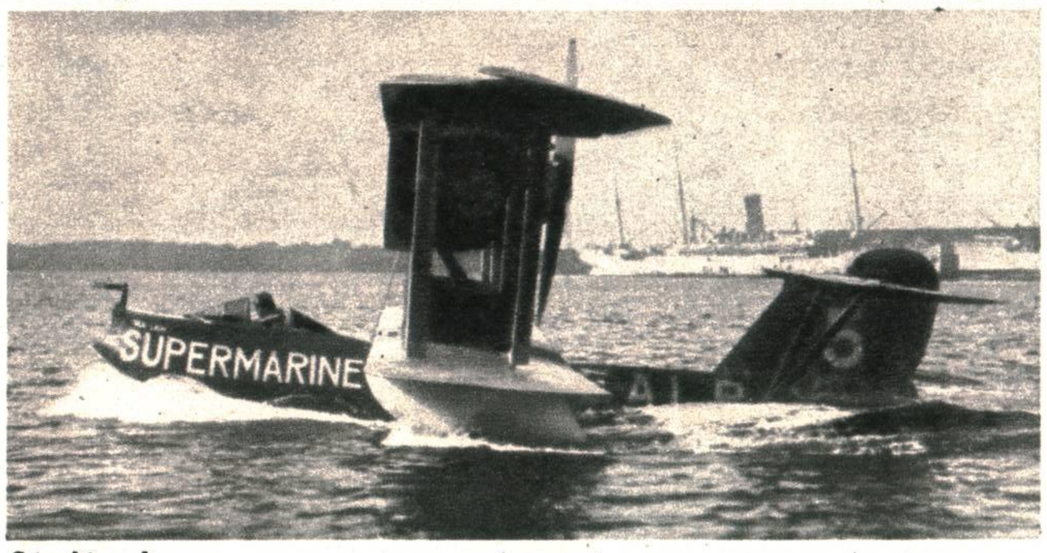




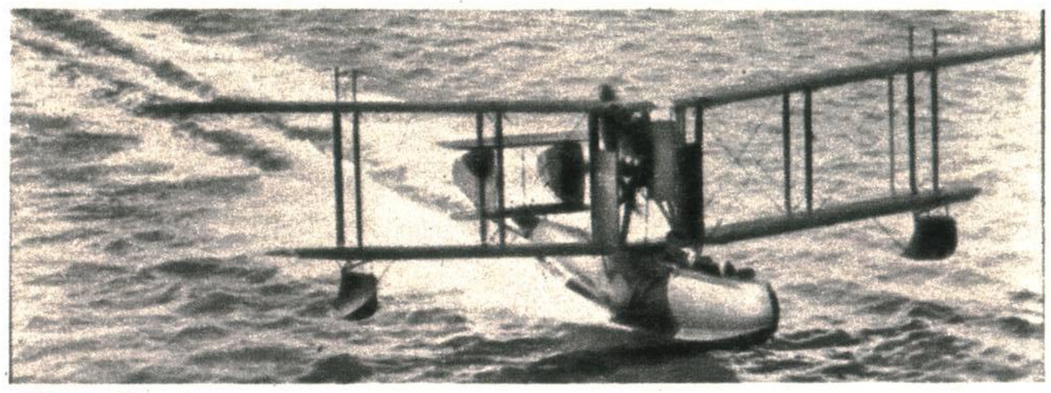
Sea King II.



Sheldrake (right).



Sea Lion I.



Channel.



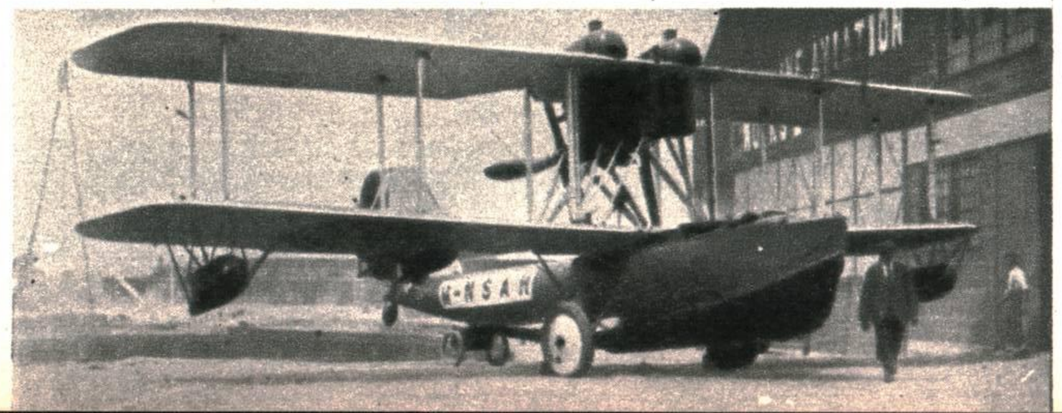
Competition amphibian.



Seagull III.



Above, Sea Eagle. Below, Scarab.



SIRES OF THE SWIFT . . .

spun with impunity, and was armed with a Lewis gun. The span was 32ft and the gross weight 2,850 lb.

Channel.—A post-war development of the A.D. boat, the Channel was laid out for commercial operation, carrying a pilot and three passengers. The engine of the Mk I machine was a 160 h.p. Beardmore, but the Channel II had a 240 h.p. Siddeley Puma and a redesigned step for cleaner running. Span and length were 50ft 4in and 30ft respectively, and the wings were arranged to fold forwards. Military versions were developed for various foreign governments. That supplied to Chile was, according to a contemporary account, "fitted with dual controls, the latest and most up-to-date wireless telegraphy and telephony sets, bomb-dropping gear for practice with dummy bombs, and a machine gun mounted in the nose."

Seal and Seagull Biplanes.—These were not distinct types, but versions of the same airframe. The characteristic Supermarine circular-section hull was retained but the Napier Lion engine drove a tractor, instead of a pusher, airscrew. There were two marks of Seal and four of the Seagull (not including the Seagull V, which eventually became the Walrus). The Seagull II differed from the Mk I in tankage arrangements and other details, and the Seagull III, which was produced in quantity for the R.A.F. and the R.A.A.F., carried all its fuel beneath the top centre-section. The Mk IV was an experimental machine fitted with Handley Page slots and flaps and twin rudders.

Sea Lion.—There were three marks of the Sea Lion, the first of which was a cleaned-up Sea King with a Lion engine and with the undercarriage removed. The Mk II—a development for the 1922 Schneider Race, in which it was victorious—differed in having a redesigned bow, fin and rudder, and the Mk III, which, in racing trim, achieved a maximum speed of 175 m.p.h., was distinguished by clipped wings, revised engine cowling and modified hull. A feature of the Sea Lion design (and, for that matter, of the Sea King also) was the ease of engine maintenance; the wing and engine mounting could be removed from the hull by releasing eight bolts.

Competition Amphibian.—For the Air Ministry's competition for commercial amphibians held during September, 1920, Supermarine entered a biplane powered with a 360 h.p. Rolls-Royce Eagle VIII, which drove a pusher propeller. The planing surfaces were larger than those of the Channel and the bows of the hull more pointed, resembling those of the Sea King. The wings did not fold. Two passengers were seated forward of the pilot, under a hinged "conservatory" roof. The pilot had a short tiller, by means of which he could steer the craft while standing up in the cockpit.

Sea Eagle.—This was another commercial amphibian, with a Rolls-Royce Eagle IX driving a pusher propeller. It was, however,

Walrus.

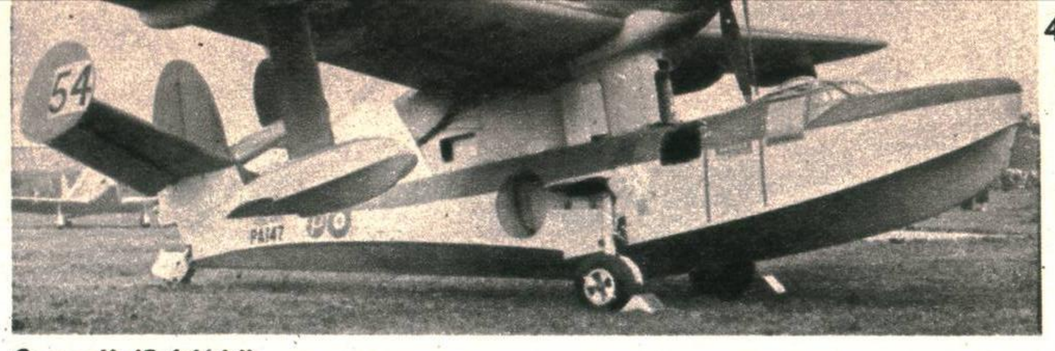


Seamew.





Sea Otter.



Seagull (S.14/44).

more commodious than the Competition amphibian, having seats for a pilot and six passengers. With that load fuel for 230 miles was normally carried, though the range could be extended by reducing the number of passengers. The maximum speed was 93 m.p.h., cruising speed 84 m.p.h. and landing speed 50 m.p.h.

Scarab.—A military development of the Sea Eagle, the Scarab was an amphibian bomber/reconnaissance type built for the Spanish Government. It was claimed for this craft, and for the Sea Eagle, that it was practically impossible to ship water over the cockpits. A water rudder allowed the machine to be turned on a radius of one span. There were carriers beneath the wings for a bomb load of up to 1,000 lb.

Sheldrake.—This was a little-known Supermarine type of 1927 (indeed, it seems already to have been forgotten by the makers themselves), and, as the *Flight* photographs suggests, was an experimental development of the Seagull, with revised hull lines. The engine was a Lion V.

Seamew.—Resembling a "baby Southampton", this amphibian was powered with two Armstrong Siddeley Lynx geared engines and was intended for reconnaissance. It carried a crew of three and had Scarff mountings for two Lewis guns. The hull was of wood and the span the same as that of the Walrus, i.e., 46ft.

Walrus.—Originally known as the Seagull V, this very famous pusher amphibian was powered with a Bristol Pegasus engine A private venture, it was designed for use on capital ships and was accordingly fitted with catapult gear. In Australian service the name Seagull V was retained and, though Walrus was the official R.A.F. name, "Shagbat" was an equally common appellation. The wings of the Mk I were of composite construction, with metal spars, wooden ribs and fabric covering, and the hull was of metal. The Mk II, built by Saunders-Roe, had a wooden hull.

Sea Otter.—Designed as a successor to the Walrus, the Sea Otter was powered with a Bristol Mercury 30 engine, driving a tractor airscrew. Construction was mixed, the hull being of metal and the fabric-covered wings having metal spars and wooden ribs; the tailplane was plywood-covered. The two main fuel tanks were in the inboard sections of the upper wings, and additional fuel could be carried in the hull. The crew numbered three or four, and the armament was three Vickers "K" guns.

Seagull S.14/44.—The Seagull monoplane of 1948 was vastly different from the original craft of that name. Intended as a replacement for the Walrus and Sea Otter, it was a parasol monoplane with high-lift, variable-incidence wing, developed from that of the S.24/37 Dumbo torpedo/bomber. The speed range of 4.81:1 was achieved with the aid of electrically operated leading-edge slats and slotted trailing-edge flaps, the outer portions of which were double-slotted. Although the Seagull weighed 200 lb more than the Southampton, it measured only 50ft 6in in span, whereas the "Soton" spanned 75ft and was, into the bargain, a biplane.

Big Boats

Swan.—The Swan was the first twin-engined flying-boat built by Supermarines, a previous project for a small three-seater twin around 1919 having been shelved. It had high, flared bows, as had the Sea Eagle, and the pilot sat in a raised "deckhouse" above the lower centre-section. Both Rolls-Royce Eagle and Napier Lion engines were fitted. The civil version carried ten passengers, with baggage, for 300 miles. It weighed 13,700 lb and had a cruising speed of 92 m.p.h.

Southampton I, II and III. — The first three marks of Southampton may be defined as: I, wooden hull, Lion engines; II, metal hull, Lion engines; III, metal hull, geared Jupiter engines. The crew numbered five—two pilots, a navigator/bomb-aimer and two gunners. The duralumin hull of the Mark II was anodically treated against corrosion and the basic structure was 540 lb lighter than that of the Mk I. Elimination of water seepage permitted a further 400 lb of fuel to be carried and increased the range from 680 miles to nearly 900 miles. During 1932 two Southampton airframes were converted to take steam-cooled Rolls-Royce Kestrels; these were not, however, known as Mk IVs, that designation being reserved for the redesigned machine later known as the Scapa.

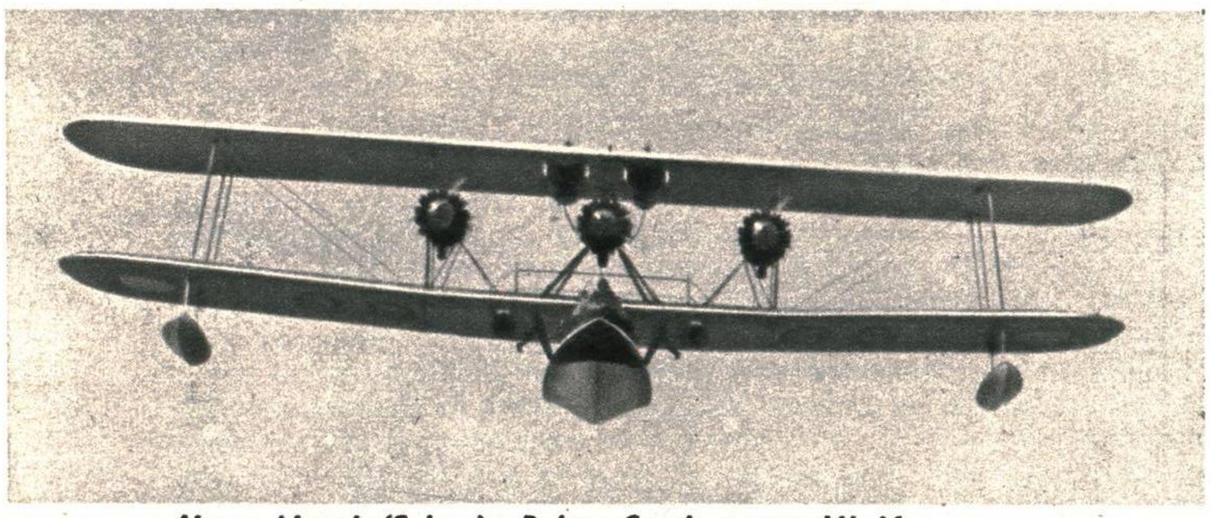
Nanok (Solent).—The hull and tail of this machine were similar to those of the Southampton, but the wing cellule was considerably different and carried three Armstrong Siddeley Jaguars mid-way between the wings. Built as a torpedo carrier for the Danish Navy, it was not taken up by that Service when it was realized that, having regard to the size of the aircraft, manœuvrability was insufficient for such a hazardous role. The Nanok was accordingly converted for service as a private air yacht and renamed the Solent.

Air Yacht.—The Solent rendered such satisfactory service when used as an air yacht by the Hon. A. E. Guinness that the same gentleman ordered this special monoplane boat, again with three Jaguar engines. Apart from the monoplane wing the most striking feature of the machine was the use of sponsons instead of lateral stabilizing floats. The Air Yacht was metal-constructed and had fabric-covered wings. For various reasons the machine was overweight and it was finally sold to a new owner and sent to the south of France, where it was wrecked in a storm.

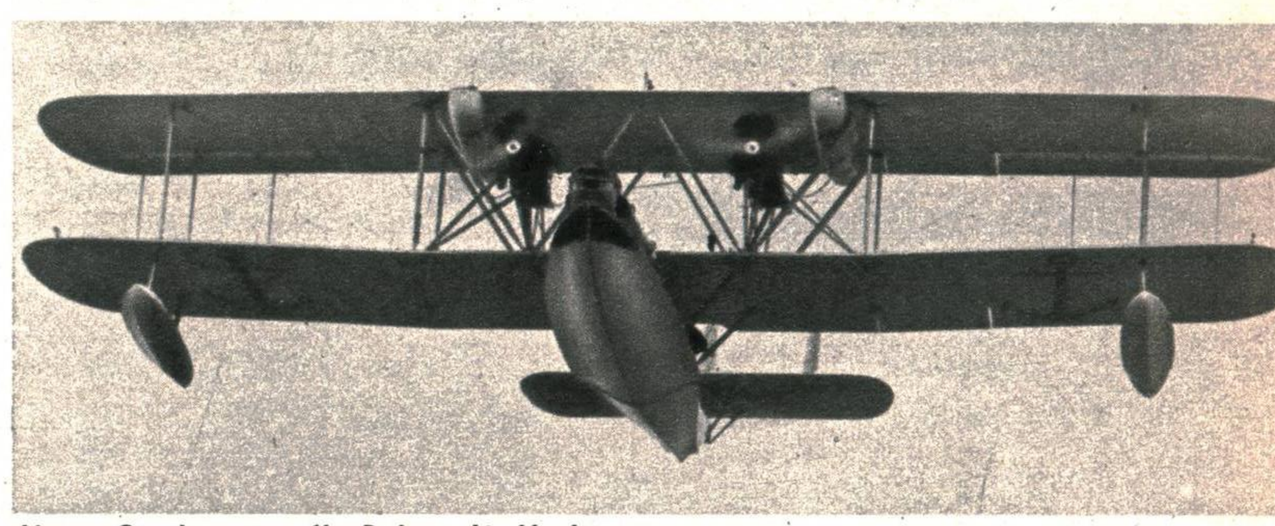
Scapa.—Originally designed Southampton IV, the Scapa had two Rolls-Royce Kestrel medium-supercharged engines mounted snug beneath the upper mainplanes. Compared with the hull of the Southampton, that of the Scapa was relatively straight-sided and of considerably greater capacity. The cockpit was enclosed (one Southampton II had been experimentally fitted with an enclosure) and there were three gun positions. The loaded weight was 16,050 lb and the maximum speed 142 m.p.h.

Southampton X.—Originally powered with three Panthers, this type subsequently had three Jupiters. It bore little or no resemblance to any preceding Southampton, being in the first place a sesquiplane, and having a flat-sided hull with stainless steel plating below the waterline. This was another of the Supermarine boats which proved somewhat heavy and the Southampton X never saw service.

Stranraer.—This was the last of the large Supermarine biplane

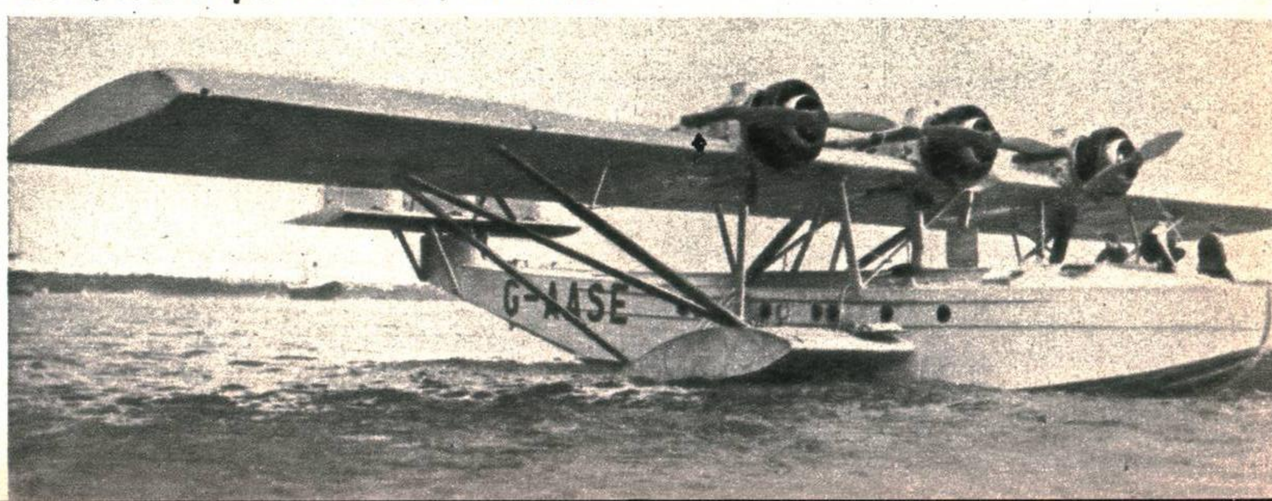


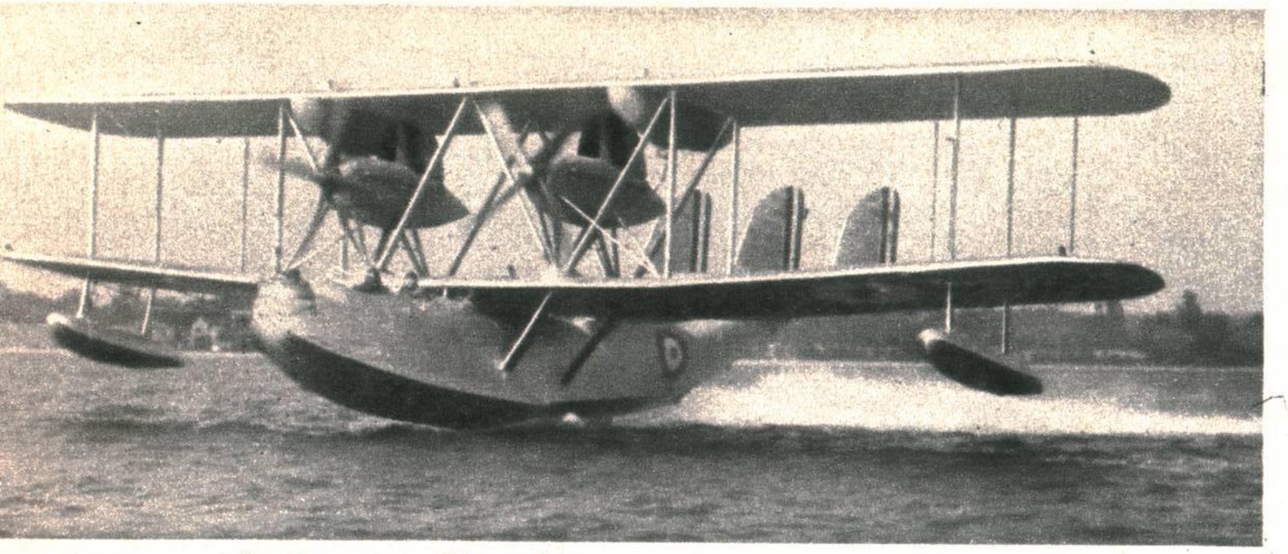
Above, Nanok (Solent). Below, Southampton Mk X.



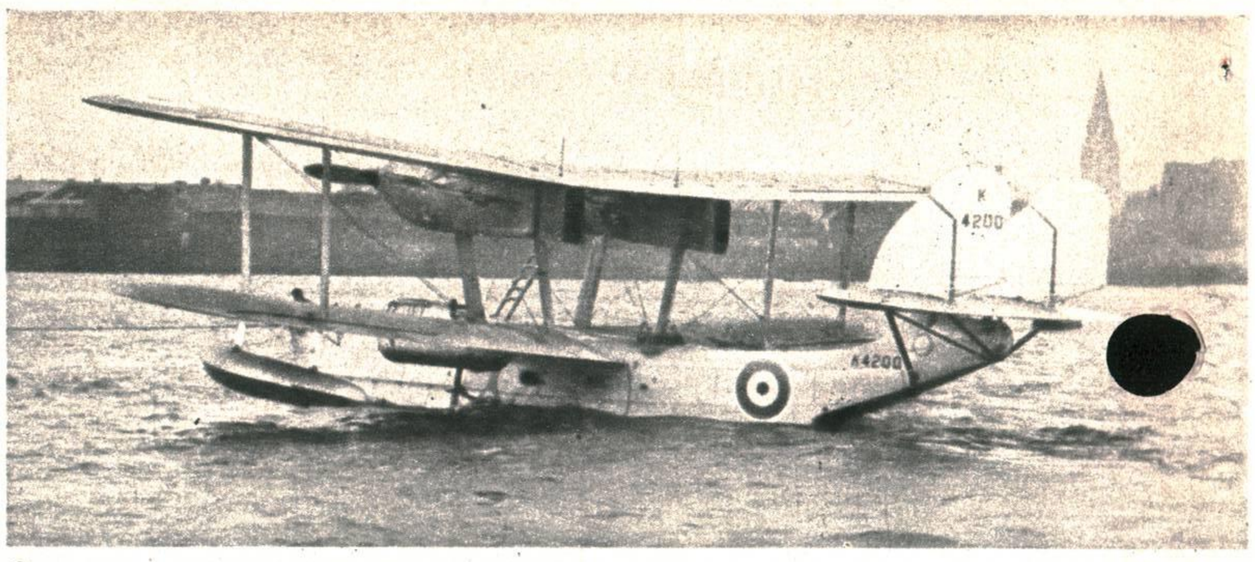
Above, Southampton II. Below, Air Yacht.



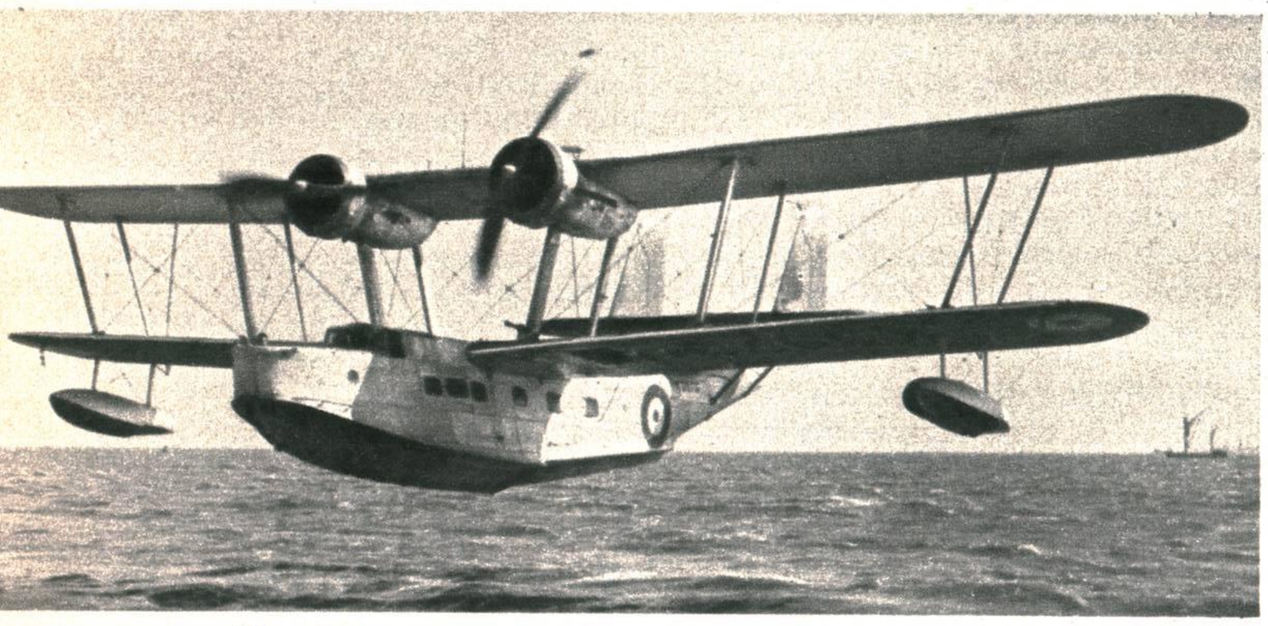




Southampton (Kestrels).



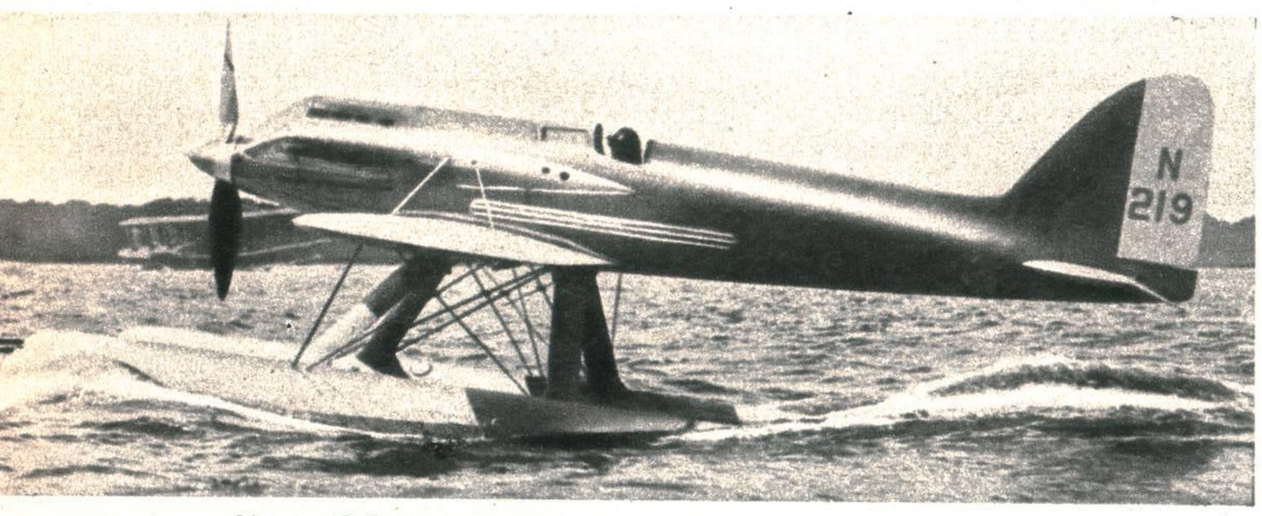
Scapa.



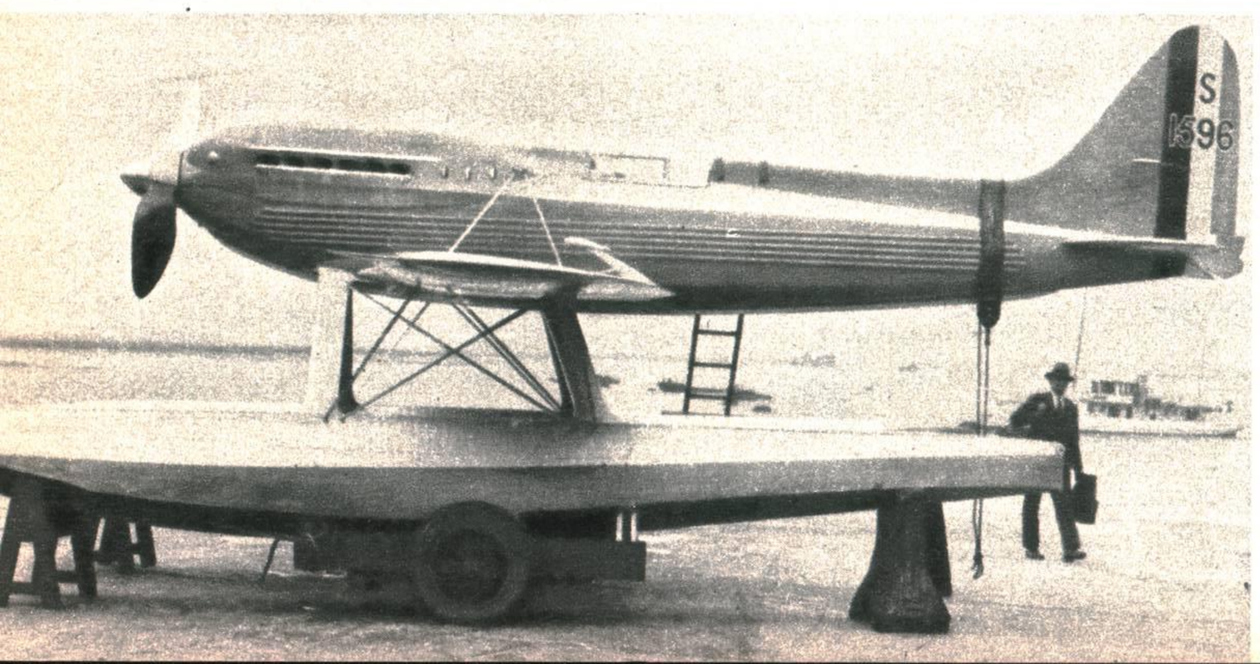
Stranraer.



S.4 of 1925.



Above, S.5.
Below, S.6B.



SIRES OF THE SWIFT . . .

flying-boats and was originally called Southampton Mk V. The hull was similar in design to that of the Scapa but larger, and had an additional gun position in the extreme stern. The wing structure had an extra bay. A feature was a self-contained slinging gear for engine changing, and provision was made for carrying a spare engine or torpedo on the lower centre-section. The span was 85ft, length 55ft, and gross weight 19,000 lb.

Supermarine's contemporary brochure avers: "The outstanding feature of this flying-boat is that the performance obtained during a series of extended service trials, whether in respect of speed, climb, ceiling or take-off, is unequalled by any other British flying-boat. All the specification requirements were exceeded by large margins. The severe test of flying with one engine stopped was easily accomplished."

Schneider Seaplanes

S.4.—This cantilever mid-wing monoplane racer was principally of wooden construction with three-ply covering taking a share of the stresses. Inboard of the ailerons were trailing-edge flaps which reduced the landing speed to about 90 m.p.h. (still decidedly "hot" for the period). The wooden floats were attached to the fuselage by four high-tensile tubes in streamline fairings and the direct-drive Napier Lion was cooled by two Lamblin radiators under the wing. A duralumin airscrew was fitted.

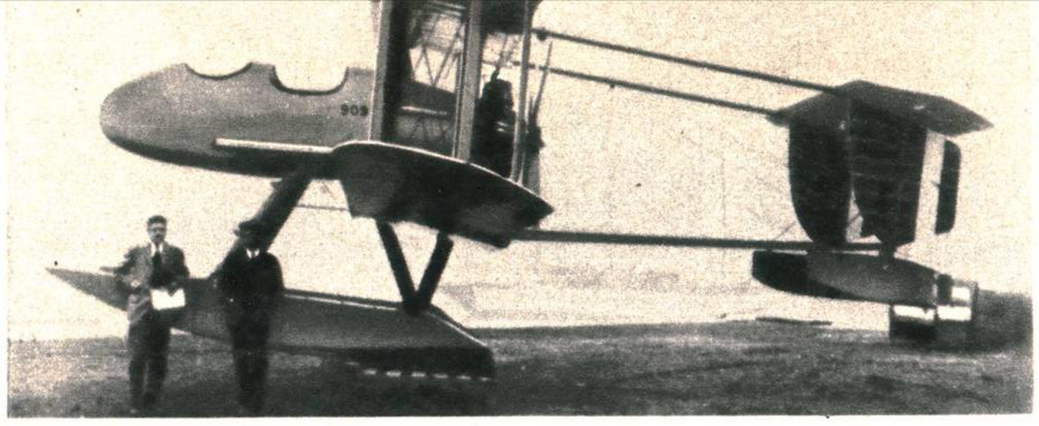
S.5.—Essential differences between the S.5 and the S.4 were that the S.5 had a low-set wire-braced wing, the fuselage and floats were of duralumin construction, and the cockpit was placed further forward. The special Lion engine gave a higher speed, 283.66 m.p.h. having been clocked over 100 km. Three examples of this extremely pretty little racer were built.

S.6.—Somewhat resembling the S.5, the S.6 was larger and heavier, having been built to take the Rolls-Royce R-Type engine, specially developed for racing; thus, the cowling lines were very different from those of the S.5. The radiators, as on the S.5, formed the wing covering and added no drag. Construction was all metal. Whereas the S.5 had a cantilever engine mounting, on the S.6 the front float struts were moved forward to provide a support. The oil tank was in the fin.

S.6A.—Two S.6s were modified to S.6As for the 1931 Schneider contest. They had new floats, giving improved water handling characteristics and carrying an increased fuel load. More cooling surface was added by utilizing the tops of the floats, and the control surfaces were mass-balanced. The gross weight was 5,250 lb and the wing loading 36.2 lb/sq ft.

S.6B.—The two 1931 Schneider Trophy S.6Bs had, like the S.6As, new and larger floats, wherein the fuel was redistributed to balance the torque of the more powerful Rolls-Royce R engine, especially at take-off. The entire upper and lower surfaces of the wings and the upper surfaces of the floats were used as water radiators, and the oil coolers down the sides of the fuselage were of improved type. Various components were strengthened.

Indicative of the problems attending the development of these historic racers is the curious point which arose in connection with the airscrews in 1931. The new screws produced by Faireys were of 8ft 6in diameter, as compared with 9ft 6in for the 1929 S.6. With these it proved impossible to take off, owing to the fact that at an early stage the machine swung violently to port, even with full starboard rudder. With the old 9ft 6in airscrews, however, take-off was easy—in fact, a great improvement owing to revised float design. Eventually 9ft 1½in airscrews were found to give satisfactory take-off, while with an 8ft 10in screw it was only just possible to get off under very favourable conditions.



Navyplane.



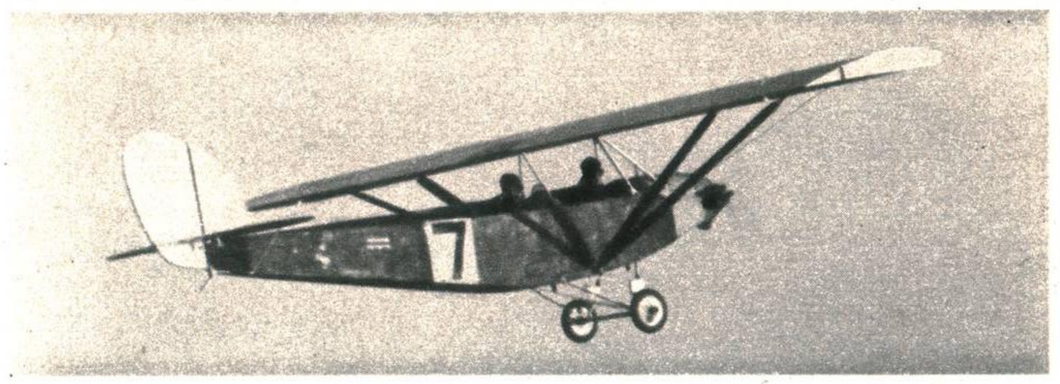
Sparrow sesquiplane.

Odd Three Out

Navyplane.—This twin-float pusher seaplane was sponsored by the Admiralty and was designed to take the Smith radial engine, which was not a success. A Bentley A.R.1 rotary was substituted for trials, conducted by Lt.-Cdr. John Seddon. The nose incorporated a glass screen to afford the best possible field of view for reconnaissance, and the observer was provided with wireless. The gun mounting was of the pivoted traversing type.

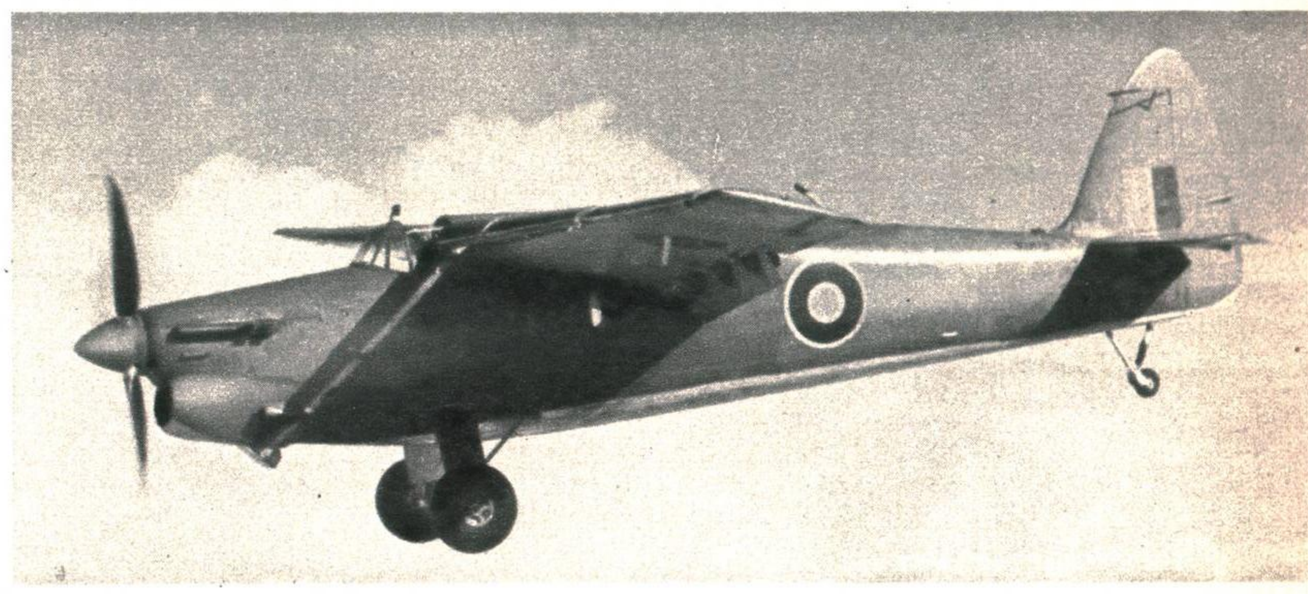
Sparrow.—The Sparrow lightplane, of 1924, was the first land machine to be built by Supermarines since the Pemberton Billing days. For the 1924 Lympne Competition it was arranged as a sesquiplane, the two wings being of different sections. The engine was the tiny Blackburne three-cylinder radial and the gross weight was under 900 lb. A speed range of 27-72 m.p.h. was claimed and the ceiling was 11,000ft. The 1926 version, seen on the right, was a parasol monoplane, fitted with a Bristol Cherub flat twin.

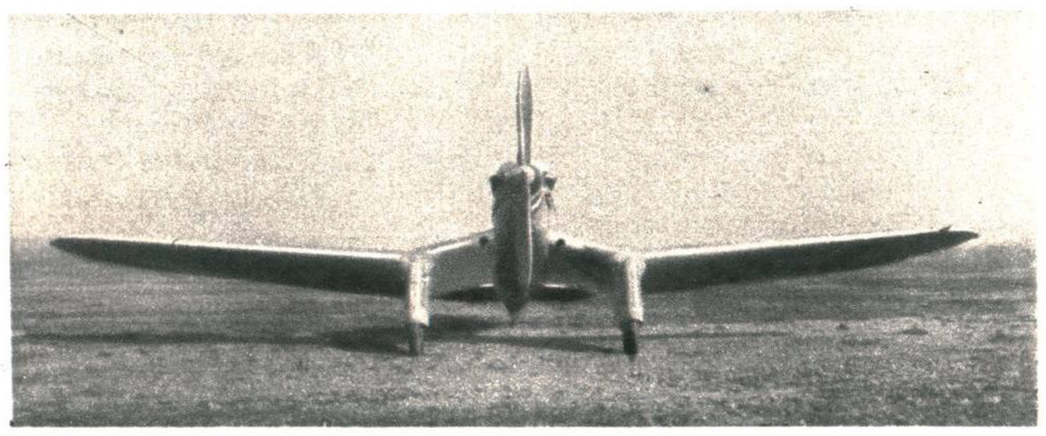
S.24/37 ("Dumbo").—This experimental deck-landing torpedo/bomber/reconnaissance aircraft bore the Supermarine Type Number 322. Two prototypes were built, the first with a Merlin 30 and the second with a Merlin 32. The most striking feature was the variable-incidence wing, pivoted on the main spar and electrically actuated. Additionally, there were Handley Page leading-edge slots, and the entire trailing edge was hinged. The fuselage was of wooden construction and a great deal of wood was also used in the wings. The gross weight was about 12,000 lb and the top speed nearly 280 m.p.h.



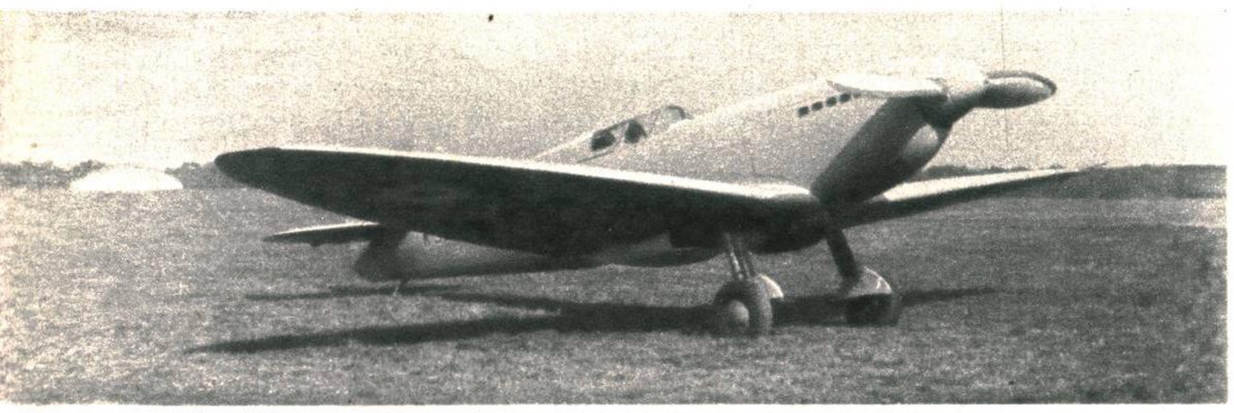
Sparrow monoplane.

S.24/37 ("Dumbo").

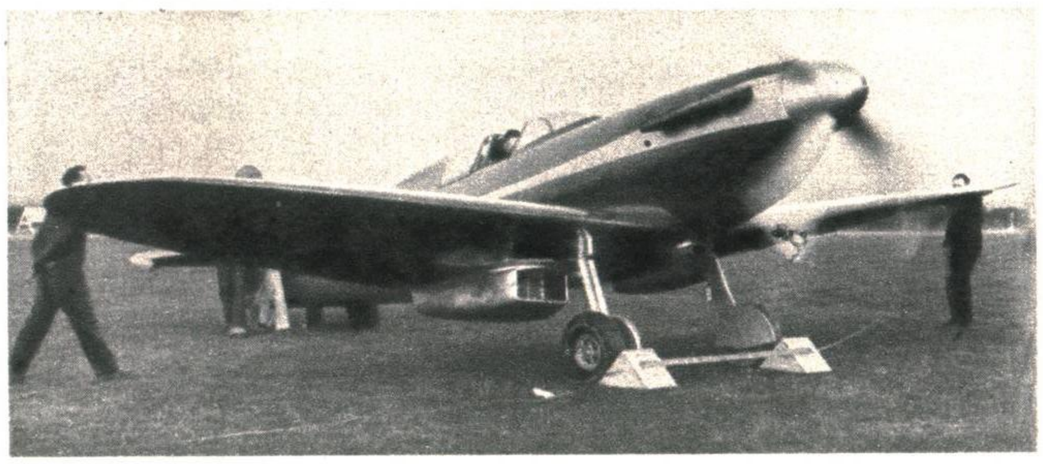




F.7/30 (Spitfire).



Spitfire I prototype.



Speed Spitfire.

Spitfire II.

Spitfire and Seafire

Spitfire I.—Production-type Mark Is differed from the original version of the prototype in having ejector exhausts, a tailwheel in place of the skid and numerous other small modifications. The Mk IA had eight 0.303in guns and the IB two 20 mm guns and four 0.303in guns. The original fixed-pitch wooden airscrew was replaced by a D.H. v.p. or c.p. three-blader.

Speed Spitfire.—This special machine was built in 1938 and had an experimental boosted Merlin. At one stage the massive underwing radiator was completely removed and the coolant was allowed to boil away. The tail skid was retained and the windscreen specially faired. When war came a standard Merlin was fitted.

Spitfire III.—In this experimental mark a Merlin XX engine drove a three-blade Rotol airscrew. The wing spar and undercarriage were strengthened and a larger radiator was necessary.

Spitfire IV (later Spitfire XX).—This was another experimental development, with a Griffon IIB engine, which flew during 1941. One version had provision for six 20 mm guns. To avoid confusion with the P.R.IV the designation was later changed to Spitfire XX.

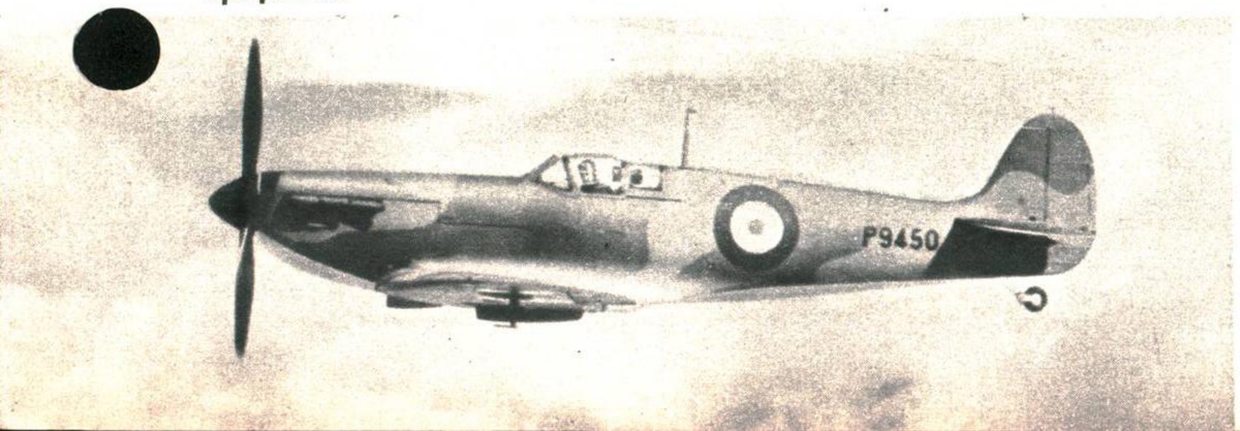
Spitfire P.R. IV.—A Merlin 45, large leading-edge tanks and a wing oil tank distinguished this unarmed photographic-reconnaissance version.

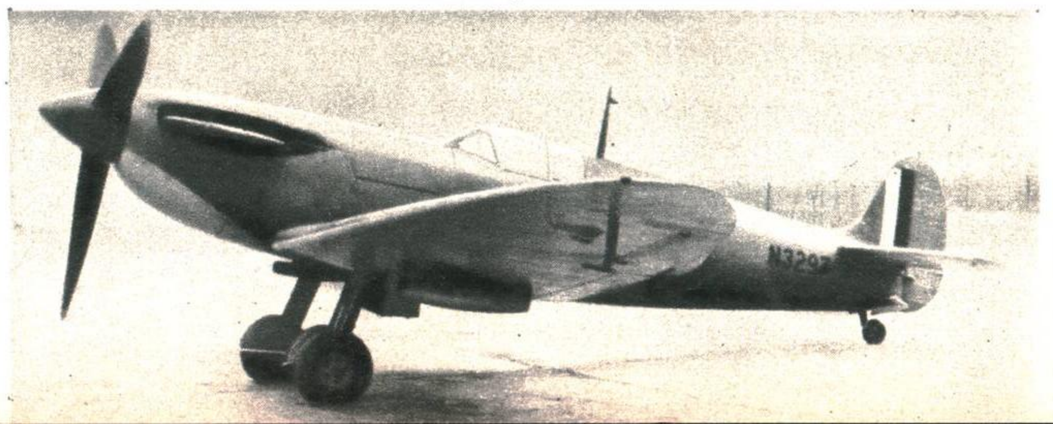
Spitfire V.—The engine of the Mk V was a Merlin 45, 46, 50, 50A, 55 or 56. The VA and VB corresponded in armament to the IA and IB, and the VC had universal-armament wings, later with provision for carrying two 250 lb bombs. Low-altitude versions had special Merlins and clipped wing-tips.

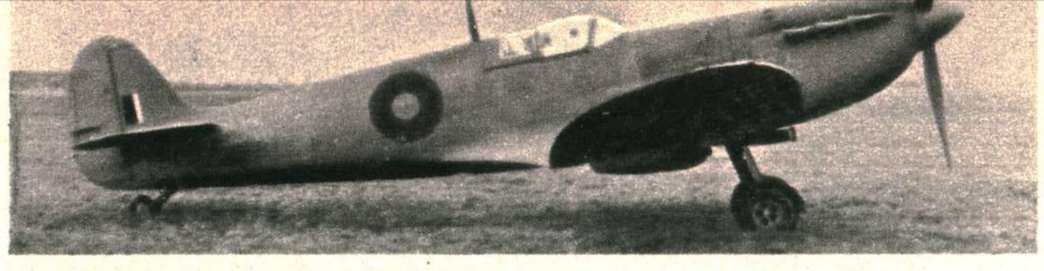
Spitfire VI.—The first British fighter with a pressure cabin, this machine had a wing span of 40ft 2in (the standard span was 36ft 10in) and a Rotol four-blade, constant-speed airscrew.

Spitfire VII.—A redesign of the Spitfire to take the Merlin 61 series engine, with two-stage supercharger. The wing-tips were extended to take full advantage of the power at altitude, and the tailwheel was retractable. Some Mk VIIs had deep-chord

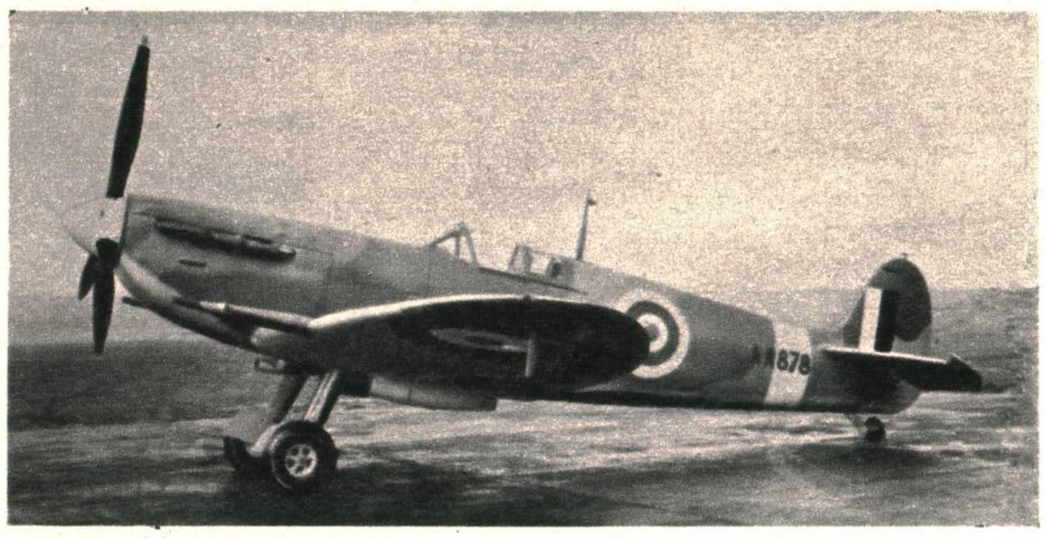
Spitfire III.







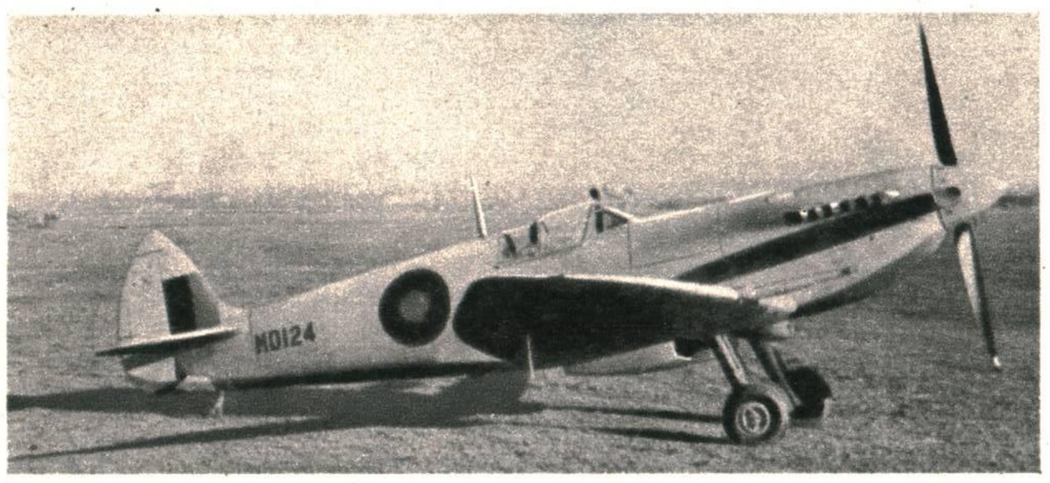
Spitfire IV.



Spitfire VC.



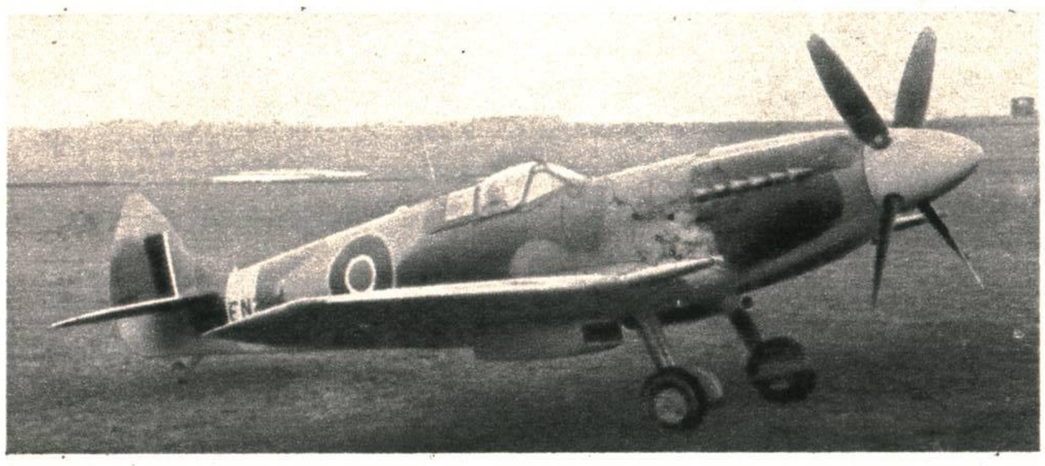
Spitfire VI.



Spitfire VII.

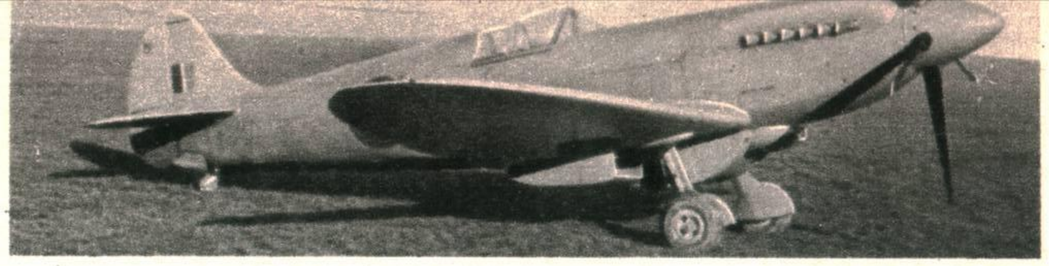


Spitfire IX floatplane.



Spitfire XII.

Spitfire XIV.



Spitfire XIX.

SIRES OF THE SWIFT . . .

pointed rudders. Armament: 2 x 20 mm plus 4 x 0.303in guns. A number of Mk VIIs were equipped for P.R. work.

Spitfire VIII.—The Mk VIII was essentially an unpressurized Mk VII. Variants were the F.VIII, with Merlin 61, 63 or 63A, and standard wings; the low-altitude fighter, L.F.VIII, with Merlin 66 engine and standard wings; and the high-altitude H.F.VIII, with Merlin 70 and long-span wings.

Spitfire IX.—Merlins of the 61, 62, 66 and 70 series were installed in this mark, which was essentially similar to the VC but with the engine and twin-radiator installation introduced on the Mk VII. "F," "L.F." and "H.F." variants were put into service, and certain Mk IXs had "E"-type wings, with two 20 mm and two 0.5in guns.

Spitfire P.R.X.—An unarmed reconnaissance machine with Merlin 64 or 71, the fuselage and engine installation of the Mk VII, and Mk VC wings, adapted to house additional tanks.

Spitfire P.R.XI.—A cleaned-up reconnaissance variant with Merlin 61, 63 and 70 engine, and with a large drop tank, having a range of about 2,000 miles. A recognition feature was the bulging of the under-cowling to house an extra oil tank.

Spitfire XII.—This special low-altitude fighter was the first production-type Spitfire to have the Griffon engine (Mk III or IV). The airframe was essentially that of the Mk VC but was specially strengthened. The wings had "clipped" tips and the armament was 2 x 20 mm plus 4 x 0.303in guns. Two squadrons of Spitfire XIIs were operational.

Spitfire XIII.—The airframe of this mark was essentially that of the VB but it was adapted for low-level photographic reconnaissance. The four machine guns were retained.

Spitfire XIV.—A high-altitude fighter with Griffon 65 two-stage, two-speed engine, extra-careful finish, and redesigned tail. The F.XIVE had two 20 mm + 2 x 0.5in guns and (on later aircraft) a rear-view hood; the F.R.XIVE had provision for an oblique camera and carried additional fuel. The top speed of this mark was 442 m.p.h.

Spitfire XVI.—Essentially a clipped-wing Mk IX, this version had the Packard-built Merlin 66. Later versions had a rear-view hood and additional fuel.

Spitfire XVIII.—Basically a Mk XIV, with strengthened wings and increased tankage.

Spitfire P.R.XIX.—The Griffon 65 or 66 engine of this fast, high-flying reconnaissance machine drove a five-blade Rotol airscrew. The wings were similar to those of the Mk XIV but carried additional fuel. Most XIXs had pressurized cockpits. This was the fastest operational mark of Spitfire, with a speed of 446 m.p.h.

Spitfire 21.—The wings of the Mk 21 were completely redesigned and of slightly increased area. The tail was also modified, and the undercarriage strengthened. Armament was four 20 mm guns.

Spitfire 22.—This was similar to the 21 but had a rear-view hood and a 24-volt, instead of a 12-volt, electrical system.

Spitfire 24.—The final production version of the Spitfire—almost identical with the Spitfire 22 but with a strengthened undercarriage and additional fuselage tanks.

Spitfire Floatplanes.—The first Spitfire floatplane had Blackburn Roc floats but was abandoned at the termination of the Norwegian campaign, for which it was being built. Later three Spitfire Vs were converted and used operationally in the Mediterranean. A Mk IX on floats is illustrated.

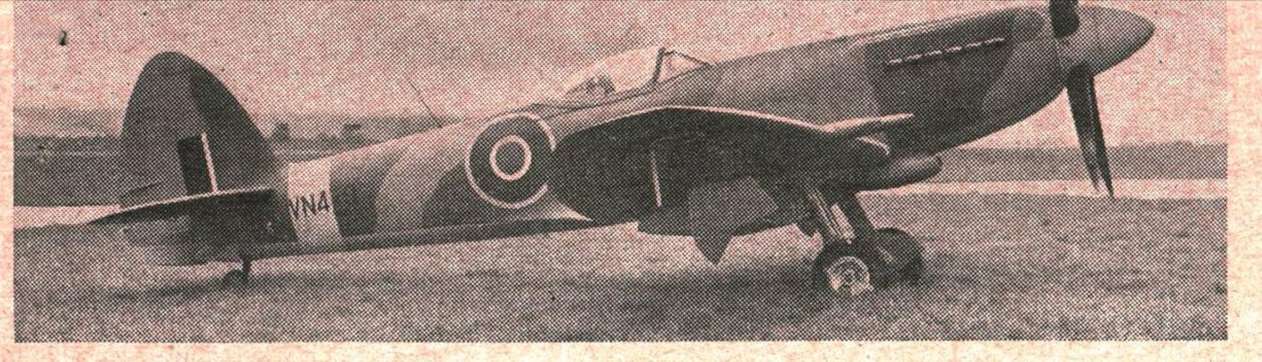
Spitfire Trainer.—A post-war tandem-seat, dual-control development familiar at air races in Great Britain and exported in small quantities. The prototype was a converted Spitfire VIII.

Seafire I.—This first Naval development of the Spitfire had the Merlin 32, 45 or 46 engine, an arrester hook and catapult spools. Armament was eight 0.303in guns.

Seafire II.—A development with alternative armament provisions. A number of Mk IIs were eventually fitted for reconnaissance.

Seafire XV.—Resembling the Spitfire XIV, this important Seafire development had the Griffon VI engine and strengthened,

Spitfire 21.



Spitfire 24.



Seafire I.

SIRES OF THE SWIFT . . .

folding wings. Later models had a sting-type hook.

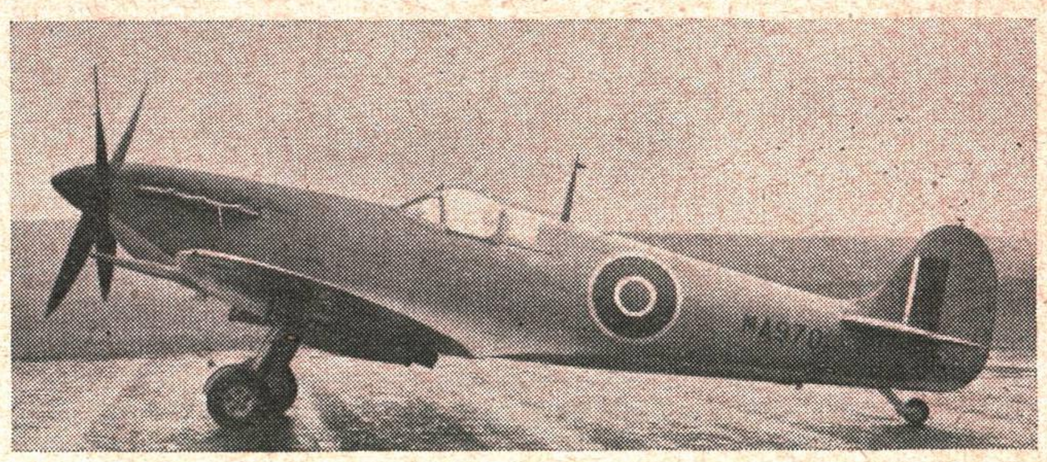
Seafire XVII.—An improved Seafire XV with strengthened undercarriage, rear-view hood and sting-type arrester hook.

Seafire XVIII.—Work on the prototype of this mark, which was to have the Griffon 36 engine, was stopped before completion.

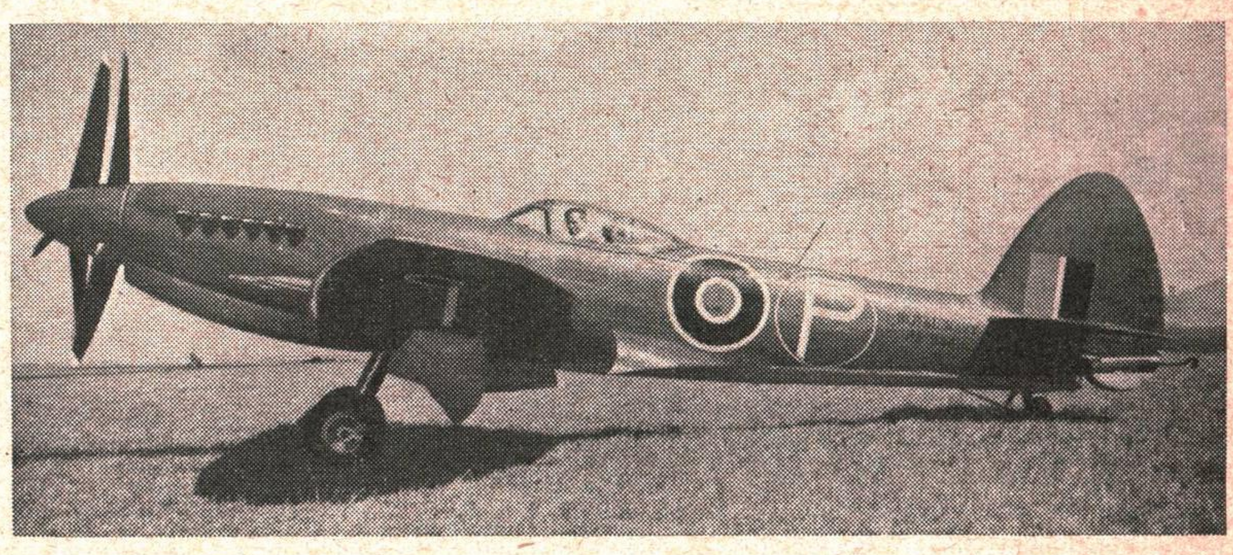
Seafire 45.—A Naval counterpart of the Spitfire 21, with sting-type hook and Griffon 61 engine.

Seafire 46.—Similar to the 45, but with the Spitfire 22-type rear fuselage and canopy. Some machines had Rotol contra-rotating airscrews.

Seafire 47.—Fitted as standard with contra-rotating airscrews for its Griffon 85, the Seafire 47 had folding wings, revised flaps and increased tankage. The F.R.47 had two cameras.



Seafire III.



Seafire 47.

Spiteful to Swift

Spiteful XIV.—The Spiteful was designed to Specification F.1/43 and, though bearing a family resemblance to the later Spitfires, was a completely new aircraft. The most notable advance was the adoption of tapered wings with squared tips. Deeper and more streamlined, the fuselage carried a larger tail-plane and a new fin and rudder assembly, also used on the ultimate types of Spitfire and Seafire. The narrow-track under-carriage of the earlier Supermarine fighters having been open to some criticism, the adoption of an inward-retracting, wide-track gear was of considerable significance. A Griffon 69 engine was fitted.

Spiteful XV.—Contra-rotating Rotol airscrews were fitted to the Griffon 89 or 90 engine of this development.

Spiteful XVI.—With a Griffon 101 three-speed-blower engine, this development of the Spiteful XIV achieved a speed of 494 m.p.h. at 28,500ft during official tests at Boscombe Down. The sea level speed was 408 m.p.h. and the maximum rate of climb 4,750ft/min.

Seafang 31.—Built to Specification N.5/45, this was virtually a "hooked" Spiteful. The engine was a Griffon 69 and the wings did not fold.

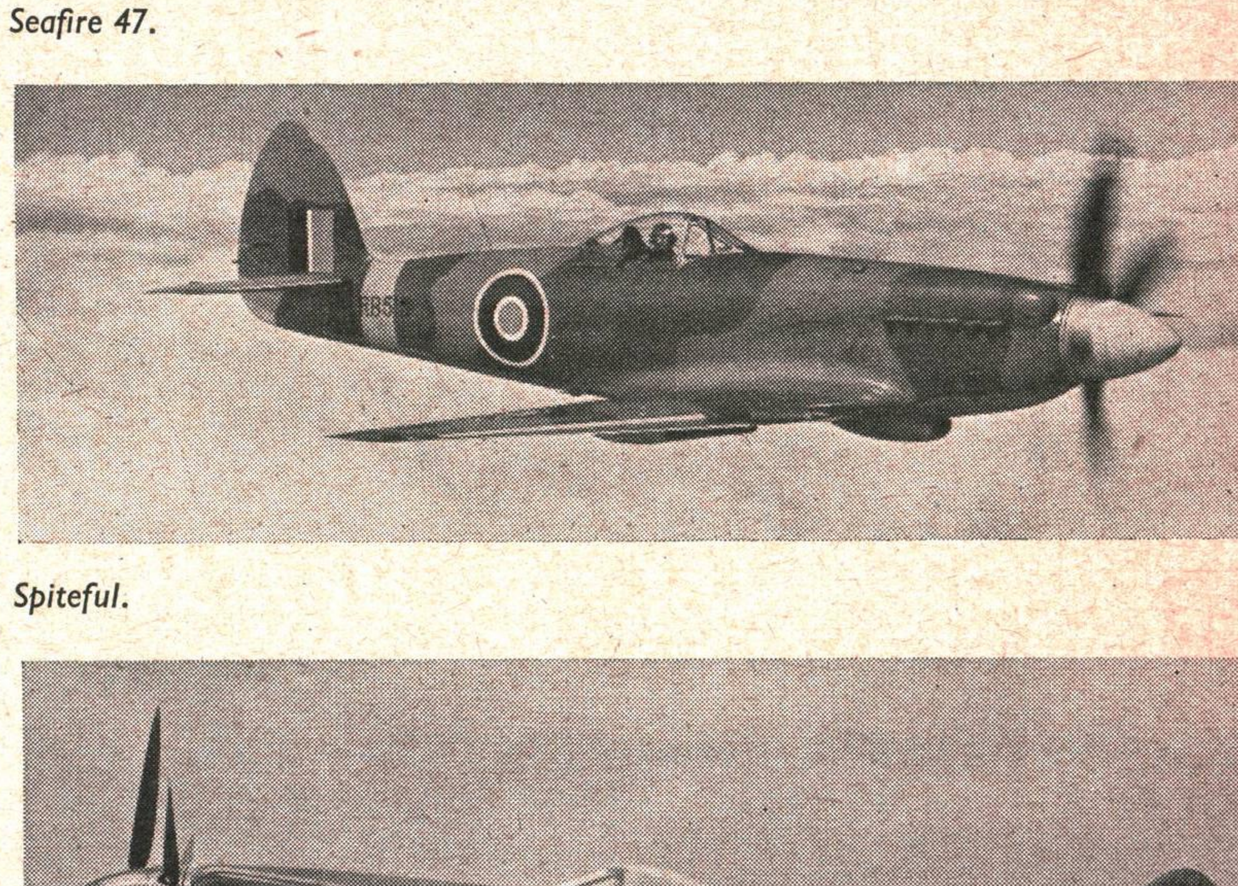
Seafang 32.—A production version of the Mk 31, with increased tankage, folding wings and Griffon 89 engine driving a Rotol contra-rotating airscrew.

Attacker F.1.—The basic Attacker design stems from Specification. E.10/44, issued before the end of the war for an aircraft to utilize the Rolls-Royce Nene turbojet. Incorporating the wings and undercarriage of the Spiteful, the prototype was a land-based machine, but the second and third examples, to Specification E.1/45, were adapted to meet Naval requirements and had the long-stroke, pre-retracting undercarriage, as originally designed for the Seafang. Carrier trials took place during October, 1947. After a number of Attacker F.1s had been delivered to the Royal Navy, a quantity of similar aircraft, without Naval fittings, went to the Royal Pakistan Air Force. The F.1 is armed with four 20 mm wing-mounted guns, has a span of 36ft 11in, weighs 11,500 lb, and has a maximum speed of about 590 m.p.h.

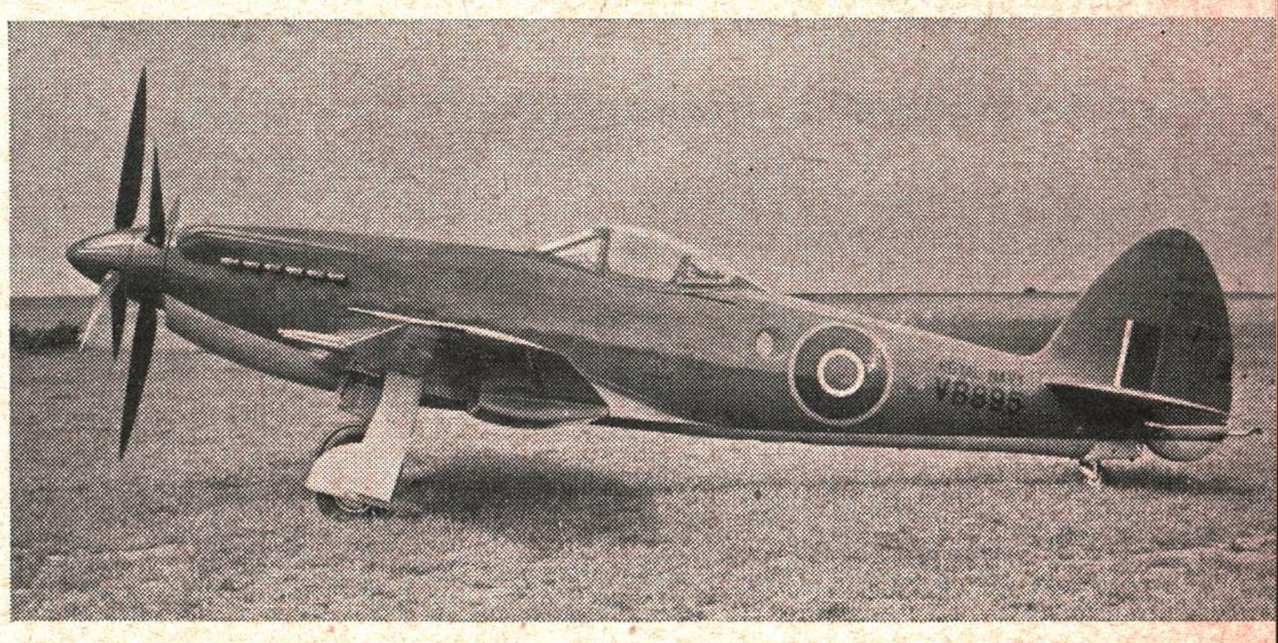
Attacker F.B.1 and F.B.2.—These are fighter/bomber developments for the Royal Navy carrying, in addition to full ammunition for the four 20 mm guns and 250-gal drop tank, two 1,000 lb bombs or eight rocket projectiles under the wings.

Type 510.—The excellent design of the Attacker fuselage and power plant installation was a convenient foundation upon which to base full-scale experimentation with swept wings and tail surfaces, and design work to this end was begun in 1945. The outcome was the Type 510 research aircraft, two examples of which were built. The first machine flew one year and nine months after the placing of the development contract. The wings were of Supermarine laminar-flow section and had a single main spar, auxiliary rear spar, and plate ribs. Slotted ailerons, split trailing-edge flaps and dive-recovery flaps were fitted. Originally designed with an Attacker-type nose, the 510 also appeared with a pointed nose. During November, 1950, the second of the two prototypes completed deck-landing trials aboard H.M.S. *Illustrious*. For this purpose it was fitted with an arrester hook and rocket-assisted take-off gear.

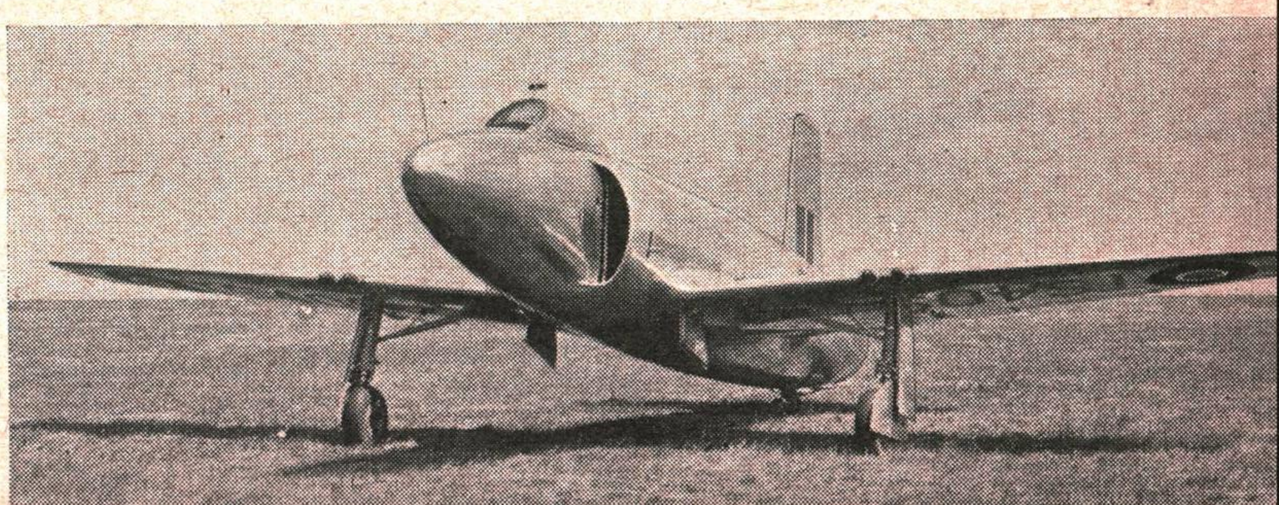
Type 535.—A progressive development of the 510, with redesigned wing, nosewheel undercarriage, lengthened nose,

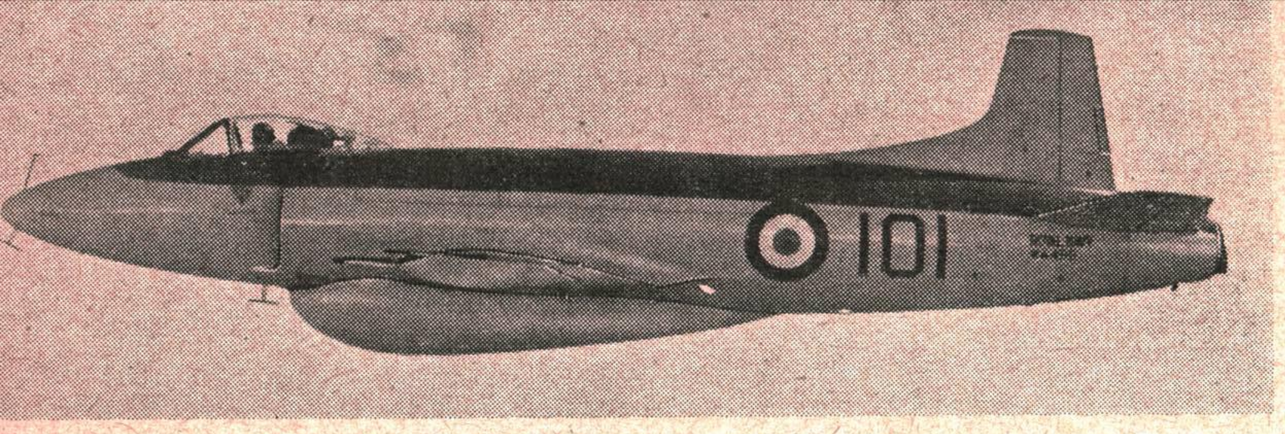


Spiteful.

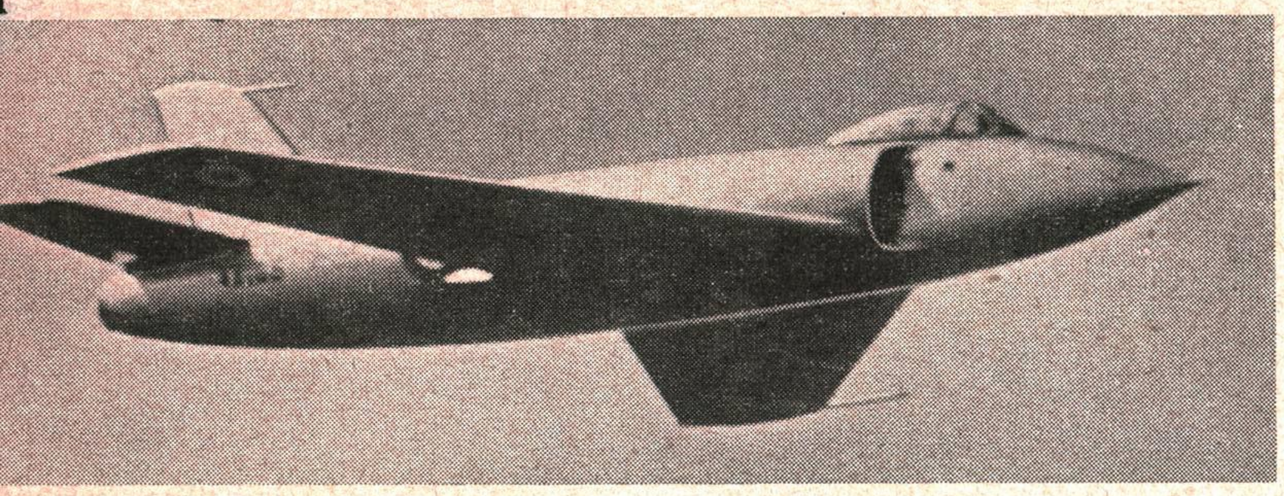


(Above) Seafang. (Below) Attacker prototype (E.10/44).

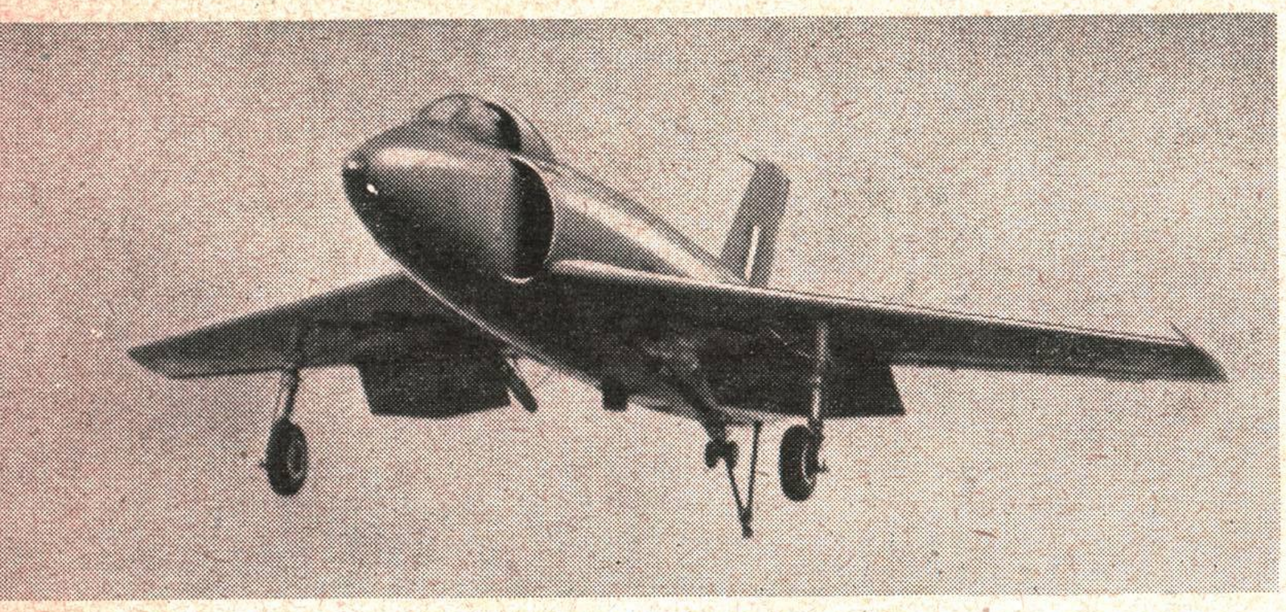




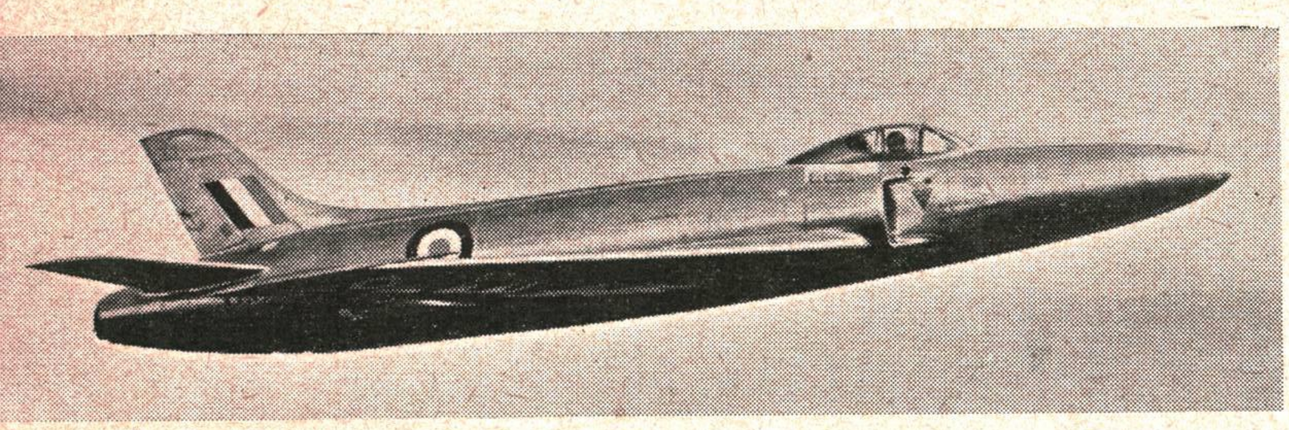
Attacker (production type).



Type 510.



Above, "Navalized" Type 510. Below, Type 535



SIRES OF THE SWIFT . . .

revised tail, and having an Attacker-type twin-tailwheel unit in addition to the nosewheel, the 535 first flew during August, 1950. Use of the tailwheels made possible a conventional tail-down landing with corresponding braking effect, due to the high angle of attack of wings: The Nene turbojet was retained.

Type 541 Swift.—This was the prototype of the Swift, and differed from the Type 535 in having enlarged intakes for the axial Avon turbojet. The tailwheel installation was deleted.

Swift F.1.—Developed as a day intercepter fighter from the Type 535, the Swift F.1 was fitted with Service equipment and guns (2 x 30 mm) and put into limited production for the R.A.F. The "four-point" undercarriage (or more strictly "five-point," the tail-wheel being double) and long nose of the 535 were discarded in favour of a normal tricycle gear and short nose; the engine intakes were carried forward to the level of the cockpit windscreen, and the guns were mounted in the lower fuselage beneath the pilot. A number of F.1s were completed and delivered to the R.A.F. for evaluation. As work progressed, development was continuing and several important modifications were introduced to increase performance and firepower. These resulted in the F.4 which is the version eventually to go into large-scale service.

Swift F.2.—This interim mark of Swift retains the original Avon, without reheat, but features two additional 30 mm guns. These are mounted beneath the fuselage, between the guns mounted under the intake ducts.

Swift F.3.—First demonstrated at the recent S.B.A.C. Flying Display, the Swift Mk 3 is virtually a reheat Mk 1. There are a number of other detail alterations, but the increased power is the main change, the big afterburner and tail-pipe necessitating a number of cooling-air intakes above the fuselage. Like the Swift F.2, this mark retains the cranked wing leading-edge.

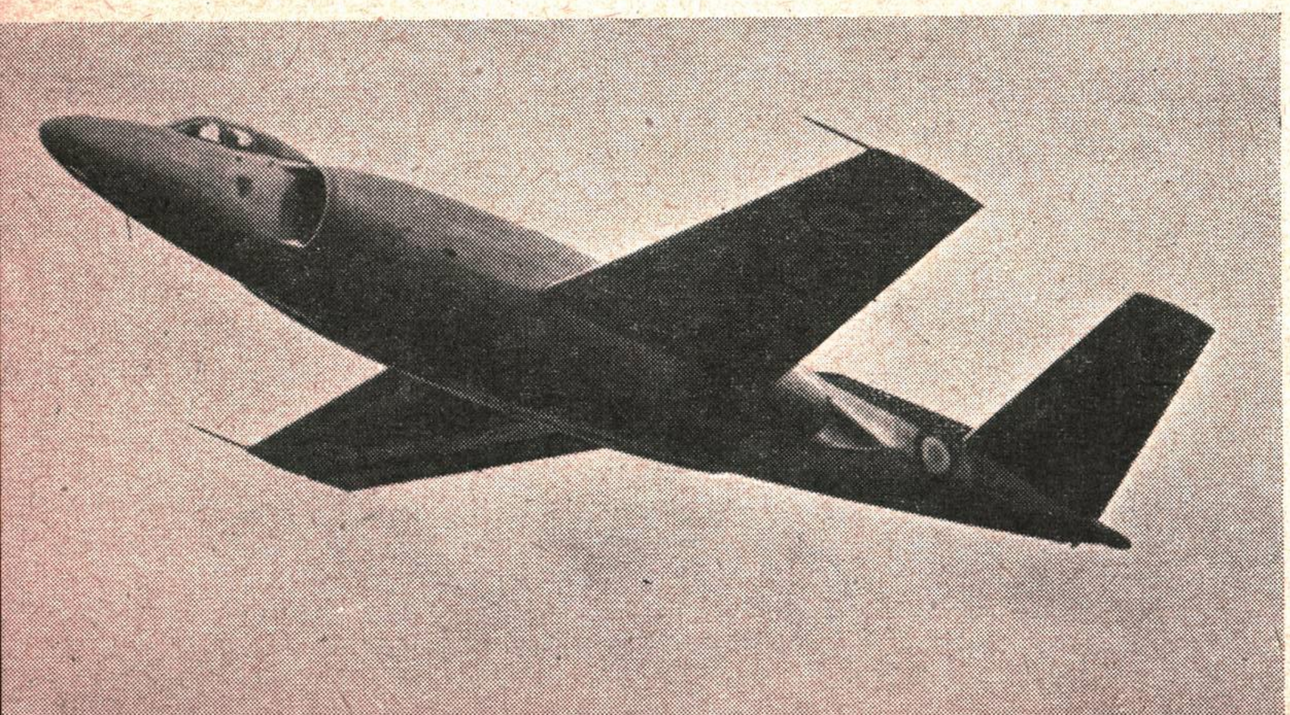
Swift F.4.—The basic external differences between the F.1 and F.4 are in the tailpipe, tailplane, wing plan, armament and gunsight. The Avon engine has reheat; the tailpipe is consequently longer and has a nozzle area which can be varied by the use of "eyelids." The tailplane is of "all-flying" type, in which the control column moves the tailplane directly, the elevators playing a purely secondary role; the wing plan has also been modified by sweeping the inboard section of the leading edge forward, as in the Mks 2 and 3. Armament of the F.4 corresponds to the new British fighter standard of four 30 mm cannon, for which space has been found in the under-fuselage. F.4s seen recently are also fitted with the radar gunsight, nose-mounted gun camera and a buried aerial along the leading edge of each wing, close to the fuselage. Various arrangements of wing fences have been observed on the Swift 4, but the latest arrangement consists of one long, fairly deep fence from the leading edge to a point just forward and outboard of the inner edge of the ailerons. A number of intakes on the top of the fuselage over the engine bay have recently been fitted; these are of the flush type, developed by the N.A.C.A. in America.

An interesting feature of all Swifts is the combined speed-brake and flap. The flaps themselves are of very large area and, because of their deep chord, the hinge line is some distance forward of the wing trailing edge. Trim change on extension at high speeds should therefore be comparatively small. It is thought that the dive-brake control operates the first flap position and that a second lever controls the full range of movement.

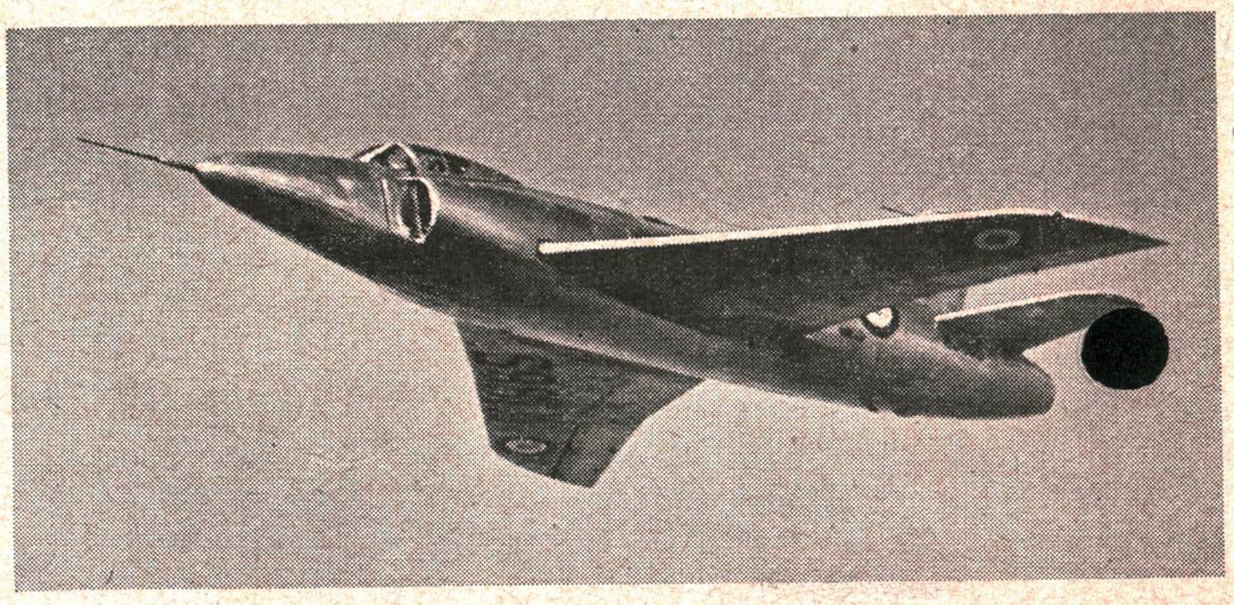
Types 508 and 529.—The few weeks preceding the S.B.A.C. Display of 1951 were significant ones for Supermarines. The Type 541 Swift had flown on August 1st, and on September 5th came an announcement of the maiden flight that day of a new Naval twin-jet fighter designated Type 508. It was a machine of singular appearance, having an extremely thin straight wing, two Rolls-Royce Avon turbojets housed in the fuselage sides, and a "butterfly" tail unit, in which the hinged trailing portions worked as elevators (operated together) and as rudders (operated differentially). When it appeared at Farnborough more novel features were observed, including "droop-snoot" leading edges, which, in conjunction with the large flaps, conferred a moderate landing speed. Four large gun ports (presumably for 30 mm weapons) were visible beneath the air intakes. The first deck-landing trials, aboard H.M.S. *Eagle,* were undertaken by M. J. Lithgow early in 1952. The Type 529 differs only in minor respects from the 508.

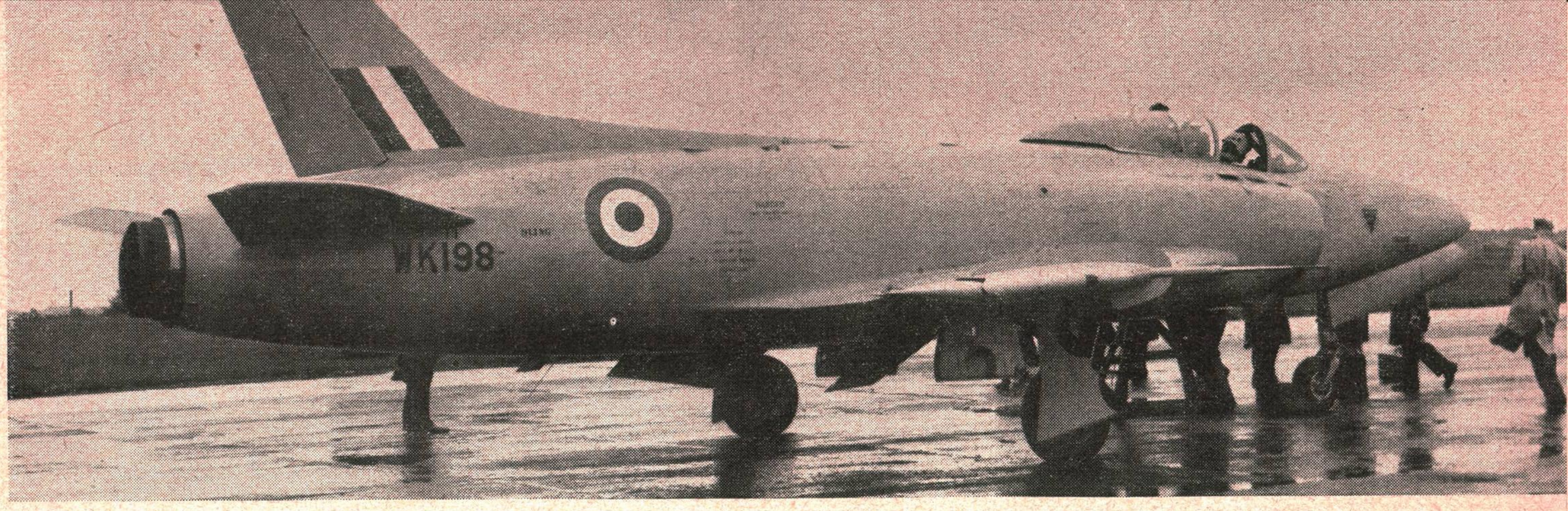
Type 508 Development.—In April this year it was announced that an order had been placed for a substantial quantity of "twin-jet fighters developed from the Supermarine 508." The aircraft concerned is reported to be designated Type 525 and has swept-back wings and a conventional tail.

Type 529. (Type 508 is similar).



Swift F.1.





The Swift F.4 at Supermarine's Chilbolton airfield, in Hampshire, prior to its departure for Libya on September 22nd to attack the world's speed record.

SIRES OF THE SWIFT

PART III. MACHINES AND MEN

By Jeffrey Quill, O.B.E., A.F.C.

IT was suggested that I should write something about some of the more interesting aeroplanes with which I was concerned during the eleven-odd years that I flew for Supermarines. I find this difficult because, ever since I learnt to fly twenty-two years ago, I have found nearly every aeroplane of absorbing interest.

However, it is clear that I must start with the prototype Spitfire, K.5054. I first flew this machine on March 26th, 1936, quite soon after its first flight which had been made by J. Summers. It is entered in my log simply as "Supermarine Fighter K.5054." I was 24 years old and had done about 1,300 hours flying; and from that day onwards I, with my friend the late George Pickering, did the bulk of the development testing on this machine, apart from what was done at Martlesham. In those days Bulldogs were still in service in the R.A.F., the Gauntlet was their newest fighter; the Gladiator was perhaps just about to go into service and there were still Virginias flying about. The prototype Hurricane had been flying at Brooklands since the previous November.

A monoplane fighter was something of a novelty anyway, but a fighter with the performance of K.5054 was a good deal more than that in those days. The Hurricane was the only aeroplane in the world which approached anywhere near it, for the Americans didn't seem to take fighter development very seriously and the German Me 109 was powered with an engine of, speaking from memory, only about 600 b.h.p. as against the 1,100 b.h.p. of the Merlin III.

Apart from anything else, therefore, flying the Spitfire was the greatest possible fun and I have seldom enjoyed anything so much as the two years during which we flew K.5054 whilst awaiting the emergence of the first production machine in May, 1938.

The impression has once or twice been given that the Spitfire was "right, from the word go." This is not strictly correct. We had our full share of troubles, headaches and frights during that period and it was all full of interest. I personally was keenly aware of the privilege of working for R. J. Mitchell. But it would need a book to record all this. One point of interest is that K.5054 was, I think, one of the first aeroplanes to be fitted with an anti-spin parachute. It had shown up badly in the spinning calculations at R.A.E. and there was thus a certain amount of gloom about the prospects for the actual spinning tests. The cable of the anti-spin parachute was attached to the fuselage just forward of the fin; it was then led along the outside of the fuselage, secured by sticky tape, and the parachute itself stowed in the cockpit.

The idea was that, if in trouble, one opened the canopy, seized a handful of parachute and flung it over the side—preferably the appropriate side. I well remember the first spin, entered at 20,000 feet from a strangely silent stall with the big two-bladed wooden airscrew ticking over very, very slowly. But eight years elapsed before I actually had to use an anti-spin parachute (in a Seafire with an experimental rudder), and it broke my leg—but that is another story. The only difficulty we had with the prototype was persuading the R.A.E. that the spin recovery characteristics were, in fact, perfect. It seemed they had no business to be, but they were.

In 1936 Supermarine was still primarily a flying-boat firm. George Pickering was the flying-boat pilot and one of the very best. I had practically never seen a flying-boat and I was lucky to have him to teach me to fly them. Like the true expert that he was he made no mystery about it, and very soon I was happily splashing about in Walruses, Stranraers and an occasional Scapa.

The Walrus was one of the most remarkable aeroplanes ever built. There are those who have flown them and those who have not, and it is idle for the former to try to explain matters to the latter. The Walrus did an incredible variety of jobs and could operate in very heavy seas.

In the air they clattered along in the course of their various duties, swinging gently from side to side with a pendulous motion and keeping up a steady directional oscillation. If the Walrus' flight characteristics were measured and recorded by modern methods the man who wrote AP.970 would probably have a heart attack. It was perhaps one of the best and most useful aeroplanes ever produced.

The main story of the development of the Spitfire during its eleven years of production life has been told elsewhere. From the flight development point of view the problem was primarily a race to maintain and improve the handling characteristics in the face of rapidly increasing speed, all-up weight, power, airscrew solidity and operating altitudes, not to mention diversity of operational roles and ever increasing quantities and sizes of "external stores." All modifications and alterations made in the interests of handling had to be such as could be developed quickly and incorporated in the production line without slowing the ever-increasing tempo of production.

More often than not the obvious aerodynamic answer had to be abandoned because it meant too radical a change to be practical from the production/time viewpoint, and some sort of aerodynamic "fiddle" adopted instead. On the whole, the inevitable conflict of interest between "design" and "production" was resolved by Supermarines as well and as successfully, I think, as was humanly possible. But it meant some give-and-take on all sides and some of the "give" inevitably had to be on the "handling" side.

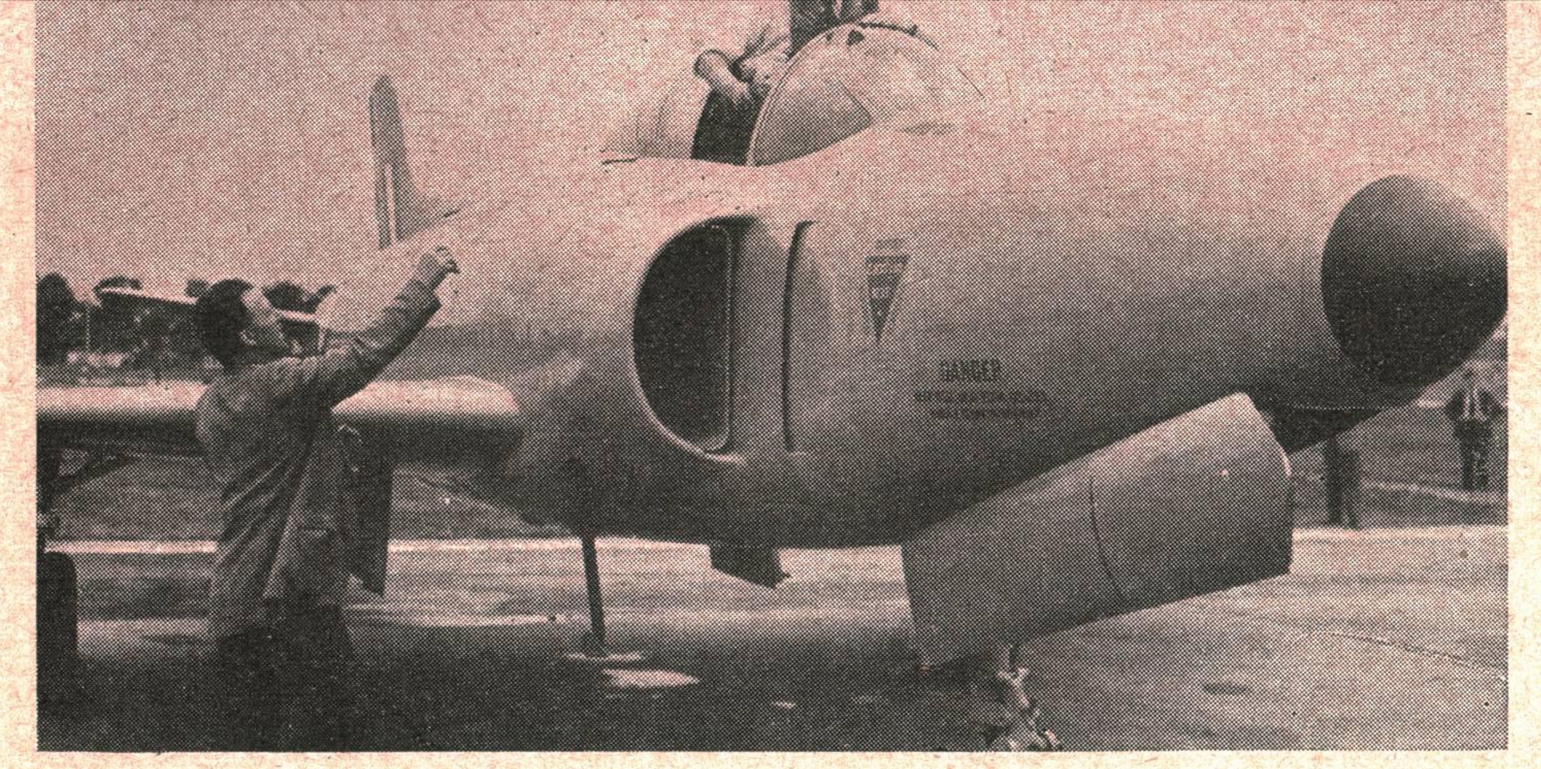
It was none-the-less galling, on occasions, to encounter people whose sole pre-occupation in life was the study of flight characteristics and to be told something like "what you want to do with the Spitfire Mark so-and-so is to double the tailplane area."

As if we didn't know.

I always thought the best of the Spitfires for handling were the later Mark VIIIs with standard wing tips and Merlin 66 engine, and perhaps the worst was the Mark 21. However this latter machine had an outstanding performance as a combat aeroplane, having an unrivalled combination of speed, climb and turning circle. But by that stage of the war the emphasis was on air-to-ground fighter operations, and air-to-air combat performance, such as possessed by the Spitfire 21, had less significance then than it had in, say, 1940, '41 and '42. This, incidentally, is a point frequently overlooked. The basis of air superiority in any theatre in daylight is the possession of fighters which can outclimb, out-turn, outstrip and out-dive the fighters of the enemy, as well as their bombers. Only then (or in the case of the virtual collapse of enemy air opposition due to internal reasons) can a tactical air force operate with reasonable impunity against ground targets. At the beginning of any war such a collapse cannot be expected; therefore control of the air must be fought for in the air and fighters must possess real combat performance, at almost any cost.

However, there were only a comparatively few Mark 21's produced and the handling was put right on the Marks 22 and 24 with very little sacrifice of performance.

But to return to the original theme. The Spitfire floatplane



Lt.Cdr. M. J. Lithgow, Supermarine's chief test pilot, entering the Swift F.4 for his London—Paris record flight

SIRES OF THE SWIFT . . .

was, of course, a fascinating toy. Also of ever-present interest were the problems of trying to make the Spitfire into a suitable carrier-borne aircraft, i.e. Seafire, and at the same time keep its performance in line with current marks of Spitfire. Then the Spiteful gave us many problems and we did a lot of work in dives at (in those days) high Mach numbers. We also achieved with this aeroplane the remarkable speed in level flight of 494 m.p.h. "Dumbo," of the variable-incidence wing, was a most interesting experiment, and finally, in 1946, I flew our first jet, the Attacker TS.409.

Having written very briefly of some of the aeroplanes of Supermarine it would be appropriate to write of some of the pilots who flew them and did so much to help both the firm and me personally.

I have already mentioned George Pickering, who was quite fearless and full of energy. Desperately injured in a crash while testing a production Spitfire he had a long year of recovery and convalescence, only to be killed in a Bren-gun carrier the day after he was pronounced medically fit to fly again. There was Johnnie Wakefield, a great driver of racing cars before the war, who was killed in a collision while testing a PR. Mark IV. Then we had Don Robertson (now a stockbroker), who was an experienced pilot with a very highly developed critical faculty for all things mechanical, which he exercised with great tolerance and understanding. (There is incidentally, nothing worse than the intolerant or impatient test pilot who makes no effort to appreciate the problems and difficulties of designers and production engineers.) There was Alex Henshaw—a real master of aerobatics such as one only encounters rarely in the course of a flying life—with the responsibility for the testing of the vast production output of Castle Bromwich. The manner in which he coped with the winter weather conditions there, with no "aids," had to be seen to be believed. He was helped at Castle Bromwich by George Lowdell and George Snarey until the latter returned to the Supermarine end.

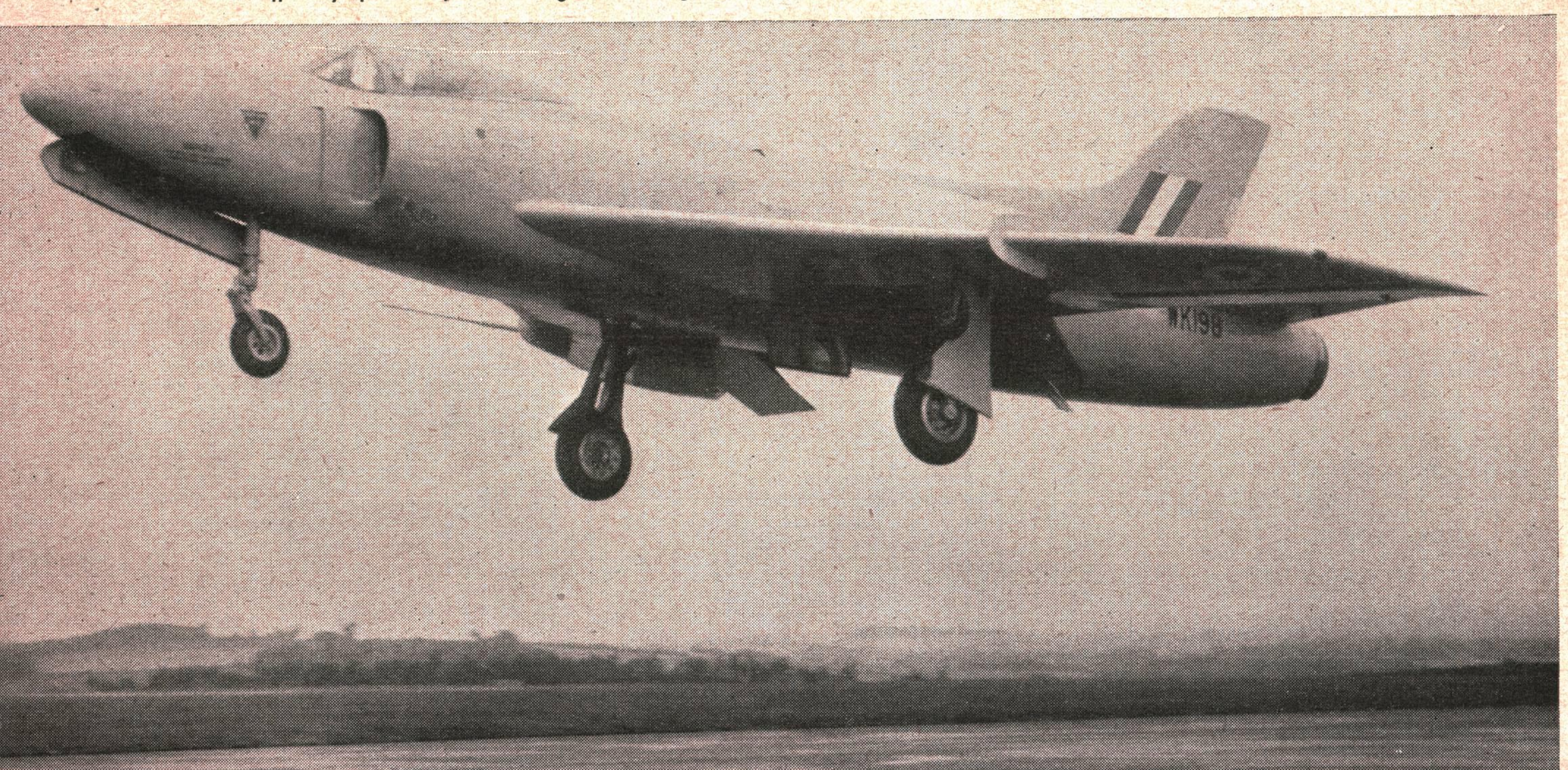
Then there was Frank Furlong, a man of unbounded exuberance and tremendous courage. He had no technical background—he was brought up with horses (he rode the winner of the Grand National in 1935); but he applied a deep-rooted intelligence and enthusiasm to test flying and in the hurly-burly of activity in our war-time experimental flight test department he was the ideal chap. He was killed in the prototype Spiteful in 1944.

And Guy Morgan, ex-P.R.U. pilot, now flying for Vickers Weybridge. He took charge of the testing of the whole of the production output of Supermarine, thus taking a great weight of worry and responsibility off my shoulders. For a time during the war George Errington came and flew for us; his experience and help, as well as his conversation, was highly stimulating. Then there was Pat Shea-Simmonds, our first E.T.P.S. graduate, who did much valuable work on Spitfires, Spitefuls and Seafangs before returning to his peace-time occupation after the war. John Derry came to us from C.F.E., on leaving the Service. I remember being greatly impressed with him when he walked into my office at High Post for his interview. Unfortunately circumstances were such that we could only offer him a temporary job; but the promise that he showed with us was amply borne out when he went to de Havillands a year later. Then there was Peter Robarts, who gave up much in order to continue with the flying which he loved. He died testing a production Attacker in 1950. In addition to these pilots who were part of the firm, we had many R.A.F. and Naval pilots attached to us. We could not possibly have coped with the enormous production output and experimental programmes without them. It is impossible to mention them all by name, but they mostly did a first-class job.

All the pilots who have flown for Supermarine, whether civilians or in the Service are inevitably part of the firm's history and have contributed something towards the firm's success, and some of them lost their lives in the process.

Our present team of test pilots is, I think, second to none. They all know their job thoroughly and get on with it quietly and effectively without fuss or notoriety. If there is one thing the writer can afford to be proud of it is that he was primarily responsible for choosing them. Working under Mike Lithgow their names, in case there may be anyone who doesn't know, are: L. R. Colquhoun, D. W. Morgan, G. J. Horne and J. W. C. Judge—and the future of test flying at Supermarines could not be in better hands.

This take-off study of the Swift F.4 leaving Chilbolton gives an excellent impression of the main features of this outstanding Avon-powered fighter.



SPITFIRE AND SEAFIRE

clipped wing tips, 1; rear-view hood and deletion of mirror, 1.

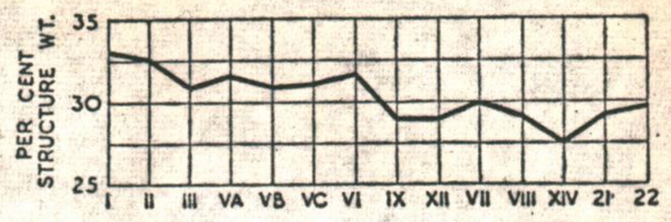
In changing to the Griffon engine, the opportunity was taken to drop the nose, giving an improved shape to the forward part of the machine and slightly improving the view.

Control

The problem of "feel" and ease of control over a wide speed range was not easy, but there is little doubt that the Spitfire set a new high standard in this respect. As development proceeded, and fighting experience became available, efforts were made to improve control. Aileron control first received attention. Although very effective at low and moderate speeds, it was found to become heavy and less responsive when during combat pilots dived the Spitfire to its limit. Stick forces and rate of roll were measured, and the results are given in the graph on page 707.

As operational speeds increased further the effect of torsional stiffness of the wings on aileron effectiveness became a serious factor, and in designing the wing of the Mk. 21 a theoretical reversal speed of 825 m.p.h. was catered for, against 580 m.p.h. with earlier types. An increase in wing stiffness of 47 per cent was obtained by ensuring rigid load-carrying joints at all points of access to the torsion box, and by increasing the gauge of wing plating and modifying the structure at various points.

Careful analysis on various marks revealed fairly wide variations in aileron section and in the position of the ailerons relative to the wings. These differences resulted in inconsistent aileron characteristics, and ailerons of a type which would be simple to manufacture and which would be less sensitive to manufacturing tolerances were considered necessary.



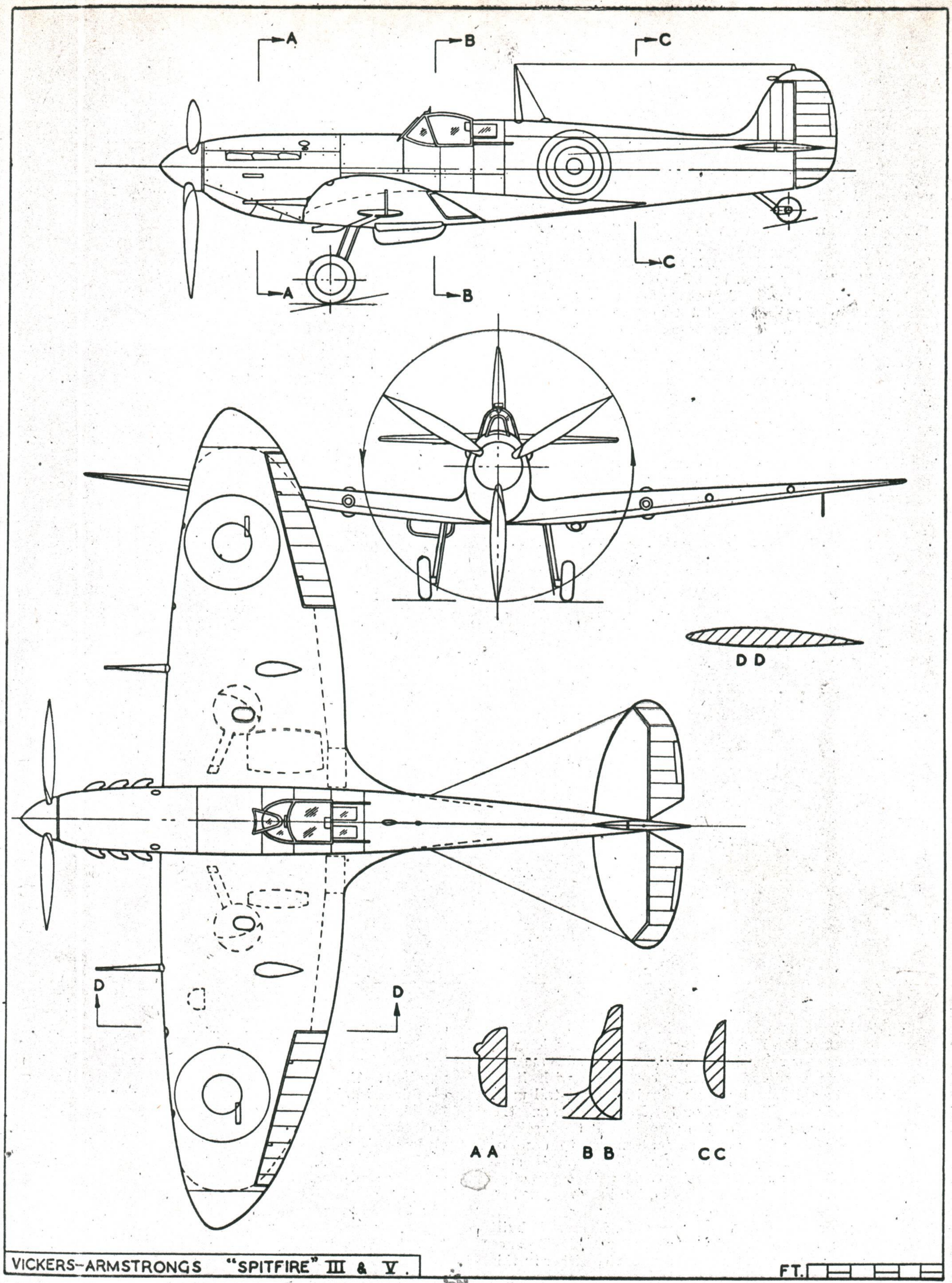
Variation of percentage structure weight.

Quantitative data obtained from flight trials on a Spitfire V with plain ailerons

TABLE I

Mark	Engine	Engine mounting	Airscrew	Engine cowling	Air intake	Exhaust manifold	Radiator type and frontal area	Intercoolant radiator	Oil cooler and area
Ia, Ib	Merlin II or III	Tubular	2-posn. D.H. 3-blade 2-blade fixed pitch or 3-blade D.H. c.s.	Sectional, quick-release fasteners	Temp.	Triple ejector plain or fish tail ends	1.88 sq ft or QA, 1.85 sq ft	—	0.2 sq ft
II	Merlin XII	Tubular	3-blade Jablo Rotol c.s.	do	do	do	do	—	0.35 sq ft
III	Merlin XX	Tubular, extended Mk. I	3-blade Jablo Rotol	do	do	do	WS, 6450 1.45 sq ft	—	0.35 sq ft
Va, Vb	Merlin 45 series	As Mk. I	3-blade Rotol c.s. or 3-blade D.H. bracket or hydromatic type	do	Temp. or trop.	do	QCV, 1.88 sq ft or QCY, 2.04 sq ft	—	do
Vc and trop.	Merlin 45 series	As Mk. I	do	do	Temp. or trop.	do	do	—	do
VI	Merlin 47 series	As Mk. I	4-blade Jablo Rotol	do	Temp.	do	QCV, 1.88 sq ft	—	do
VII	Merlin 61 series	Tubular, extended	Rotol 4-blade Hydulignum	Extended and louvred for Marshall blower	Temp.	Multi-ejector	Two QCP, each 1.24 sq ft	QCR 0.72 sq ft	QCQ 0.6 sq ft
VIII	Merlin 61 series	do	do	Extended	Trop.	do	do	do	do
IX	Merlin 61 series	do	do	do	Temp. or trop.	do	do	do	do
XII	Griffon III or IV	Built-up box members	4-blade Jablo Rotol	Blistered over cylinders	Temp.	do	QCY, 2.04 sq ft	—	0.35 sq ft
XIV	Griffon 65	As Mk. XII extended	5-blade Rotol	Amal type fasteners	Trop.	do	QFG and QFJ each 2.45 sq ft	QFH 2.45 sq ft	QFK 2.45 sq ft
XVI	Merlin 266	Tubular, extended. As Mk. IX	4-blade Rotol	Extended as Mk. IX	Temp. or trop.	do	Two QCP each 1.24 sq ft	QCR 0.72 sq ft	QCP 0.6 sq ft
XVIII	Griffon 65	Extended Mk. XII	5-blade Rotol	Amal type fasteners	Trop.	do	QFG and QFJ each 2.45 sq ft	QFH 2.45 sq ft	QFK 2.45 sq ft
21	Griffon 61 or 64	Built-up box members, as Mk. XVIII	5-blade Rotol	do	Trop.	do	QEW and QEY each 2.45 sq ft	QEV 2.45 sq ft	QEZ 2.4 sq ft
22	Griffon 61 or 64	do	do	do	Trop.	do	QGD and QGE each 2.45 sq ft	QGC 2.45 sq.ft	QGF 2.45 sq ft
24	Griffon 61 or 64	do	do	do	Trop	do	do	do	do
Seafire I	Merlin 45, 50, 55, 46, 50A or 56	Tubular	As Spitfire Va	Sectional, quick-release fasteners	Temp. or trop.	Triple ejector, plain or fish-tail ends	QCY, 2.04 sq ft	—	0.347 sq ft S.799-3C-528R
Seafire II	Merlin 32, 45 or 46	do	4-blade Rotol	do	do	do	do	—	do
Seafire III	Merlin 45, 50, 55, 46, 50A or 56	do	do	do	do	do	do	—	do
Seafire XV	Griffon VI	Built-up semi-cantilever beam	4-blade Rotol	do	Trop.	Multi-ejector	QCP, 1.24 sq ft QCV, 1.85 sq ft	—	QCQ 0.6 sq ft
Seafire XVII	Griffon VI	As Seafire XV	do	do	Trop.	do	do	—	do
Seafire 45	Griffon 61	do	5-blade Rotol	Extended with Amal type fasteners	Trop.	do	QGD and QGE each 2.45 sq ft	QGC 2.45 sq ft	QGF 2.45 sq ft
Seafire 46	Griffon 87	do	2-3-blade Rotol contra-rotating	do	Trop.	do	do	do	do
Seafire 47	Griffon 87	do	do	do	Trop.	do	do	do	do
PR. IV	Merlin 45, 46, 50, 55A, 55 or 56	Tubular	3-blade D.H. c.s.	Sectional, quick-release fasteners	Temp. or trop.	Triple ejector	QCY 2.04 sq ft	—	0.347 sq ft S.799-3C-525R
PR. VII	Merlin 45 or 46	do	do	do	Temp.	do	QCV 1.85 sq ft	—	do
PR. X	Merlin 64	Extended tubular	4-blade Rotol c.s.	Extended	Trop.	Multi-ejectors	Two QCP each 1.20 sq ft	QCR 0.714 sq ft	QCQ 0.6 sq ft
PR. XI	Merlin 61, 63, 63A or 70	Extended tubular	4-blade Rotol hydulignum	Extended	Temp. or trop.	do	do	do	QCR 0.6 sq ft
PR. XIII	Merlin 32	Tubular	3-blade D.H.	As PR. VII	Temp.	Triple ejector	QCV 1.85 sq ft	—	0.347 sq ft S.799-3C-525R
PR. XIX	Griffon 65 or 66	Built-up semi-cantilever beam	5-blade Rotol c.s.	Extended, with Amal type fasteners	Trop.	Multi-ejector	QFJ and QFG each 2.46 sq ft	QFH 2.46 sq ft	QFK 2.46 sq ft

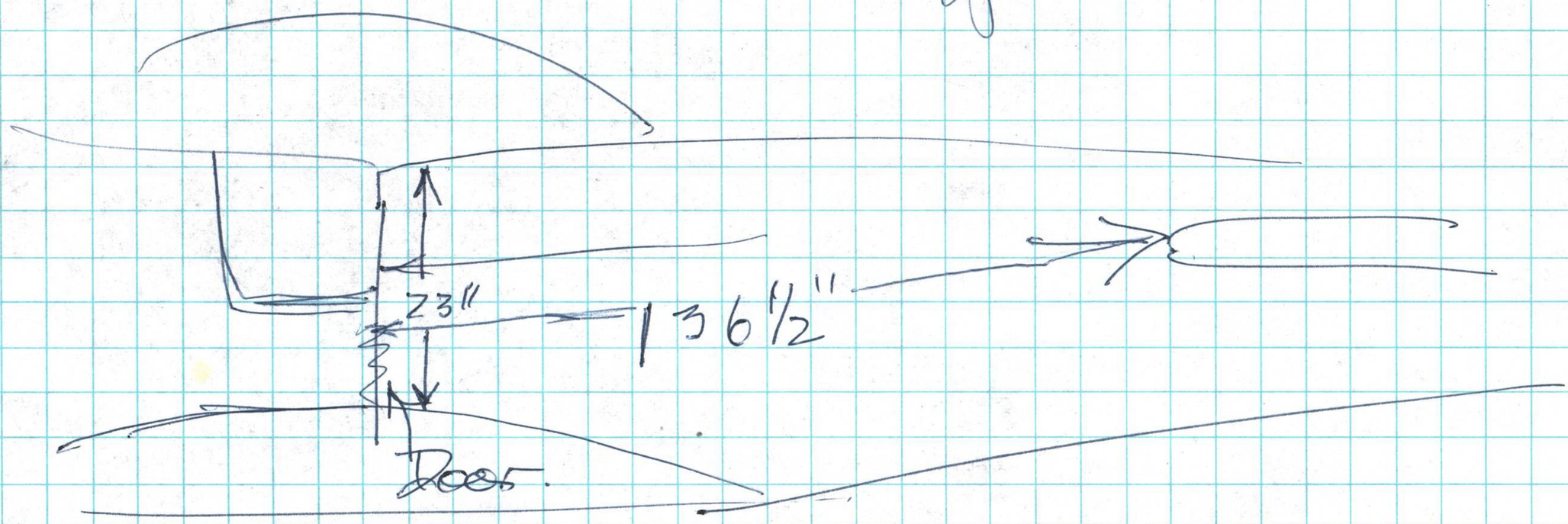
All radiators commencing with type letter "Q" by Morris, all others by Serck. Temp. = Temperate; Trop. = Tropical.



VICKERS–ARMSTRONGS "SPITFIRE" III & V.

FT.

Spot XVI



CANADAIR LIMITED F-6548

Spit XVI

No Bobble TE 353

URGENT YES NO

Green & Grey

DN - 1

2nd

416

Griffin →

Message for Mr.

WHILE YOU WERE OUT

Dent E.

Mr. Flight Lieut Owen -

Of Ottawa

Returned your call ☐

Called ☐ Phoned ☑ at 2:25 A.M. P.M.

Mr Traverse Viking

HIS MESSAGE WAS

Phone him at 992-8811

Remarks Please call collect

Taken by

Date

G 438

Layout Same Port + Starboard.
checks for MK XIV

open up to 16"

20
32
4R
54

3½
24

4/14
3½

54
56
A 110" section
28

42
54

A 18
½

30"

2" square Door

16 2 16 2 18 1

10

14

2" 24"
3

10 " ?

C/L

Serial ½" ahead of Stbd leading edge

24"

Block 29x8"

C/L — Serial

if rounded was 4" over
d leather Top 8" over
} relative ship letter

J. A. GRIFFIN
39 GRANTBROOK ST.
WILLOWDALE - ONTARIO

29

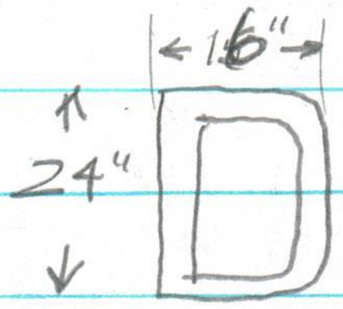
5.1.5.1.5.1.5.1.5

TE 353 (Page 179)

LF XVI Clipped wing - IX with Packard Merlin 266

Rear view fuselage started Feb/45

MK XVI delivered autumn 44



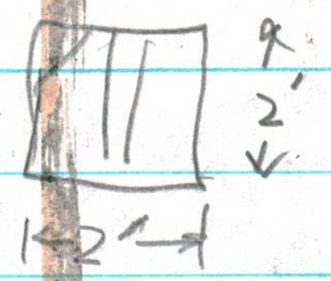
2" Between letters.

Fuselage 36" Roundel. (c 1½" above c/l) Medium

Top Wing 4'9" " 54"

Lower 2'8" " 32" B, 16" W 12" R.

Flash



½ 416

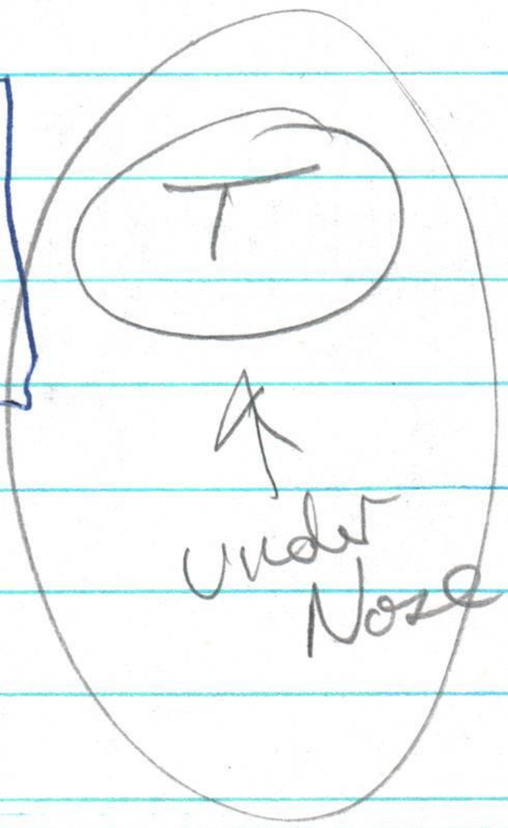
F14e

LF16e

F9, F9b, 4c

F5b

F2b+a

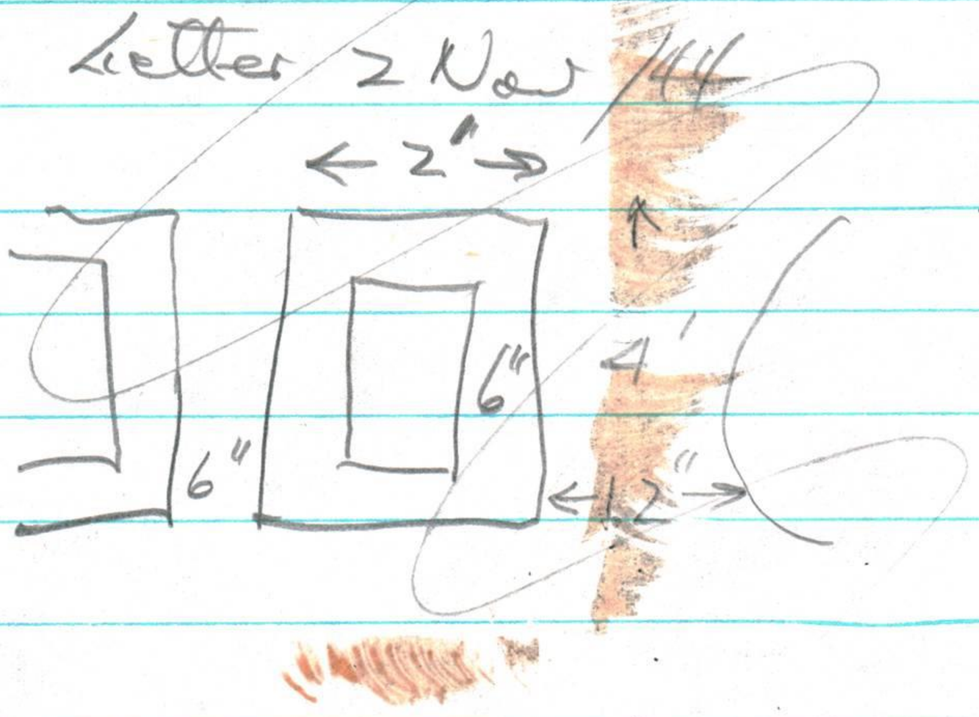


Stbd Showing yellow leading edge

No belly band

Light ~~Black~~ spinner

Letter 2 Nov /44



NB The Right + Left Side Code, Roundel + A/c Letter identical spacing.

Code.

15 15

D2N2(36) 36"

Eddie ? finish Photos.

Ron Wylie

TE 35 (Page 179)

4F VI (Clipped wing)

= MR IX with Packard Merlin 266

Rear view fuselage started Feb/45

antenna 44

Sea Grey Med Bottom.

Dark Green
Dark Sea Grey } Top

26 5+4
27

28" →

YG Matt
US P.C.

R.C.A.F. Spitfires

Spitfire L-1090 Merlin III

19-2-40 N° 1 Depot on Transfer Order # 201

9-5-40 Ottawa

30-5-40 N° 1 T.C.

6-6-40 Ottawa

20-6-40 N° 1 Depot

25-6-40 Ship from Ottawa to England – CNR Box Car 653186

Spitfire V R-7143 Merlin XLV

26-2-43 N° 3 T.C. Rockcliffe (HWE) On loan from Air Ministry for high altitude tests being made on behalf of R.A.F.

10-9-44 "C" crash at Rockcliffe

15-7-46 9(T) Group

2-9-47 R.C.N.

Spit V X-4492 Merlin XLV

7-4-43 N° 3 T.C. – Loan to HMCS Stadacona.

Spit V X-4555

7-4-43 N° 3 T.C. – Loan to HMCS Stadacona.

Spit II B P-8332

20-3-41 Taken on strength by R.A.F.

16-4-41 " " " 22 Sqn R.A.F.

26-6-41 Taken off operations and sent to Canada where it was given training number and sent out on display.

REMARKS:

RECORD OF WRITE-OFF

APPLICATION RC'D FROM	DATE	FILE No.	DATE APPROVED	APPROVED BY	APPROVAL SENT TO	DATE	T. O. No.

DISPOSAL PARTICULARS

AIRFRAME — T. O. No.

ENGINE/S (QUOTE SERIAL NOS.) — T. O. No.

AIRSCREW/S (QUOTE SERIAL NOS.)

ACCESSORIES

EMARKS:

EFFECTIVE DATE WRITTEN-OFF

R.C.A.F. E. 233B — 3M-5-42 (2220) M.Q. 985 — E-233

AIRCRAFT RECORD CARD

FIRST ENTRY AT # 8. R. D. (W. Wg.) DATE 21. 3. 44. TRANSFER ORDER No. 19391

TRANSFERS DATE	TO	AUTHORITY	TRANSFERS DATE	TO	AUTHORITY
12.444	# 2 T.C. (W.E. + T.F.)	T.O. 12495	~~1/12/44~~	~~No. 2 Air Command~~	~~T.O. 17327(10)~~
5.7.44	Stored Reserve, # 2 T.C.	T.O. 14592	1		Ftr.
20.7.44	No. 2 T.C.	T.O. 14863	May 47	Director of Naval Air Services	
1/12/44	No. 2 Air Command	T.O. 17327(10)		Royal Can Navy H.Q	T.O. MC 12435
25.9.45	Stored Reserve 2 A.C.	T.O. 15138			
2.1.46	N W A C	T.O. MC 16054			
12 July 46	converted to Instructional	T.O. MC 12570			
12 July 46	Indefinite Loan - Naval Training Establishment Supply & Secretarial School Esquimalt B.C Transferred by D.E.D.	T.O. MC 12573			

REMARKS: 21/3/44:- THIS AIRCRAFT ARRIVED AT HALIFAX 7 MARCH, 1944 ON S.S. INDOCHINOIS. IT HAS BEEN CONSIGNED TO W.R. NO. 8 R.D.P.O. FOR ASSEMBLY, PRIOR TO BEING ALLOTTED TO THE W.E. & T.F. AT GIMLI.

21/3/44:- ON LOAN TO THE AIR MINISTRY, ENGLAND.

25.9.45 - Serviceable

(JG 480) A-517 Spit VIII

A 1273

ENGINE TYPE	UNITS	AIRSCREW TYPE (CODE)	REF. No.
MERLIN LXVI	1		

BATCH NO.	QUAN. IN BATCH	LEDGER FOLIO	SPECIFICATION NO.

REGISTRATION NO.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS NO.
(JG 480) A-517	SPITFIRE VIII INSTRUCTIONAL	1944	S.E. FIGHTER	

REGISTRATION NO.

OVERHAUL

DATE	REASON	DONE BY	REQ'N NO.	COST		HOURS SINCE NEW		
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

ACCIDENT RECORD

DATE	CATEGORY	PLACE	TIME	REPORT REFERENCE	DATE	RANK & NAME OF PILOT	No. IN CREW	DISPOSAL	DATE SERV.
1									
2									
3									
4									
5									
6									
7									
8									

B. S. LTD.

PAT'D 1920

AIRCRAFT RECORD CARD

REMARKS

1 Aug 47

Engine # 2 R.D.3 th Class Log Book Ledger Sheet and the forward and Record Receipt Copy of the Above Voucher to the Deputy Director Technical Office, Middle East, The R.A.F. Transport Unit. Class 8.30-2-3-1(R.E.A.) In Quadruplicate Pro Q. 31-3-(16).

16 July 47

REMARKS:

RECORD OF WRITE-OFF

APPLICATION RC'D FROM	DATE	FILE No.	DATE APPROVED	APPROVED BY	APPROVAL SENT TO	DATE	T. O. No.

DISPOSAL PARTICULARS

AIRFRAME — T. O. No.

ENGINE/S (QUOTE SERIAL NOS.) — T. O. No.

AIRSCREW/S (QUOTE SERIAL NOS.)

ACCESSORIES

EMARKS:

EFFECTIVE DATE WRITTEN-OFF

AIRCRAFT RECORD CARD

FIRST ENTRY AT No. 1 Aircraft Depot — DATE 19/2/40 — TRANSFER ORDER No. 201

TRANSFERS DATE	TO	AUTHORITY	TRANSFERS DATE	TO	AUTHORITY
9.5.40	RCAF Stn Ottawa	T.O. 388			
30.5.	No. 1 I.C.	T.O. 389			
6.6	RCAF Stn Ottawa	T.O. 484			
20.6	No. 1 (S) Depot - Ottawa	T.O. 595			
25.6	Departed Ottawa in CNR Car No. 653086 to England	T.O. 596			
	653086				

REMARKS BR. AIR MINISTRY AIRCRAFT.
THIS AIRCRAFT NOT BROUGHT ON CHARGE TO R.C.A.F. SINCE IT WAS IN THIS COUNTRY ONLY FOR TEST PURPOSES — RETURNED TO ENGLAND WITH OWN ENGINE.

L-1090

ENGINE TYPE MERLIN III — UNITS 1 — AIRSCREW TYPE (CODE) — REF. No.

BATCH No. — QUAN. IN BATCH — LEDGER FOLIO — SPECIFICATION No.

REGISTRATION No.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS No.
	SPITFIRE	1940	S E FIGHTER	L 1090

L 1090	SPITFIRE	1940	S E. FIGHTER	L 1090
REGISTRATION No.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS No.

OVERHAUL DATA

DATE	REASON	DONE BY	REQ'N No.	COST		HOURS SINCE NEW	DATE COMPLETED	ALLOTMENT
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

ACCIDENT RECORD

DATE	CATEGORY	PLACE	TIME	REPORT REFERENCE	DATE	RANK & NAME OF PILOT	No. IN CREW	DISPOSAL	DATE SERV.
1									
2									
3									
4									
5									
6									
7									
8									

B. S. LTD.

AIRCRAFT RECORD CARD

PAT'D 1920

REMARKS

REMARKS:

RECORD OF WRITE-OFF

APPLICATION RC'D FROM	DATE	FILE No.	DATE APPROVED	APPROVED BY	APPROVAL SENT TO	DATE	T. O. No.

DISPOSAL PARTICULARS

AIRFRAME — T. O. No.

ENGINE/S (QUOTE SERIAL NOS.) — T. O. No.

AIRSCREW/S (QUOTE SERIAL NOS.)

ACCESSORIES

REMARKS:

EFFECTIVE DATE WRITTEN-OFF

R.C.A.F. E. 233D — 6M-1-43 (9029) H.Q. 885 — E-233

AIRCRAFT RECORD CARD

FIRST ENTRY AT "3 T.C." DATE 7.4.43 TRANSFER ORDER No. 161

M/4

TRANSFERS DATE	TO	AUTHORITY	TRANSFERS DATE	TO	AUTHORITY
15.1.45	No. 1 A.C.	T.O. 17364 (25)			
15 July 46	No 9 T Group	T.O. MC 12331			
11 Oct 46	Aprod # 9 (T) Group	T.O. MC 13122			
9 Jan 47	SK # 9 (T) Group	T.O. MC 13375			
1 Feb 47	R.C.N. (HMS Stadacona) (Indefinite loan) Halifax	T.O. MC 13445	* S.D. to clear loan by letter and a copy of the same marked "C" to the Deputy Minister, attention Mr. P.S. Conway.		
1 Aug 47	Director of Naval Aviation Royal Canadian Navy	T.O. MC 12436			

REMARKS: 7/4/43:- On loan to R.C.A.F. Stn., Rockcliffe (H.W.E.) for high altitude tests in behalf of the R.A.F.

1/2/47 - Indefinite loan to RCN (HMS Stadacona) loan acct is to be carried by S.E.D.

X4555

ENGINE TYPE MERLIN XLV — UNITS 1 — AIRSCREW TYPE (CODE) — REF. No.

BATCH No. — QUAN. IN BATCH — LEDGER FOLIO — SPECIFICATION No.

REGISTRATION NO.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS No.
X 4555	SPITFIRE V	1943	S E FIGHTER	

REGISTRATION NO.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS NO.

OVERHAUL DATA

DATE	REASON	DONE BY	REQ'N NO.	COST	HOURS SINCE NEW	DATE COMPLETED	ALLOTMENT
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

ACCIDENT RECORD

DATE	CATEGORY	PLACE	TIME	REPORT REFERENCE	DATE	RANK & NAME OF PILOT	No. IN CREW	DISPOSAL	DATE SERV.
1									
2									
3									
4									
5									
6									
7									
8									

B. S. LTD.

AIRCRAFT RECORD CARD

PAT'D 1920

REMARKS

REMARKS:

RECORD OF WRITE-OFF

APPLICATION RC'D FROM	DATE	FILE No.	DATE APPROVED	APPROVED BY	APPROVAL SENT TO	DATE	T. O. No.

DISPOSAL PARTICULARS

AIRFRAME — T. O. No.

ENGINE/S (QUOTE SERIAL NOS.) — T. O. No.

AIRSCREW/S (QUOTE SERIAL NOS.)

ACCESSORIES

EMARKS:

EFFECTIVE DATE WRITTEN-OFF

AIRCRAFT RECORD CARD

FIRST ENTRY AT No. 3 P.D. Rockcliffe (H.W.E) DATE 26.2.43. TRANSFER ORDER No. 5879.

TRANSFERS DATE	TO	AUTHORITY	TRANSFERS DATE	TO	AUTHORITY
15.1.45	No. 1 A.C.	T.O. 17664 (1.5)			
13 July 46	No 9 T Group	T.O. MC 12331			
11 Oct 46	Apdal * 9 (T) Group.	T.O. MC 13122			
9 Jan 47	SR No 9 (T) Group	T.O. MC 13375			
2 Sept 47	Royal Can. Air Force	T.O. MC 12449			

REMARKS 26/2/43:- ON LOAN FROM AIR MINISTRY TO ROCKCLIFFE (H.W.E.) FOR HIGH ALTITUDE TESTS TO BE MADE ON BEHALF OF R.A.F.

X 4492

ENGINE TYPE MERLIN XLV — UNITS 1 — AIRSCREW TYPE (CODE) — REF. No.

BATCH No. — QUAN. IN BATCH — LEDGER FOLIO — SPECIFICATION No.

REGISTRATION No.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS No.
X 4492	SPITFIRE V	1943	S E FIGHTER	

X 4492	SPITFIRE V	1943	F. FIGHTER	
REGISTRATION No.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS No.

OVERHAUL DATA

DATE	REASON	DONE BY	REQ'N No.	COST	HOURS SINCE NEW	DATE COMPLETED	ALLOTMENT
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

ACCIDENT RECORD

DATE	CATEGORY	PLACE	TIME	REPORT REFERENCE	DATE	RANK & NAME OF PILOT	No. IN CREW	DISPOSAL	DATE SERV.
1									
2									
3									
4									
5									
6									
7									
8									

A. V. LTD. AIRCRAFT RECORD CARD PAT'D 1926

REMARKS

2 Sept 47 - Supplies to R.C.A.F. Requirements. One priced receipted copy of the voucher is to be forwarded to the Office of the Deputy Minister D.N.D. attention Mr. P. S. Conway. Shipping to be made, transportation charges collect.

EMARKS:

RECORD OF WRITE-OFF

APPLICATION RC'D FROM	DATE	FILE No.	DATE APPROVED	APPROVED BY	APPROVAL SENT TO	DATE	T. O. No.

DISPOSAL PARTICULARS

AIRFRAME — T. O. No.

ENGINE/S (QUOTE SERIAL NOS.) — T. O. No.

AIRSCREW/S (QUOTE SERIAL NOS.)

ACCESSORIES

EMARKS: — EFFECTIVE DATE WRITTEN-OFF

AIRCRAFT RECORD CARD

FIRST ENTRY AT No. 3 A.C. Rockcliffe (H.W.E) DATE 26.2.43. TRANSFER ORDER No. 5879

TRANSFERS DATE	TO	AUTHORITY	TRANSFERS DATE	TO	AUTHORITY
15.1.45	No. 1 A.C.	T.O. 17364 (F5)			
15 July 45	No 9 T Group	T.O. MC 12331			
11 Oct 46	Aptsal #9 (T) Group	T.O. MC 13122			
9 Jan 47	SR # 9 (T) Group	T.O. MC 13375			
4 Sept 47	Royal Can. Navy	T.O. MC 12449			

REMARKS 26/2/43:- ON LOAN FROM AIR MINISTRY TO ROCKCLIFFE (H.W.E.) FOR HIGH ALTITUDE TESTS TO BE MADE ON BEHALF OF R.A.F.

R-7143

ENGINE TYPE	UNITS	AIRSCREW TYPE (CODE)	REF. No.
MERLIN XLV	1		

BATCH No.	QUAN. IN BATCH	LEDGER FOLIO	SPECIFICATION No.

REGISTRATION No.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS No.
R 7143	SPITFIRE V	1943	S E FIGHTER	

REGISTRATION NO.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS NO.
R 7143	SPITFIRE V	1943	S E FIGHTER	

OVERHAUL DATA

DATE	REASON	DONE BY	REQ'N No.	COST	HOURS SINCE NEW	DATE COMPLETED	ALLOTMENT
1							
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4							
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6							
7							
8							
9							
10							
11							
12							

ACCIDENT RECORD

DATE	CATEGORY	PLACE	TIME	REPORT REFERENCE	DATE	RANK & NAME OF PILOT	No. IN CREW	DISPOSAL	DATE SERV.
10-9-44	"C"	Rockliffe		"NIL"	10.9.44				
2									
3									
4									
5									
6									
7									
8									

B. A. LTD.

AIRCRAFT RECORD CARD

PAT'D 1920

REMARKS

2 Sept 47 - Surplus to RCAF Requirements. One price receipted copy of the vouchers is to be forwarded to the office of the Deputy Minister (D.O.S.) attention Mr. P.S. Cooley. Shipment is by road - transportation charges collect.

REMARKS:

RECORD OF WRITE-OFF

APPLICATION RC'D FROM	DATE	FILE NO.	DATE APPROVED	APPROVED BY	APPROVAL SENT TO	DATE	T. O. No.

DISPOSAL PARTICULARS

:MARKS:

EFFECTIVE DATE WRITTEN-OFF

R.C.A.F. E. 233A — 10M-1-43 (3029) M.Q. 885 — E-233

AIRCRAFT ~~ENGINE~~ RECORD CARD

FIRST ENTRY AT North West Air Command DATE 11 Feb 46 TRANSFER ORDER No. TO MC16445

TRANSFERS (NEC Flt Edmonton)

DATE	TO	AUTHORITY	DATE	TRANSFERS TO	AUTHORITY
21 July 49	Aydel NWAC (NEC Flt Edmonton)	20 Ax 12199			
30 Apr 50	Nav Assets Comp	20 - 1074			

REGISTRATION No.	MAKE & MODEL	YEAR	TYPE	MANUFACTURERS No.
VP-138	SPITFIRE XIV (Lend)	1946		

OVERHAUL DATA

DATE	REASON	DONE BY	REQ'N No.	COST	HOURS SINCE NEW	DATE COMPLETED	ALLOTMENT
1							
2							
3							
4							
5							
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8							
9							
10							
11							
12							

ACCIDENT RECORD

DATE	CATEGORY	PLACE	TIME	REPORT REFERENCE	DATE	AIRCRAFT TYPE	NUMBER	DISPOSAL	DATE SER
1									
2									
3									
4									
5									
6									
7									
8									

B. S. LTD.

AIRCRAFT ENGINE RECORD CARD

FAT'D 1920

REMARKS

1 Sept 47 A.f.u.g. T.S.N. 1073 - T.S.O. - Fitment - Std.

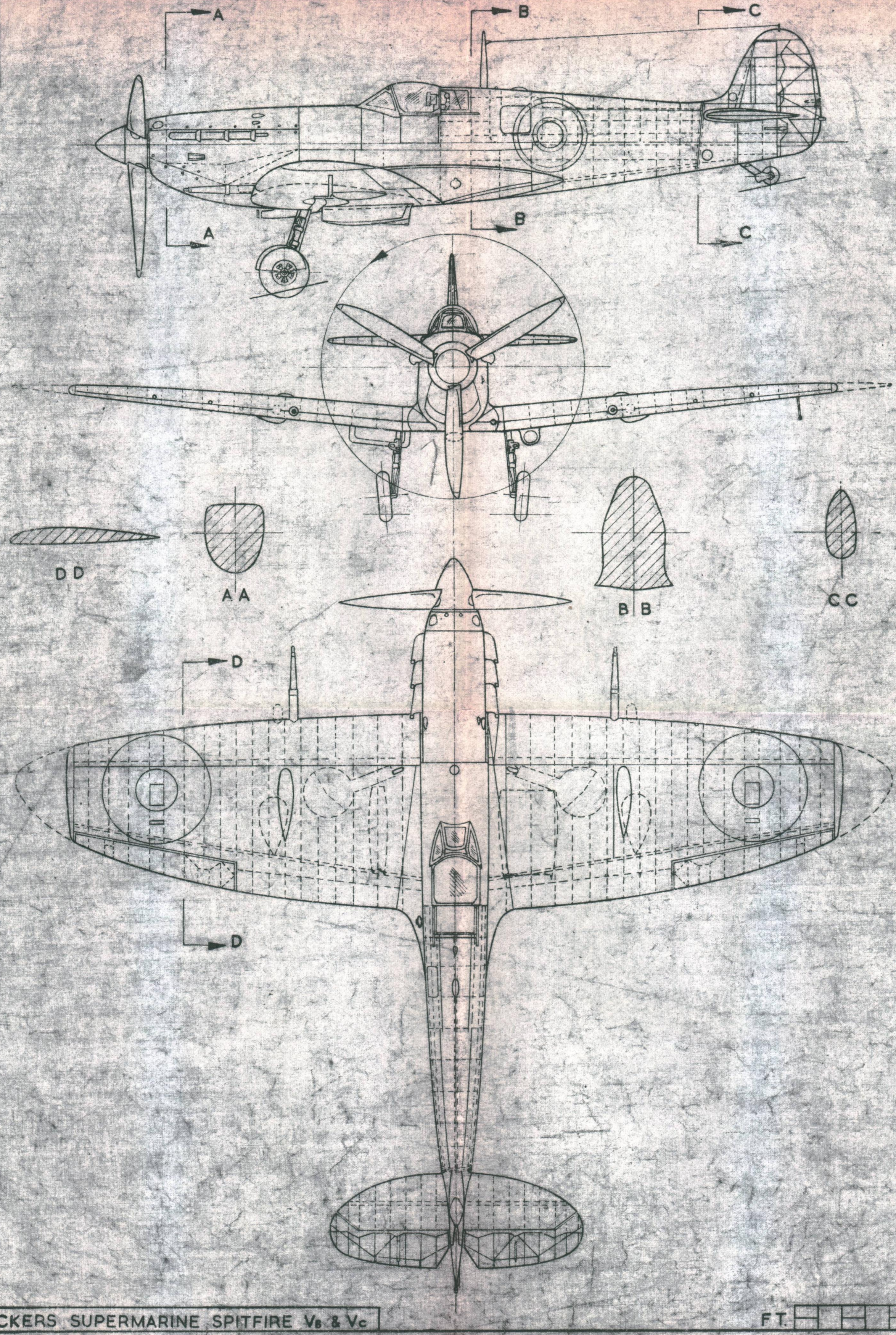
1 Mar 48 " " 150.15 - - - Constn Good

G 672

IF UNDELIVERABLE RETURN TO

CANADIAN GENERAL ELECTRIC

A 2347



VICKERS SUPERMARINE SPITFIRE Vb & Vc

FT.

G 672

IF UNDELIVERABLE RETURN TO

CANADIAN GENERAL ELECTRIC

Spitfire MK. IX & XVI

Aeromodeler

Drawing:

½" = 1'

M 2740

COCKPIT COLOURING – COCKPIT GREEN

CROWBAR

LATCHING ROD

OPEN COCKPIT DOOR DETAIL

½" LETTERING (BLACK) (LOWER LETTERING INVERTED)

"MAKE SURE LOCKED BEFORE DOOR" FLIGHT

MK. XVI REAR VISION MIRROR

W. LIGHT. DELETED ON LATER VERSION MK. XVI's

LATER CARB. DOTTED ALL MK XVI S

170 GALL. DROP TANK DOTTED.

MK. XVI SERIAL – TB 354 (F BEA) – No 5 (P) AFU. 1947

LATER AIRCRAFT ALL MK XVI S.

W. LIGHT.

SPAR

250 LB. WING BOMB

FIXED TO 27

500 LB BOMB CARRIER

CABLE

CLIPPED WINGTIP ALL MK. LF XVI S.

GOLD ROTOL TRADE MARK. (ROTOL PROP ONLY)

0° TAILPLANE DIHEDRAL

6° WING DIHEDRAL

TRIM TABS RUDDER 6° ⊙ 18° X
ELEVATORS +20 –7.

WING BOMB POSITION

MK. XVI's

LIGHTS
X. R.
⊙. G.

ALL STENCILLING B.
1 WALKWAY FORWARD.
2 " INBOARD.
3 LOCATION FOR WINGTIP STEADYING TRESTLE.
4 B DOTTED LINES ¼" X ¾"
5 " " " 1 X ½
6 JACK HERE.
7 68/168917.
8 ENGINE STARTING PLUG.
9 100 OCTANE, CAPACITY 85 GALLS.
10 ELECTRICAL & RADIO SOCKET.
11 " "
12 FUEL, OCTANE 100. 30 GALLS.
13 SMALL B PIPES.
14 COCKPIT COVER EMERGENCY RELEASE.
15 MIRROR.
16 CAMERA GUNPORT.
17 BRASS STRIP JABLO PROP ONLY
18 BR. FIBRE AERIAL INSULATOR.
19 HEXAGONAL HONEYCOMB.
20. DO PATCHES OVER GUN PORTS.
20A " "
25 ARMOUR PLATE.
26 B FOOTHOLD SHEET LIKE SANDPAPER
27 DROPTANK ATTACHMENT POINTS.
29 1" DIA. FLUSH PIPE ANGLED BACK.
30 WING BOMB ATTACHMENT POINTS.

COLOUR CODE.
A. AMBER.
B BLACK.
BR. BROWN.
D. DUCK EGG BLUE
DO. DOPE (PIEDISH BR.)
G. GREEN.
GD. DARK GREEN.
GI. LIGHT GREY.
GM. MID " .
GS. DARK SEA GREY.
W. WHITE.
Y. YELLOW.
R. RED.
BM. BARE METAL ALL DROP TANKS.

W. MARKS UPPER SURFACE.
B. " LOWER "

SECTION NACA 2200 SERIES

NOT WITH LATER CARB.

8 WITH EARLY CARB.

A' LIGHT

X. SOME AIRCRAFT

BR. 18.

X & ⊙. OTHER PANELS ⊙ ONLY.

X WINGROOT

TAIL WHEEL OMITTED

LATER AIRCRAFT

TAIL ASSEMBLY OMITTED AFT OF (J)

U/C FAIRING LATER AIRCRAFT & MK XVI

SCREWS HERE ARE BEVELLED

B MARKS

21, 22, & 28. ¼ SCALE.
23. ⅛ "

NOTES:-
A/C ARE MATT OVER ALL THEN WAX POLISHED.
ALL CAMOUFLAGE DIVISION SPRAYED.
ENTIRE UNDERSIDE U/C & U/C WELLS GM.
611 SQDN. CODE LETTERING GI.
SERIAL B.
A/C OFTEN OILY & SHOWING BARE METAL THRO' DOPE IN PLACES.
X PORT ONLY.
⊙ ST'B'D. " .
* HINGED & SPRUNG.
⊛ HINGED.

MK. XVI

OUTBOARD

L.F. XVI E & L.F. IX E PORT GUN BAY

ALTERNATIVE TO PANEL ON BS 435

PITOTHEAD X

FIREPROOF BULKHEAD

2° INCIDENCE

0° INCIDENCE

18 D. BAND

20A.

D SPINNER

30 GALL. DROP TANK

30 GALL. DROP TANK

DRAWN BY D.H. COOKSEY.

VICKERS SUPERMARINE SPITFIRE IX & XVI

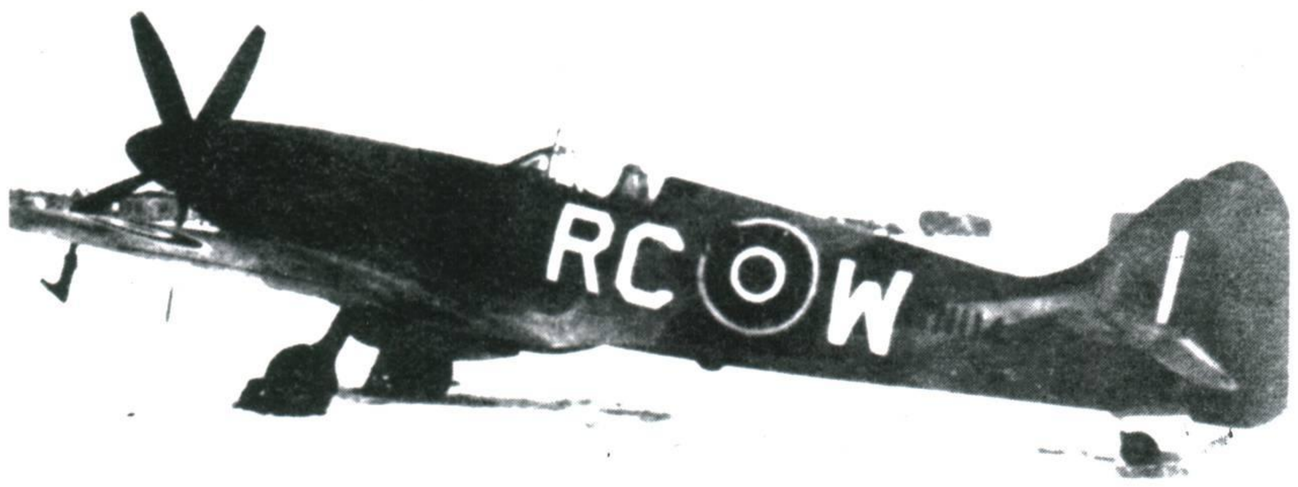
FT.



Spitfire MK V Lloyd Vern Chadburn's Aircraft.

EP548. 127 Wing Leader

Badly damaged.



Spitfire F.R. MK. XIV
RM 114

w/c R.C. Wardell
Wing Leader 39 Wing



73-19-20



74-1-1

Two versions of Douglas Bader's aircraft - Top W3185 MK. Vb
Bottom Mark IX

-	•	HF Mk. IX	**TE294**		(to SAAF as .....) Mark de Vries, Bryanston, South Africa (rest. project at Honeydew, South Africa)
CBAF. IX4494	•	LF Mk. IXe Tr Mk. IXc	**TE308**		(to Irish Air Corps as 163): del. instructional airframe, Baldonnel AB, Eire
				G-AWGB	N. A. W. Samuelson/Samuelson Film Service Elstree : del. ex Baldonnel (flown in film *Battle of Britain* .68) Sir W. J. D. Roberts, Shoreham Don Plumb, Windsor ONT (shipped to Toronto ONT, arr. 9.10.70)
				CF-RAF	Don Plumb, Windsor ONT
				C-FRAF	Don Plumb, Windsor ONT (conv. to single seater)
				N92477	Thomas J. Watson/Owls Head Transport Museum, Owls Head ME
				N308WK	Woodson K. Woods, Scottsdale AZ (conv. back to Tr.IX two-seater config., c/s) Carefree Aviation Museum, Scottsdale AZ Aero Meridian Corp, Scottsdale AZ William S. Greenwood, Aspen CO (flies as "TE308/RJ-M")
CBAF. IX4497	•	LF Mk. XVIe	**TE311**		RAF Tangmere: gate guard RAF Henlow (taxy scenes, film *Battle of Britain*" .68) RAF Benson RAF Abingdon : travelling display exhibit SERCO, West Midlands Bayeux Museum, France: loan,"MK178/LZ-V"
CBAF. 11446	•	LF Mk. XVIe	**TE330**		RAF North Weald Station Flight USAF Academy, Colorado Springs CO (del. ex RAF Odiham by C-124 7.58) USAFM, Wright-Patterson AFB, Dayton OH
CBAF. 11470	•	LF Mk. XVIe	**TE356**		RAF Bicester RAF Henlow (taxy scenes, movie "Battle of Britain" .68) RAF Kemble RAF Little Rissington RAF Cranwell RAF Leeming : displ. on pole Warbirds of GB Ltd, Bitteswell
				G-SXVI	Warbirds of GB Ltd, Biggin Hill (rest. East Midlands : ff 16.12.87)
				N356EV	Evergreen Ventures Inc, McMinnville OR
				N356TE	Evergreen Heritage Collection, Marana AZ (flies as RAF TE356/D-DE/*Carolyn*)
CBAF. 11485	•	LF Mk. XVIe	**TE384**		RAF Wymeswold: instructional airframe RAF Syerston : instructional airframe RAF Henlow (taxy scenes, film *Battle of Britain*" .68) RAFM Store, Henlow Hockey Treloar, Sydney NSW (airfreighted to Australia by RAF Belfast 12.72, open storage Canberra ACT 73/83) Camden Museum of Aviation NSW: loan, arr. H. Treloar & Jim Czerwinski, Toowoomba QLD (trucked to Toowoomba 9.83, rest. commenced)
				VH-XVI	Jim F. Czerwinski, Toowoomba QLD (ff Toowoomba 6.10.88, flies as "TE384/XVI")
CBAF.		LF Mk. XVIe	**TE392**		RAF Wellesbourne Mountford: gate guard

Photo C-14-20



Don Plumb's Spitfire Tr. Mk. IXc TE308