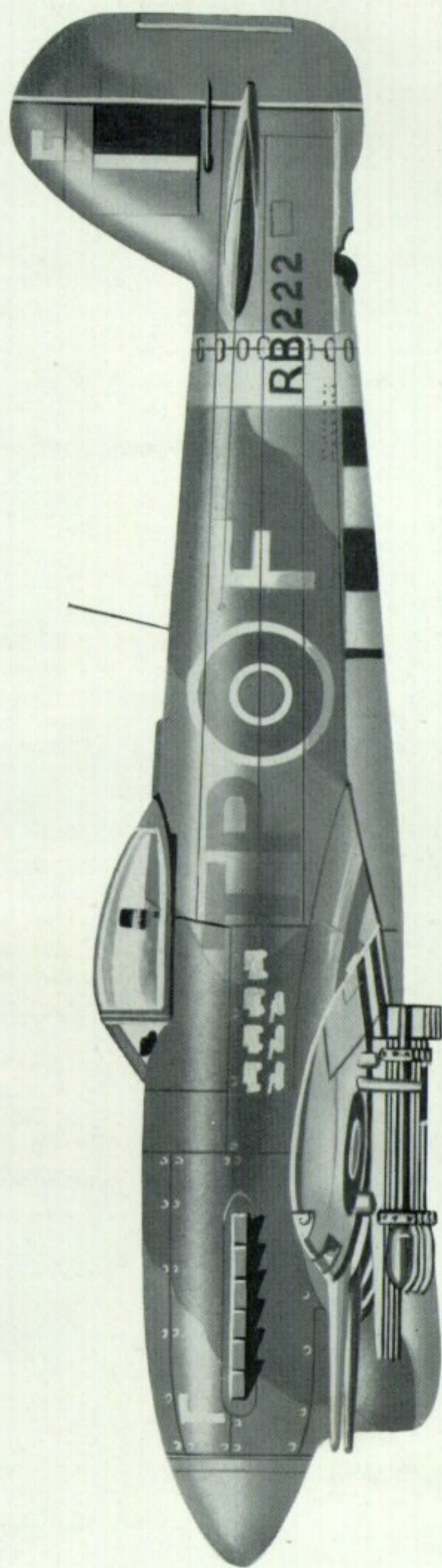


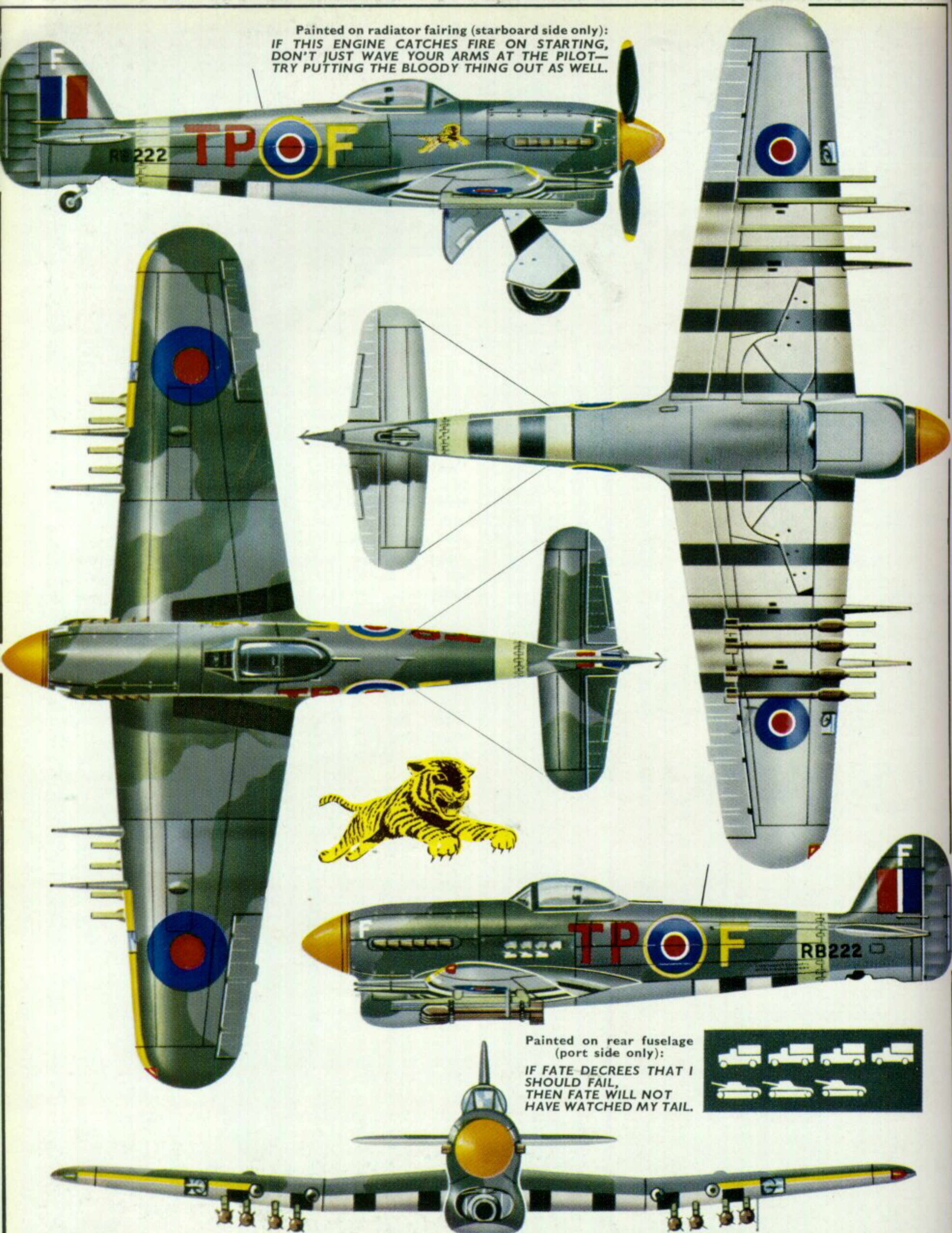
**PROFILE
PUBLICATIONS**

The
Hawker
Typhoon

**NUMBER 81
TWO SHILLINGS**



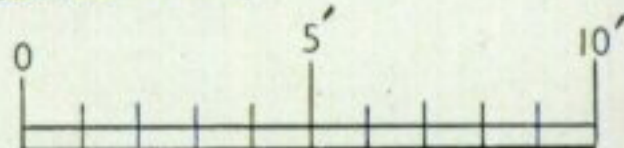
Painted on radiator fairing (starboard side only):
 IF THIS ENGINE CATCHES FIRE ON STARTING,
 DON'T JUST WAVE YOUR ARMS AT THE PILOT—
 TRY PUTTING THE BLOODY THING OUT AS WELL.

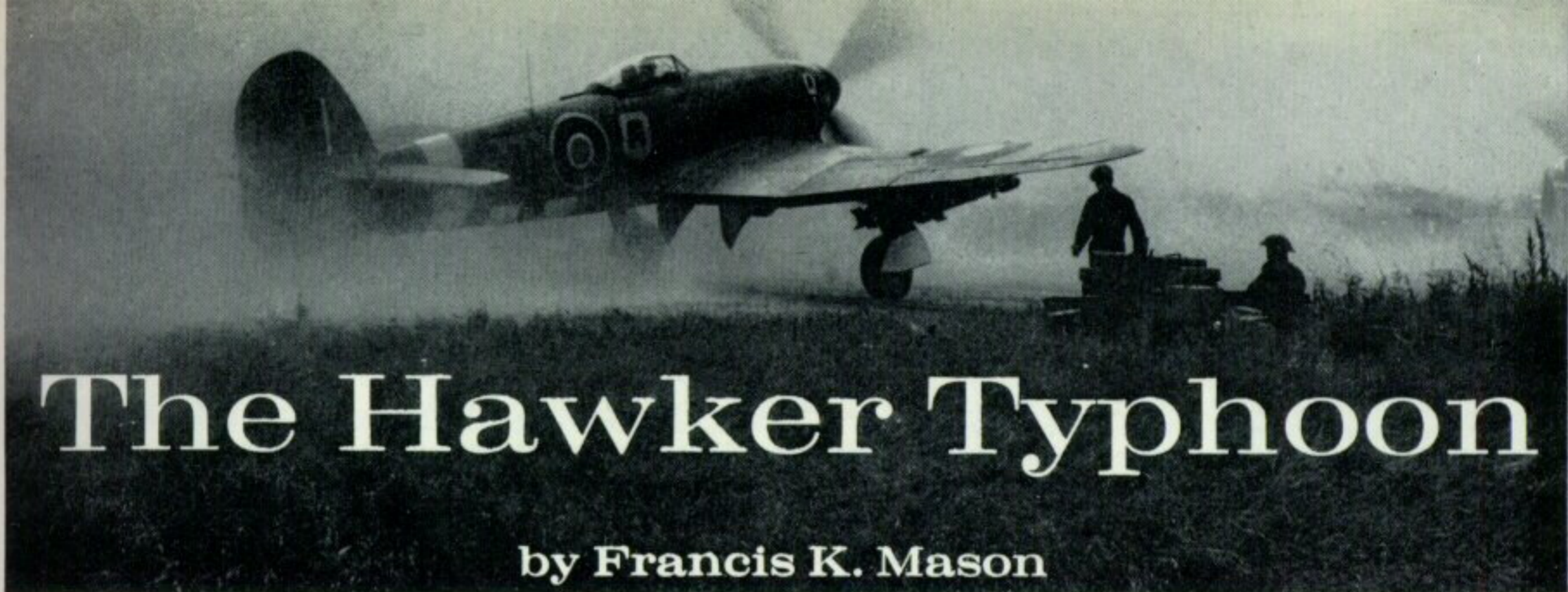


Painted on rear fuselage
 (port side only):
 IF FATE DECREES THAT I
 SHOULD FAIL,
 THEN FATE WILL NOT
 HAVE WATCHED MY TAIL.



HAWKER TYPHOON IB of No. 198 (Fighter) Squadron.
 Flown on operations against German armoured columns in the
 Battle of the Falaise Gap, mid-August 1944.





The Hawker Typhoon

by Francis K. Mason

In their historic environment, rocket-equipped Typhoon IBs of No. 198 (Fighter) Squadron taxiing on a dusty advanced strip in Normandy shortly after D-Day, 1944. (Photo: Imperial War Museum, Neg. No. CL472)

“She certainly sorted the men from the boys.” Never was an epitaph more aptly applied to an aircraft than to the Hawker Typhoon. The design had been conceived in peacetime (at a time when Air Staff planners were not quite sure for what they were planning), was hurried through its early development, test flown during times of dire political stress and national emergency and introduced into service *before* full Service clearance had been achieved either for the aircraft as a fighting machine, or for the engine as a reliable combat powerplant. In other words, from the outbreak of war in 1939 the Typhoon and its Sabre engine were regarded by non-responsible (as distinct from irresponsible) bureaucrats as of first tactical priority, while others, more *au fait* with the technical state of the art, sought in vain to administer a more realistic development programme. That the bureaucrats succeeded is surely evidenced by the unprecedented spate of failures in the early Service days of the aircraft. That the aircraft came to occupy a key place in the arsenal supporting history’s greatest invasion nevertheless justified the faith placed in it by its sponsors, its designers and, in the last resort, its pilots.

* * *

The year 1937 found British Operational Requirement staffs in something of a quandary. Already well advanced were the metropolitan defence fighters, the Spitfire and Hurricane, while an ill-found theory had started the Defiant escort fighter on its dismal path. A so-called heavy fighter, the Westland Whirlwind, had been conceived to provide surface attack.

Superficially, therefore, the fighter spectrum appeared complete. News of German activity in the heavy fighter field (hinted at by Intelligence reports of the Messerschmitt Bf 110’s first flight) suggested that the new *Luftwaffe* included in its tactical plans the

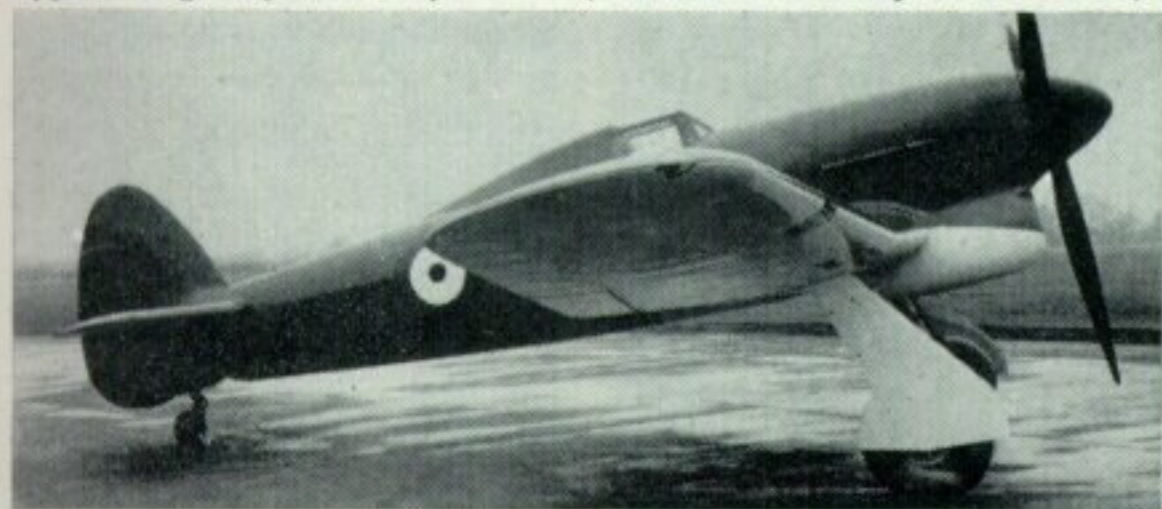
escort of strategic bombers by formidable long range fighters. Whereas Spitfires and Hurricanes were designed to combat fast bombers and lightly-armoured fighters, no interceptor existed to match a heavily-armoured, well-armed long-range fighter.

Already plans were advanced for the large-scale production of Oerlikon and Hispano 20-mm. guns for use in aircraft, but as yet no powerplant existed that could carry these into the air at high speed. The 12-cylinder Rolls-Royce Peregrine was scheduled for the Whirlwind, and as part of the research plan to find the formula for powerful engines Rolls-Royce were planning to produce a 24-cylinder X-type engine by virtually mounting one Peregrine atop another. Napier, on the other hand, was achieving some success with the H-type Dagger and this provided the basis of a new 24-cylinder sleeve-valve engine—an H-type engine on its side.

As these two engines, the Rolls-Royce Vulture and Napier Sabre, came to promise very high power outputs, so the Air Staff evolved a new fighter Specification around them, F.18/37.

Meanwhile at Hawker Aircraft Ltd., Sydney Camm was seeing his Hurricane production line maturing and by the close of 1937 the first deliveries were made to the R.A.F. Thus early was he anxious to commence development of a Hurricane replacement and his project designers set-to to tender alternative designs to F.18/37. By March 1938 these had been accepted in principle and a contract for four prototypes was issued to Hawker—two to be powered by the Sabre and two by the Vulture. Official armament proposals at the time were still somewhat flexible owing to the fact that air testing of the 20-mm. guns had not taken place in a single engine aircraft, and it was decided to arm the prototypes with the alternative armament of twelve Browning 0.303-in. machine guns.

Two views of the first F.18/37 Typhoon prototype, P5212. Principal features that identified this aircraft were the small fin and rudder, short span wings, low pressure tyres without wheel doors, triple exhaust stubs and absence of armament. Colour scheme in February 1940 was mid blue-grey upper surfaces, and black and white underwing and tailplane surfaces. Red and blue roundels appeared on upper wing surfaces only. (Photos: Ministry of Defence, Neg. No. 10280C, and Imperial War Museum, Neg. No. MH4961)





Two early photos of the second Typhoon prototype, P5216. That on the left, taken at Boscombe Down, shows the 12-gun wing to advantage as well as the hinged door flaps attached to the leg fairings. Note also the tailwheel doors. Right: A later photo taken at Langley after the tailwheel doors had been removed.

(Photos: Imperial War Museum, Neg. No. MH4962, and Hawker Siddeley Aviation Ltd.)

The Munich crisis was the first of many events to threaten the smooth progress of Camm's new fighter. As the certainty of war grew, so did the necessity to arm Fighter Command with established fighters, and all priorities were accorded to the Hurricane and Spitfire. Napier were perhaps more fortunate than Rolls-Royce in that their only production engine, the Dagger, occupied little of their production facilities, and they were thus less prevented from activating their new project. Nevertheless their experience with the Sabre prototype in the ill-fated Heston-Napier racer must have provided an indication of the volume of work that required to be completed before the Sabre was ready for service in a fighter.

(As this *Profile* is concerned only with the fortunes of the Typhoon, it is only necessary here to record that the Vulture-powered Tornado prototypes achieved their first flights on 6th October 1939 and 5th December 1940 respectively, but that difficulties with the Vulture engine led to the eventual abandonment of that design after only a handful of Tornados had been built.)

TESTING THE TYPHOON

Shrouded in the utmost secrecy, the prototype Typhoon, P5212, commenced manufacture in the old Hawker factory in Canbury Park Road, Kingston. It was first flown by Philip Lucas on 24th February 1940 but owing to a lack of directional stability it was returned to Kingston for enlargement of the fin and rudder, and it was during this period that a German bomb—one of a stick aimed at the nearby railway line to London—fell outside the Experimental Shops and narrowly missed causing serious damage to the valuable new prototype.

Shortly afterwards, during the course of a test flight, P5212 suffered structural failure of the monocoque on the starboard side of the fuselage just aft of the cockpit. The stressed skin failed and damage occurred to the primary structure; however Philip Lucas, who would have been justified in abandoning the aircraft, nursed the Typhoon back to his airfield and landed safely. He was subsequently awarded the George Medal.

It has been thought likely that the failure occurred

as the result of the larger tail unit being fitted, without re-stressing of the fuselage structure, and, although an immediate remedy was applied, the inherent weakness was to re-appear with dire results later.

During its early flights P5212 remained unarmed though provision was made for twelve Browning guns. A good deal of trouble was encountered with the Sabre I in this prototype, occasional starting fires and overheating in the air being traced to the exhaust system. As the second prototype passed through the Experimental Shop a number of improvements were included. When P5216 first flew on 3rd May 1941 it carried the twelve-gun armament, but shortly after this was replaced by the four-cannon battery. D-doors, originally fitted to the undercarriage leg fairing, were replaced by doors mounted on the centre-line of the fuselage.

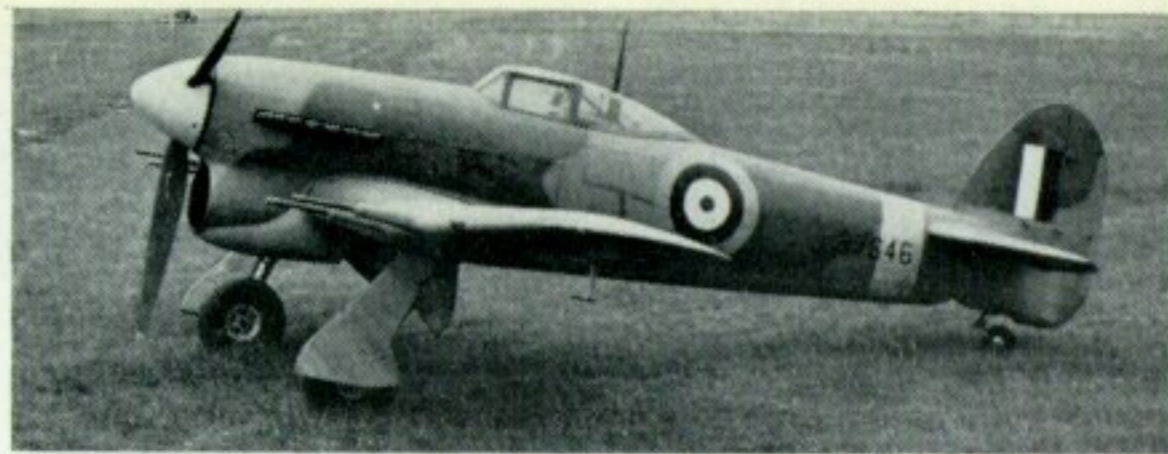
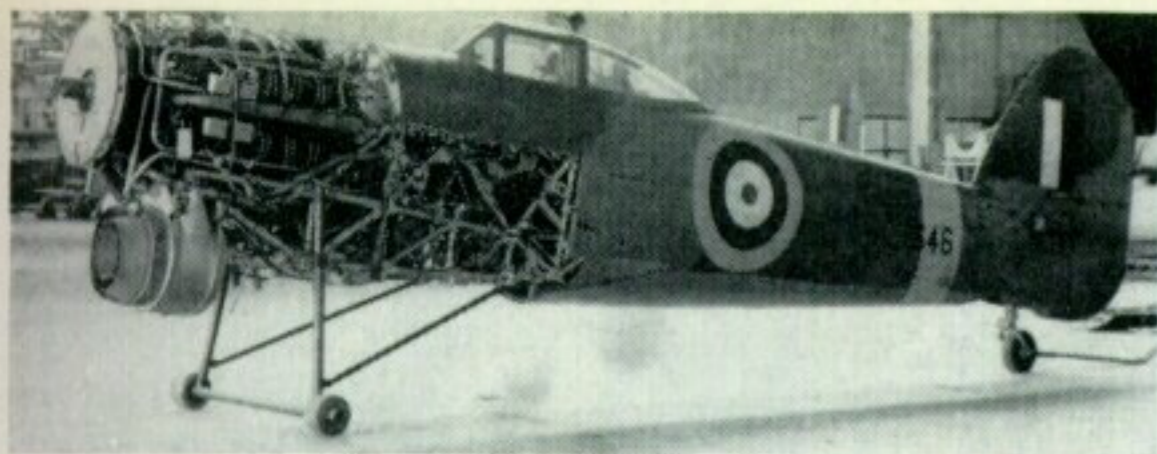
Production of the Typhoon was scheduled to be undertaken both by Hawker and by the Gloster Aircraft Company at Hucclecote, near Gloucester; and as assembly lines were beginning to take shape early in 1941 the bulk of the prototype testing fell upon but one aircraft—P5212, the only example yet completed.

This one aircraft, between frequent groundings for engine inspections (the Sabre I was only cleared for ten hours' flying between inspections), performed all gun-firing trials on the 12-gun installation, initial performance and handling trials, carbon monoxide contamination trials, spinning clearance and initial Service evaluation. The programme, spread over six months, occupied forty-seven flying hours only, and was almost completed before P5212 was joined by P5216. Much of the time was spent at Boscombe Down where critical Service pilots frequently expressed doubts about the Typhoon's potential value as an interceptor.

Not unnaturally such sentiments inevitably reached the ears of senior Air Ministry officials, and thence those of others whose vested interests might have influenced the conduct of British fighter production as a whole. Rumours reached Hawker that the Typhoon's days were numbered, rumours that seemed not ill-founded when snags and delays began to be met with the Chatellerault ammunition feed mechanism for the 20-mm. guns.



P5216 after it had been brought up to the initial production standard. Centrally-hinged mainwheel doors have been fitted, as has the four-cannon armament. Standard "dark earth and spinach" camouflage has been applied, but the absence of the "circled-P" is curious. (Photo: Hawker Siddeley Aviation Ltd., Neg. No. TYG5)



First Gloster-built Typhoon to be fitted with rear-vision hood. The photo, taken during assembly at Hucclecote, also shows the engine and radiator installation, whereas the other picture was taken during evaluation by Hawker pilots at Langley.

(Photos: F. K. Mason collection and Hawker Siddeley Aviation Ltd., Neg. No. TYG9)

It was, however, undoubtedly the Focke-Wulf Fw 190 that saved the Typhoon, for this outstanding German fighter gained ascendancy over the Spitfire V during 1941 and demonstrated that it could outmanoeuvre any R.A.F. aircraft that might venture over the Channel—and this was exactly what Fighter Command's principal actions in 1941 constituted.

Far from thus being shelved, the Typhoon's development was accelerated. Both prototypes were delivered to Boscombe Down for intensive evaluation, and the first Gloster-built Typhoon was flown by Michael Daunt on 27th May 1941.

THE EVENTFUL BAPTISM

The circumstances surrounding the Typhoon's entry into the R.A.F. can only be described as macabre. Had such events occurred in peacetime they would most certainly have been the subject of searching questions in Parliament; but this was war, and the enemy possessed an aircraft—the Focke-Wulf Fw 190A—that not only outclassed the Spitfire V and Hurricane II but posed a serious barrier to Britain's determination to win air superiority over France and the Low Countries. The Typhoon's original antagonist, the Messerschmitt Bf 110, had all but vanished as an effective offensive weapon and the appearance of the Fw 190 presented not only a dangerous threat to R.A.F. medium and heavy bombers but real danger to morale by hit-and-run raids on Southern England.

The first Typhoons were delivered to the A.F.D.U., Nos. 56 and 601 Squadrons at Duxford and its forward satellite at Matlaske, Norfolk. The aircraft were a motley mixture of Mark IAs and IBs, some with fully transparent cockpit enclosures, others with "solid" rear cockpit fairings. The engines were initially cleared for only 25 hours between major overhauls, but few reached that total. Intake fires on the ground were frequent, as were engine failures on the climb. There was also a number of unexplained structural failures for which no eye witness could account. Naturally working-up was prolonged by combat limitations and losses, but when in November 1941 the Wing was moved south under Sqdn. Ldr. R. P. Beamont to Manston and Biggin Hill to combat the sneak-raiding Focke-Wulfs, the nature of the Typhoon's major weakness was exposed—and as a result the whole matter of persevering with the aircraft at all was seriously questioned at high level.

The only known photo of a hand-tooled Gloster-built Typhoon IA showing the similarity with the prototype P5216. R7614 is shown here at Boscombe Down early in 1941 for performance trials. (Photo: F. K. Mason collection)



For in one of the relatively few instances when Typhoon pilots were brought to a perfect combat position with a height advantage from which to pounce on the enemy aircraft, the entire tail units of two aircraft were seen to break away during their dive recovery.

Lengthy structural testing in war is seldom possible and the speed with which the R.A.F. had introduced the Typhoon had precluded all but the most cursory tests. Philip Lucas' experience of failure had been confined to the monocoque immediately aft of the cockpit; the new failure occurred locally at the rear fuselage joint so that a local remedy was considered adequate—and so it proved—by the simple expedient of riveting fish plates all round the joint. Yet it is a fact born out by surviving records that of the initial 142 Typhoons delivered to the R.A.F., no less than 135 suffered serious accidents—either attributable to engine or airframe failures—without enemy action being involved.

The first Typhoon squadrons had to contend with another hazard, not previously fully understood and certainly never previously encountered at such a high level. This was the seepage of carbon monoxide into the cockpit, caused by the deterioration of bulkhead seals around the non-integral firewall. After a number of unexplained disappearances on operations, an ex-Squadron aircraft was minutely inspected and a partial remedy effected. However, the Typhoon was always regarded as potentially hazardous in this respect and it became standard practice to use oxygen breathing from the moment the engine started.

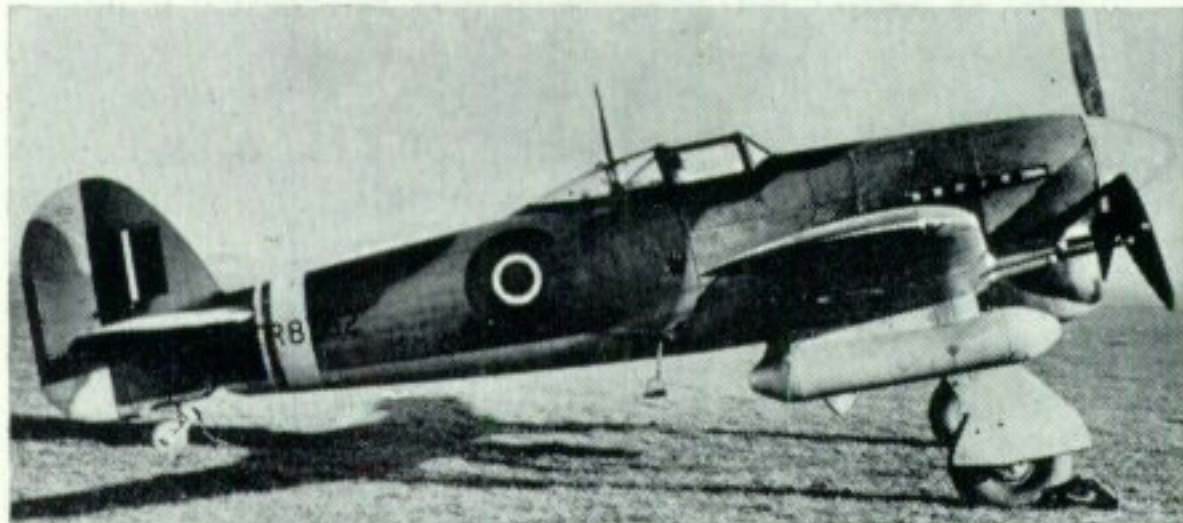
On the production side, further delays were being encountered in the delivery of Hispano guns to Gloster and Hawker, it being suspected that there was reluctance to apportion valuable stocks to an aircraft whose future was by no means assured (when other cannon-armed aircraft had already become firmly established). The result was that most of the first Service aircraft were armed with 12 Brownings, and it soon was evident that against ground targets the Typhoon was impotent.

Gradually, however, maintenance and flying experience was achieved; civilian working parties toiled side by side with Service personnel, and test pilots visited the fighter stations to dispel a feeling that every



Typhoon IB, R8224, was used for investigation into recognition schemes to eliminate confusion with the Focke-Wulf Fw 190A. The white nose was tried in an effort to so modify the Typhoon's appearance as to leave no superficial resemblance. After various alternative schemes had been discarded, reliance was placed on the now-familiar black and white stripes under the wings.

(Photo: Ministry of Defence, Neg. No. 12062B)



Typhoon IB, R8762, used at Boscombe Down for performance trials with drop tanks. The aircraft displays evidence of early anticipation of tail failure in the use of a butt strap applied round the rear transport joint (on the white band)—an interim expedient pending development of the official "fish plate" method.

(Photo: Ministry of Defence, Neg. No. 14227)

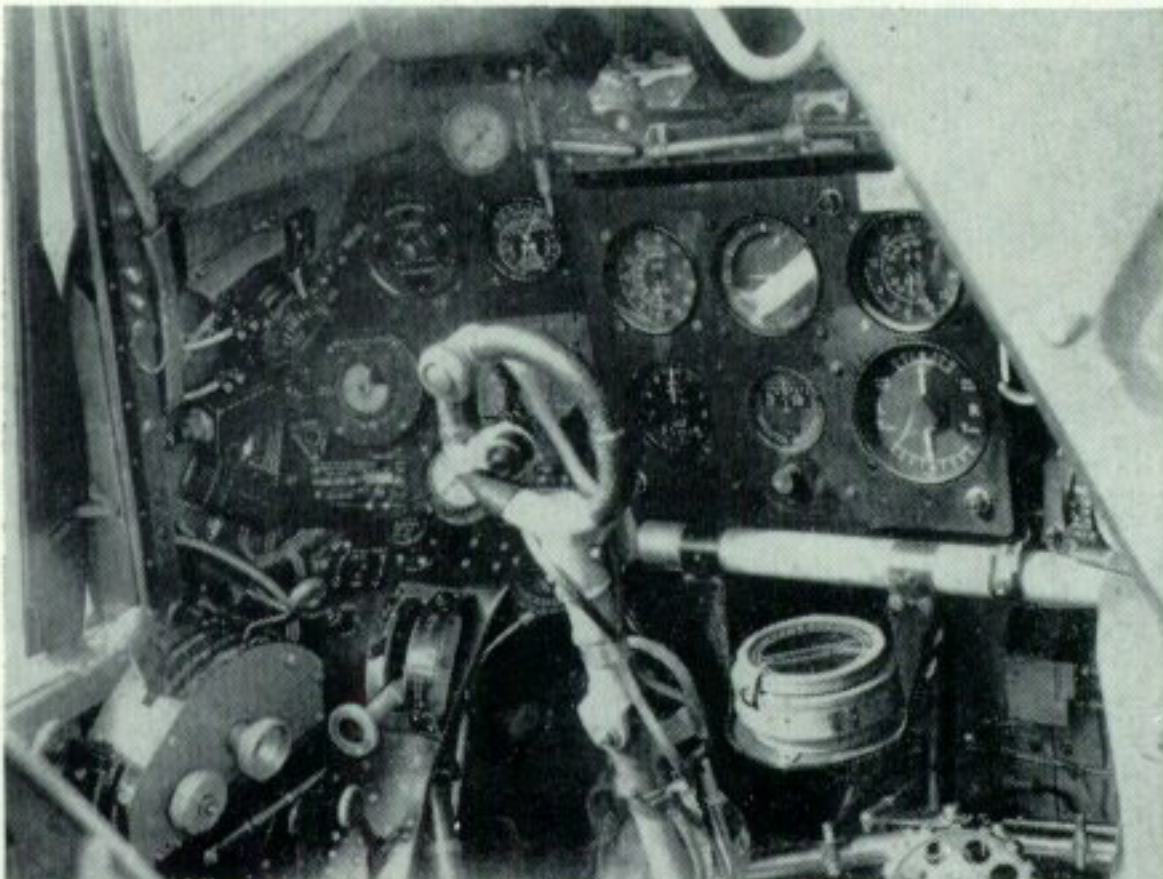


One of many Typhoon accidents, this Mark IA of No. 56 (Fighter) Squadron suffered engine failure and undershot the runway at Matlaske, Norfolk, in attempting a forced landing.

(Photo: Ministry of Defence, Neg. No. 567G (Duxford))

Cockpit of an early Typhoon IB. Elimination of the "car door" entry on later aircraft led to some tidying up of the port side of the cockpit.

(Photo: Ministry of Defence, Neg. No. 10484F)



Typhoon was a rogue aircraft. And it must be mentioned that several test pilots lost their lives. For instance, Gerry Sayer, who had been Gloster's Chief Test Pilot since 1934, was posted missing after a flight in a Typhoon, and Hawker's own K. G. Seth-Smith crashed near Windsor while testing hoods.

During the winter of 1941-42 a third Duxford-based Squadron, No. 266, became operational on the type and was followed shortly after by No. 182 at Martlesham Heath and No. 1 at Acklington.

By March 1942 Typhoon IBs had been in action against Fw 190As at low altitude with adequate success to show that below 10,000 feet there was scarcely another aircraft to match them, while at tree-top level they had proved the scourge of the tip-and-run Focke-Wulfs. But catch a Typhoon at 20,000 feet and it fell easy prey to any current first line enemy fighter. The lesson was obvious. Except for Metropolitan defence against the sneak raider, the Typhoon had failed as an interceptor, the fault lying as much in accelerated engine development as in the abbreviated aerodynamic development. Once again the Typhoon's future came under scrutiny: was it worth applying production facilities and special flying training to an aircraft for so limited a task—when variations of the Spitfire IX might well achieve better results with less industrial and military disruption?

It was the very weakness in the Typhoon's interceptor qualities that brought about the fundamental and successful change in its operational rôle, that of ground attack. For the thick wing and high wing loading that had placed the aircraft at a disadvantage at altitude now bestowed the qualities required by a load-carrying low flying fighter that might be required to survive tremendous punishment from light *flak* as well as provide a steady aiming platform in turbulent conditions.

Thus from the beginning of 1942 relatively large numbers of Typhoons were earmarked for weapon clearance trials at Boscombe Down, with back-up work being applied by Glosters and Hawker. After 44-gallon drop tank clearance trials had been completed, clearance for 500-lb. bombs was a simple next step, followed by light bomb clusters, smoke canisters, mines and finally rocket projectiles. At one time no fewer than 23 Typhoons were being tested at Boscombe Down. Encouraged by the power of the 4-cannon armament, Hawker had designed and built

The late Flt. Lt. P. E. G. (Gerry) Sayer, Chief Test Pilot of Gloster Aircraft Co. Ltd., who lost his life while flying a Typhoon. In the instance of his death, there was no evidence of structural failure of the aircraft, and the pilot of another Typhoon accompanying him at the same time also failed to return. No trace was ever found of aircraft or pilots.

(Photo: Flight International, Neg. No. 16444S)



The Typhoon IB night fighter, of which only one was built, was not considered successful owing to longitudinal dynamic instability; nor was the aircraft suitable for long range night operations, the wing tanks being used to accommodate the A.I. Mk. IV radar. Colour scheme was "middle stone" (which was extended to cover the undersurfaces) and "extra dark sea green". Trials were conducted during the winter of 1942-43.

(Photo: Hawker Siddeley Aviation Ltd.)



a set of wings mounting a 6-cannon battery and although these were fitted to a Typhoon they were never flown.

Furthermore, in an attempt to improve the high altitude performance of the Typhoon, P5216 was flown with a wing span increased to 44 ft. 2 in., but when this was abandoned the wings were reduced to 39 ft. 6 in. in an effort to further improve the low altitude performance. And although the rate of roll was considerably enhanced the aircraft displayed a marked reluctance to leave the ground at all when carrying full ammunition or two 500-lb. bombs.

ROCKETS

It was during the course of this clearance to deliver an increased broadside that the rocket projectile came to be considered. Already a trial installation of six rockets had been successfully concluded in a Hurricane at Boscombe Down, and the projectiles were in late 1942 being produced in large numbers—destined for Mosquitoes, Beaufighters, Hurricanes and Swordfish.

In themselves the British 3-in. rocket projectiles—called initially U.P.s ("unrotated projectiles") for

security reasons—were grotesque in their simplicity: a length of 3-in. cast iron pipe containing the propellant charge, a 60-lb. H.E. warhead screwed on the front and four cruciform rectangular fins at the rear. In an effort to maintain some degree of stability the charge was ignited at the forward end and exhausted through a central longitudinal orifice. Nevertheless the R.P.s were characterised by a considerable gravity drop after launching and demanded constant practice and long experience to hit a tank or other small moving targets. Theoretically a vertical dive was the best expedient . . . but pulling out . . . !

All told, a dozen Typhoons were employed in the rocket trials which were conducted from Boscombe Down, Wittering, Duxford and Farnborough, the missiles being fired over the Pendine Sands and at Leysdown on the Isle of Sheppey. On one occasion, when firing concrete-filled warheads in shallow dives over the latter range, two ricocheting missiles from one Typhoon hit and passed clean through the wings of the aircraft ahead—without fatal results.

Throughout 1943 Typhoon squadrons were withdrawn in rotation from operations for modifications to enable eight rocket-launching rails to be attached under the wings of the aircraft, and to give the pilots some opportunity to fire practice rounds. By and

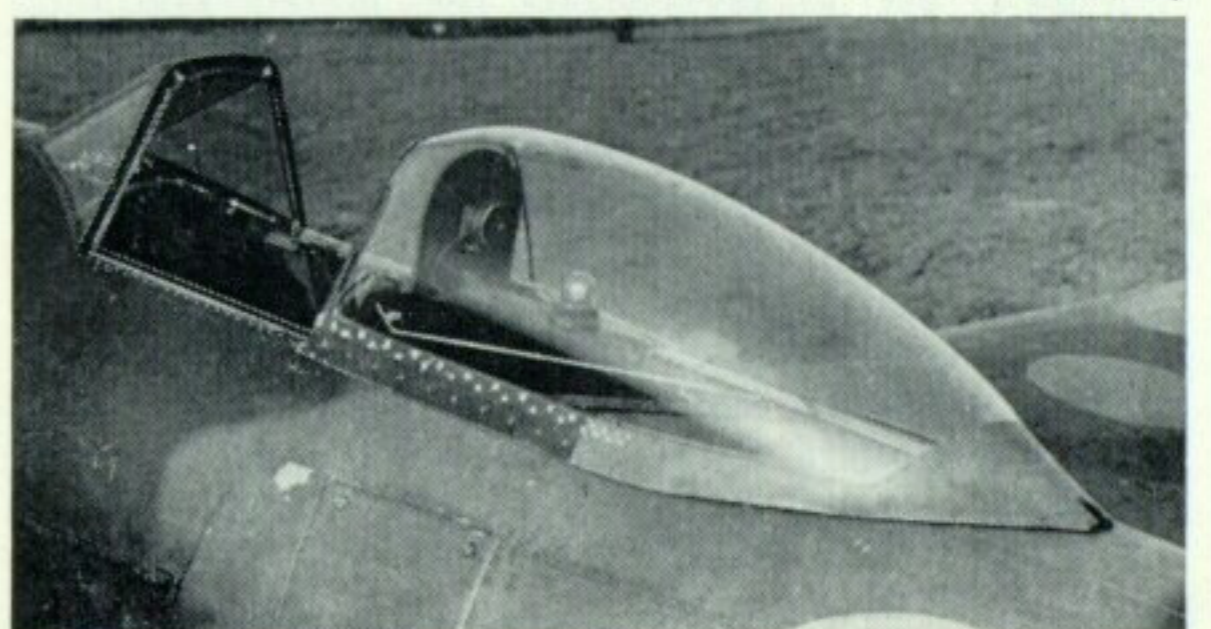


Two views of one of the tropical Typhoons. Just visible is the ventral air exit fairing between the central wheel doors. Colour scheme was sand and dark green upper surfaces and pale blue undersurfaces. Two other Typhoons, R8925 and R8889, were also equipped for tropical trials and all were shipped to Khartoum early in 1943.

(Photos: Hawker Siddeley Aviation Ltd., Neg. Nos. TYG36 and 1127)

Below: Comparative views showing the older "car door" canopy assembly and the later single-piece sliding hood. It was while performing hood development tests in R7692 that K. G. Seth-Smith, the Hawker test pilot, lost his life in a crash at Thorpe, near Windsor, in August 1942.

(Photos: F. K. Mason collection)





Cleaning up the Typhoon. A programme was initiated in 1942 to increase the performance by attention to detail; pictures of R8809 show the change in hood shape, elimination of external rear view mirror, adoption of whip aerial, fairing of cannon barrels and addition of exhaust manifold plinth. (Photos: Hawker Siddeley Aviation Ltd., Neg. Nos. TYG4 and TYG37)



large, however, there were ample targets of the operational variety, and in Operation Channel Stop daily sweeps by rocket-firing Typhoons wrought tremendous havoc among E-Boats, coastal trawlers, *flak* vessels, blockade runners and minelayers in the English Channel, and enemy airfields, railways, road vehicles and bridges in France and the Low Countries.

By 1944 the Typhoon had been mastered. Still very much a handful, it now represented a considerable portion of the Allied close-support inventory located in Southern England, poised ready to support the inevitable invasion of Europe. Now, with the Tempest coming into service as an interceptor, Typhoons were withdrawn from defence commitments and the new Tactical Air Force included twenty-two squadrons of the deadly support fighter.

Technically the aircraft had been cleaned up considerably. All now had Chatellerault cannon-feed mechanism and the Sabre IIB or IIC engine. All Typhoon IAs had long since been withdrawn, and the gun barrels of the Typhoon IBs were now faired; car doors were being replaced by single-piece sliding hoods, and Rotol and D.H. four-blade propellers appeared. The maximum speed had risen from 404 to 412 m.p.h., and numerous pilots dived Typhoons at speeds well in excess of 500 m.p.h. without parting company with their tail units!

One malady persisted until the last days of the Typhoon. Ground fires were common and often resulted in the total loss of the aircraft. Over-priming on starting, kick-back and backfiring sometimes led to otherwise easily controlled fires, but on the Typhoon the position of the large radiator caused a discontinuity in the firewall in the vicinity of the fuel trunk lines, and pilots were quick to vacate their cockpits at the first sign of smoke entering their confines in the region of their feet! During 1944 and 1945 twenty-eight Typhoons were totally destroyed in engine-starting fires.

THE INVASION

As D-Day approached, Typhoons switched their attacks to shore installations all along the French Channel coast. The "No-Ball" sites, radar installations and gun emplacements were harried and often damaged. As a prelude to the actual landings, Typhoons of Nos. 198 and 609 Squadrons on 2nd June 1944 destroyed the vital radar installation at Dieppe/Caudecôte with bombs and gunfire, and as part of the preliminary air assault twenty-six Typhoons of Nos. 174, 175 and 245 Squadrons eliminated the Jobourg radar station which would have covered the actual landing areas. The astonishing element of surprise achieved on D-Day has seldom been adequately attributed to this attack—yet its success must have been a key factor in the Allies' ability to gain a foothold on the mainland. Certainly the *Luftwaffe* was deprived of all local fighter control over the landings.

Following the "right hook" advance by American armoured divisions, there followed the classic investment of heavy German forces in Normandy, almost contained within a pocket whose only escape aperture lay at Falaise. By then most of the Typhoon squadrons were operating from airstrips on the mainland and were conveniently positioned to afford minute-to-minute support. As the German infantry and armour strived desperately to extricate themselves through the Falaise Gap, the Allied fighter-bombers dealt fearsome carnage, first blocking roads and destroying bridges and then decimating the paralysed enemy forces. At the mercy of no fewer than ten Typhoon squadrons allocated to this operation alone, it was of little wonder that survivors were anxious to surrender rather than face further inferno in the blast of the terrifying rocket salvos.

In the open battle, however, a new close support technique had been evolved, known as "Cab Rank".



One of the first Squadrons to receive the Typhoon was No. 609 (West Riding). The aircraft seen here at Biggin Hill in 1943 carried a score tally of 18 locomotives and the name "Mavis" on the fuselage and a dark red and white spinner of "A" Flight. (Photo: Imperial War Museum, Neg. No. CH9822)



Squadron Commander's aircraft of No. 197 (Fighter) Squadron. (Photo: Imperial War Museum, Neg. No. CH11592)

Interim-standard Typhoon IB fighter, JP853, of No. 486 Squadron, R.N.Z.A.F. (Photo: Imperial War Museum)





Typhoon IB line-up of No. 193 (Fighter) Squadron. Photo believed taken at Manston late in 1943. (Photo: Imperial War Museum)

The Typhoons would maintain a standing patrol at about 10,000 feet over the battle area until enemy resistance could be pin-pointed. An R.A.F. liaison officer, often stationed in a leading armoured vehicle, would then call his fighters down by radio, directing the pilots on to the aggravating target.

By October 1944 the Typhoon squadrons had reached bases close to the Dutch frontier and it was on the 24th of that month that Nos. 193, 197, 257, 263 and 266 Squadrons of No. 84 Group staged one of the brilliant "set pieces" that occasionally characterised the North European campaign. Led by Group Captain D. E. Gillam, three waves of Typhoons attacked the Headquarters of the German Fifteenth Army in the ancient city of Dordrecht. Planned to the minutest detail, the attack was entirely successful and resulted in the destruction of the Headquarters building and the deaths of two enemy generals and more than seventy other Staff officers.

The advance continued and by the New Year Typhoons were operating from Dutch airfields. On New Year's day they suffered severe losses in the *Luftwaffe's* forlorn and desperate—yet brilliantly conceived—surprise attack, Operation Hermann. All manner of enemy fighters and fighter-bombers



For many months No. 183 (Fighter) Squadron flew Typhoons on fighter-bomber strikes. These two pictures are interesting in that both aircraft are carrying the same code letters; that above, R8884, was one of the first Typhoons modified to carry underwing bombs (note old canopy and unfaired cannon). JR128 displays faired exhaust stacks, faired cannon, sliding canopy, whip aerial and 3-blade propeller.

(Photo: Hawker Siddeley Aviation Ltd., Neg. No. TYF1)



streaked over Allied airfields strafing every possible target of opportunity. Typhoon-equipped Nos. 438 and 439 Squadrons of the R.C.A.F. were caught taxiing out for a dawn take-off when the enemy appeared. Almost every aircraft in the two squadrons was damaged or destroyed; pilots with no chance of take-off promptly dived for cover, while one or two who struggled into the air were promptly shot down.

Nevertheless the Typhoon came to be regarded as the yardstick by which future close support specifications were evaluated for some years. When the War in Europe ended, the Typhoon was speedily replaced by the Tempest, and most aircraft were reduced to scrap (few being allocated to training units owing to many Tempests being surplus to the post-war R.A.F.'s requirements).

A total of 3,330 Typhoons were built, almost all by Gloster Aircraft Co. Ltd. A surprisingly small number of experimental variants was developed and included a night fighter, a tropical version (which underwent clearance trials at Khartoum), and an aircraft with an annular radiator. The constant uncertainty as to the Typhoon's capacity to overcome progressive faults and limitations, together with the early arrival of the Hawker Tempest, prevented more exotic development of this, surely one of the most outstanding—if notorious—of all close support fighters.

FLYING THE TYPHOON

To pilots accustomed to the low wing loading and sensitivity of the Spitfire IX, the Typhoon was undoubtedly a fearsome experience! Perhaps one of the most animated reminiscences of a pilot's first encounter with the aircraft was written in Pierre Clostermann's *The Big Show**:

"I tightened my straps, released the brakes, carefully aligned myself on the white line down the middle of the concrete and slowly opened the throttle, with my left foot hard down on the rudder bar.

I had been warned that Typhoons swung, but surely not as much as this! And the brute gathered speed like a rocket! I corrected as much as I could with the brakes, but even then I found myself drifting dangerously to the right.

Halfway down the runway my right wheel was practically on the grass. If I came off the concrete I would gracefully flip on my back . . . To hell with it, I tore her off the ground.

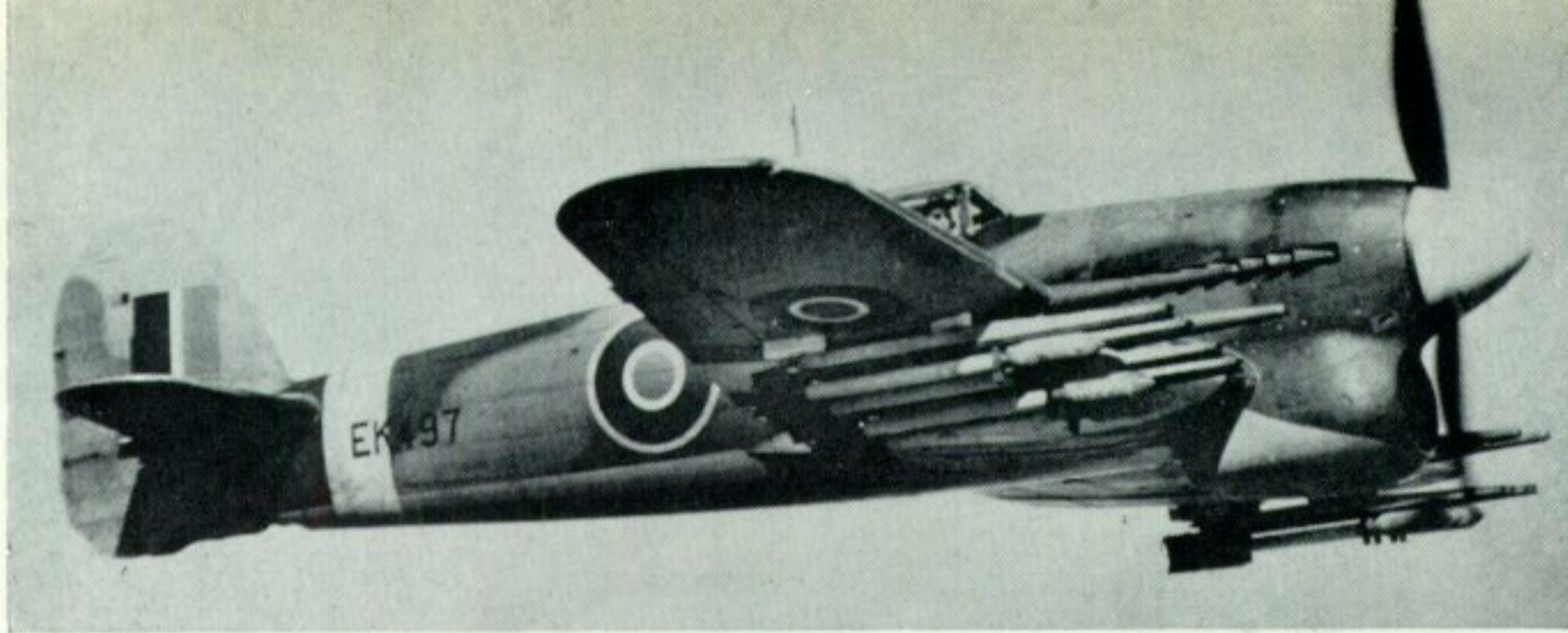
This plane just had no lateral stability at all. I still went on drifting to starboard and, with those miserable ailerons that only 'bit' at speeds higher than 100 m.p.h. I dared not lower my port wing too much. . . . I retracted my undercart but forgot to put the brakes on. A terrific vibration which shook the whole plane from stem to stern reminded me that my wheels had gone into the cavities in the wings still revolving at full speed. . . .

In the end I got my hand in a bit and felt better. There was a tendency to skid in the turns, but it wasn't too bad.

Just a wee dive to see what happened. Phew! With its seven tons, the thing's acceleration downhill was simply fantastic. I realised with satisfaction that as far as speed was concerned this was much better than a Spitfire. What would it be like in a Tempest?

Half an hour quickly passed and I began to summon courage for the landing. First a circuit at full throttle at 420 m.p.h. to clear those plugs again. But after that I couldn't seem to reduce speed enough

*The Big Show, Pierre Clostermann, translated by Oliver Berthoud (Chatto & Windus, London).



Scourge of the Normandy battlefields were the rocket-armed Typhoons. Eight 3-in. rockets were carried in addition to the standard 4-cannon armament.

to lower my undercart with safety, even though I throttled back, swishtailed violently, and lowered my radiator. . . . In desperation I did a vertical climb, without the engine; this took me up about 3,000 feet but it reduced my speed to about 200 m.p.h. At this low speed the machine was horribly unstable, and letting down the undercart had an unexpected effect on the centre of gravity.

Cautiously . . . I made my approach, lowered the flaps, and everything went off fine until I tried to level out—those thick wings seemed to have plenty of lift, but they were treacherous. I had just begun to ease the stick back when the whole contraption stalled and dropped like a stone. Then it bounced back a good 30 feet with its nose in the air, amidst an appalling din.

I opened up like mad to break the fall, wrestling at the same time with the ailerons so as not to land on my back.

Eventually, after bucking two or three times like a mustang, my Typhoon finally calmed down and rolled drunkenly down the runway, which now looked distinctly short. However, I managed to stop before ramming the scenery, in a cloud of smoke and oil. A strong smell of burnt rubber rose from my poor tyres, which had stood up valiantly to seven tons landing on them at 120 m.p.h. . . ."

PRODUCTION AND SERVICE ALLOCATION

Hawker F.18/37 prototypes. Two aircraft, P5212 and P5216, ordered under Contract No. 815124/38 and built under Works Order No. 5232 dated 3/3/38. P5212 powered by Napier Sabre I No. 95007 (later 95018), ff. 24/2/40 with provision for 12 machine guns. P5216 powered by Sabre I No. 95023 (later 95018 from P5212, ff. 3/5/41 armed with four 20-mm. Hispano Mk. I guns. P5216 flown on 9/11/41 with production cockpit canopy and extended wing tips.

Hawker Typhoon (Centaurus). One aircraft, LA594, ordered under Contract No. 21392/41, commenced but not completed. Centaurus II engine proposed. Referred to as Typhoon II, later developed into Tempest II.

Hawker Typhoon IA and IB. Production batch of 15 aircraft built by Hawker Aircraft Ltd., Langley, Bucks. R8198-R8200, R8222-R8231. Most aircraft with 12-gun wings.

Hawker Typhoon IA and IB. Contract for 250 aircraft placed with Hawker Aircraft Ltd., but sub-contracted to Gloster Aircraft Co., Hucclecote, Glos. Most aircraft with 4-cannon wings. Car-type cockpit doors, Sabre I and II. R7576-R7599, R7613-R7655, R7672-R7721, R7738-R7775, R7792-R7829, R7845-R7890, R7913-R7923.

Hawker Typhoon IB. Second sub-contract for 250 aircraft placed with Gloster. Sabre II. R8630-R8633, R8680-R8722, R8737-R8781, R8799-R8845, R8861-R8900, R8923-R8947, R8966-R8981.

Hawker Typhoon IB. First contract for 700 aircraft placed with Gloster. Sabre II, Deliveries commenced 20/9/42; average production rate 22 aircraft per week. DN241-DN278, DN293-DN341, DN355-DN389, DN404-DN453, DN467-DN513, DN529-DN562, DN576-DN623, EJ900-EJ934, EJ946-EJ995, EK112-EK154, EK167-EK196, EK208-EK252, EK266-EK301, EK321-EK348, EK364-EK413, EK425-EK456, EK472-EK512, EK535-EK543.



Two views of a Typhoon F.R.IB, EK427. Armed with the outboard cannon only, these aircraft were equipped to carry a forward-facing camera in the starboard inboard gun bay, an oblique camera in the port wing and one or two vertical cameras in the fuselage. About sixty such aircraft were thus modified. (Photos: Ministry of Defence, and Imperial War Museum)



JP648-JP689, J P723-JP756, JP786-JP802, JP836-JP861, JP897-JP941, JP961-JP976, JR125-JR152, JR183-JR223, JR237-JR266, JR289-JR338, JR360-JR392, JR426-JR449, JR492-JR535.

Hawker Typhoon IB. Third contract for 800 aircraft placed with Gloster. Sabre II. Deliveries commenced 8/12/43. Most aircraft fitted with sliding hoods; some aircraft with four blade propellers. Average rate of production 29 aircraft per week. MM951-MM995, MN113-MN156, MN169-MN213, MN229-MN269, MN282-MN325, MN339-MN381, MN396-MN436, MN449-MN496, MN513-MN556, MN569-MN608, MN632-MN667, MN680-MN720, MN735-MN779, MN791-MN823, MN851-MN896, MN912-MN956, MN968-MN999, MP113-MP158, MP172-MP203.

Hawker Typhoon IB. Fourth contract for 255 aircraft placed with Gloster. Sabre II. Deliveries commenced 6/3/44. (Most aircraft delivered with Sabre IIB and IIC driving 4-blade propellers.) Average rate of production 5 aircraft per week. RB192-RB235, RB248-RB289, RB303-RB347, RB361-RB408, RB423-RB459, RB474-RB512.

Hawker Typhoon IB. Fifth contract for 300 aircraft placed with Gloster during 1944. Sabre IIC. Deliveries commenced 5/1/45; last aircraft delivered 13/11/45. Average rate of production 7 aircraft per week. SW386-SW428, SW443-SW478, SW493-SW537, SW551-SW596, SW620-SW668, SW681-SW716, SW728-SW772.

Representative aircraft in R.A.F. service:

No. 1 (Fighter) Sqn., Acklington and Tangmere: R7919, R7921, R7922, R8630, R8631, R8634, R8690, R8708, R8862, R8981, EJ974 ("T"), EJ992 ("M"), JP337 ("A"), JP685 ("O"), JP738 ("N"), JR126 ("H"), MN115 ("Q"), MN124 ("F"), MN252 ("M"), MN513 ("N"), RB352 ("L").

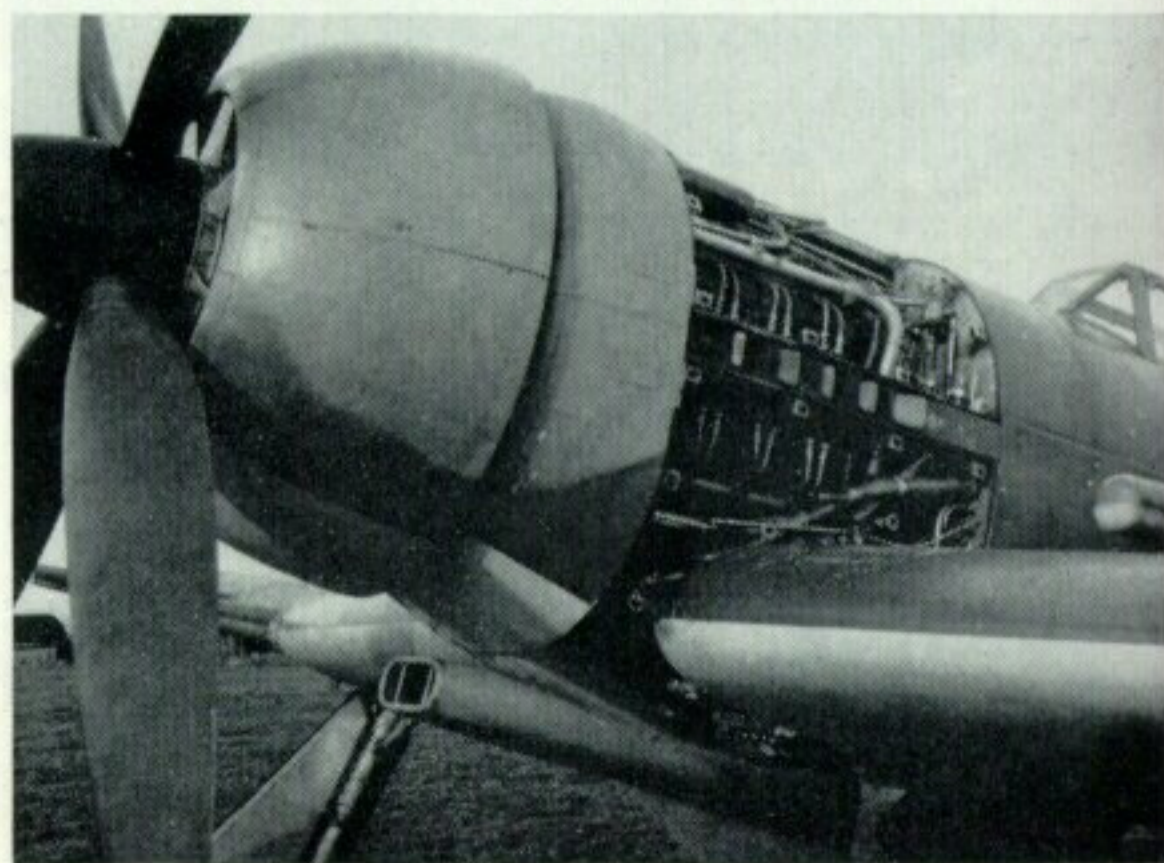
No. 3 (Fighter) Sqn.: JP741 ("U"), JR446, JR448, JR497.

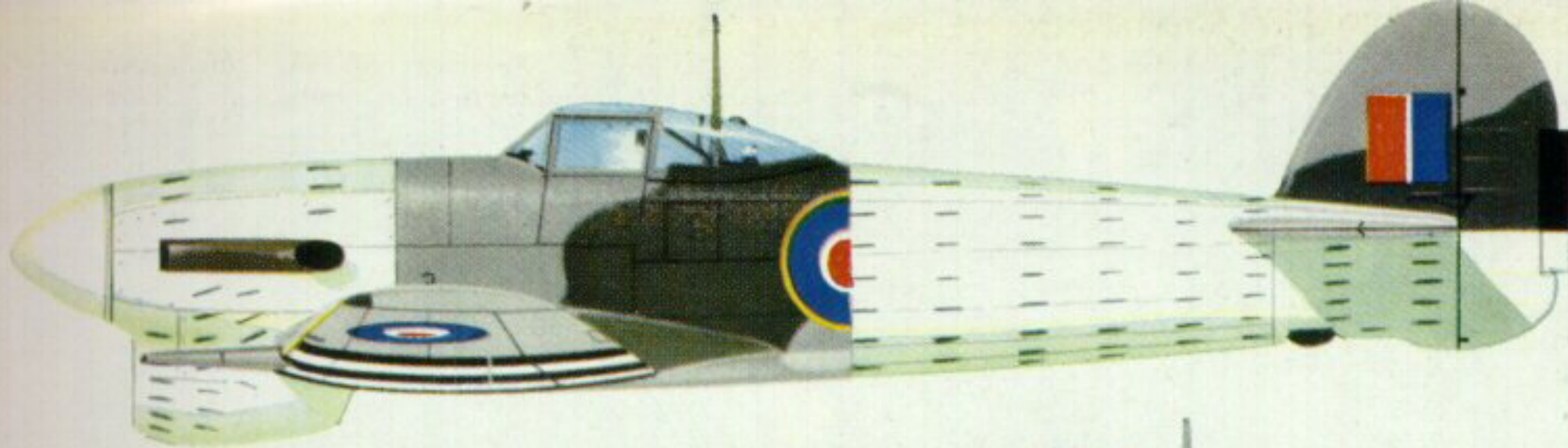
No. 33 (Fighter) Sqn.: EJ930 ("P"), EJ987 ("M"), EK187 ("K"), EK495 ("L"), MN515 ("A"), MN779 ("P").

No. 56 (Fighter) Sqn., Duxford, Matlaske, Snailwell: R8220-R8223, R8231 ("Z"), R7583 ("W"), R7584 ("S"), R7586 ("P"), R7587 ("D"), R7588 ("N"), R7591 ("T"), R7593 ("A"), R7594 ("B"), R7596 ("M"), R7598 ("O"), R7599 ("L"), R7615 ("J"), R7616 ("F"), R7619 ("O").



One of the interesting installations carried out on the Typhoon was that of the annular radiator with Sabre II and IV engines in R8694. By and large this was a successful experiment but disruption to production lines forestalled any interest by the Air Ministry. Top speed was quoted by Napiers at 452 m.p.h.





Typhoon IB used by Aerodynamics Depts., R.A.E. and A. & A.E.E., 1941, for airflow tests with wool tufts. Note temporary exhaust shroud and extended rudder tab. Serial No. unknown.

Typhoon IB of No. 197 (Fighter) Squadron; Channel sweeps, 1943.



One of three Typhoon IBs used for tropical trials, Ismailia and Khartoum, early 1943.

Typhoon IB of No. 486 Squadron, R.N.Z.A.F., North Weald and West Malling, 1943.



Late-series Typhoon IB of No. 198 (Fighter) Squadron—serial unknown—Normandy and Brittany landing strips, July and August 1944.

Sole Typhoon N.F.IB, R7881, with A.I. Mk. IV radar, Boscombe Down and F.I.U., Ford, 1942-43.



Typhoon T.T.I (believed SW500); target tug flown by 2nd Tactical Air Force, late 1945, and by No. 56 O.T.U., 1946 (markings of latter shown).

Final production standard shown by Typhoon IB, SW537, delivered to the R.A.F. just before the end of the European war in 1945. Napier Sabre IIC driving four-blade D.H. propeller, faired cannon, exhaust plinth, sliding canopy and whip aerial all characterised the last production batch. (Photo: Hawker Siddeley Aviation Ltd., Neg. No. TYP11)



R7621 ("H"), R7622 ("Q"), R7629 ("P"), R7633 ("C"), R7679 ("L"), R7711 ("M"), R7713 ("Z"), R8884 ("L"), R8869 ("T"), R8973 ("B"), DN317 ("C"), EJ962 ("R"), EK181 ("X"), EK269 ("K"), EK326 ("E"), JP446 ("U"), JP681 ("F"), JP682 ("L"), JP728 ("G"), JP749 ("V"), JR262 ("J"), MM992 ("B"), MN182 ("C"), MN198 ("D"), MN206 ("J").
 No. 137 (Fighter) Sqn.: DN492 ("W"), JR261 ("Z"), MN455 ("A"), MN533 ("E"), MN584 ("W").
 No. 164 (Fighter) Sqn.: DN432 ("F"), EK115 ("L"), EK379 ("J"), JP367 ("J"), JP437 ("J").
 No. 168 (Fighter) Sqn.: EK384, EK413, EK432, JP515, JP920, JR308, JR332, JR444, JR508, MN265, MN366, MN369, MN999, RB427, RB499.
 No. 175 (Fighter) Sqn.: EK153 ("S"), EK447 ("B"), EK455 ("B"), JP394 ("E"), JP753 ("S"), JR308 ("D"), JR501 ("R"), MN204 ("Y"), MN606 ("T").
 No. 181 (Fighter) Sqn., Duxford: R8772, R8802, R8826-R8830, R8831 ("U"), R8835, R8865, R8873, R8877, R8879, R8896, R8929, DN337, DN358 ("B"), EK184 ("U"), EK221 ("Q"), EK280 ("G"), JP604 ("W"), JP917 ("O"), JP920 ("E"), JR212 ("K"), JR294 ("C"), JR297 ("B"), JR381 ("Z"), MN199 ("F"), MN304 ("N"), MN992 ("E"), RB341 ("R").
 No. 182 (Fighter) Sqn., Martlesham Heath: R8221, R7624 ("D"), R8833 ("A"), R8834 ("M"), R8836 ("B"), R8840 ("L"), R8862 ("C"), R8924 ("E"), R8928 ("H"), DN261 ("L"), DN319 ("X"), EK388 ("F"), JP395 ("H"), JP397 ("S"), JP920 ("P"), JR220 ("X"), JR255 ("Y"), JR293 ("C"), JR528 ("J"), MN995 ("A").
 No. 183 (Fighter) Sqn.: JP790 ("C"), JR128 ("L"), JR209 ("G"), JR263 ("Z"), MN260 ("H"), MN454 ("L"), MN549 ("A").
 No. 184 (Fighter) Sqn.: DN471, JP367, JR337 ("Z"), MN301 ("Y"), MN485 ("G").
 No. 189 (Fighter) Sqn., Digby: R8939.
 No. 193 (Fighter) Sqn.: MN716 ("B"), MN886 ("E"), MN902 ("X"), RB227 ("P").
 No. 195 (Fighter) Sqn., Hutton Cranswick: R8938.
 No. 197 (Fighter) Sqn.: DN494 ("N"), EJ928 ("A"), EK505 ("D"), JP504 ("Z"), JR318 ("L"), MN326 ("A"), MN752 ("C").
 No. 245 (Fighter) Sqn.: JP660 ("S"), MN182 ("C"), MN267 ("V"), MN371 ("J").
 No. 247 (Fighter) Sqn., Duxford: R8687, R8809, R8894, R8968, DN252 ("N"), DN278 ("D"), EJ911 ("J"), EK190 ("X"), JP578 ("Z"), JP661 ("P"), JR205 ("B"), JR207 ("L"), JR208 ("C"), JR326 ("T"), MN975 ("A"), MN299 ("H"), MN979 ("S").
 No. 257 (Fighter) Sqn., High Ercall and Exeter: R8631-R8633, R8636-R8639, R8650-R8655, R8646 (delivered 24/7/42, crashed 29/7/42), EJ926 ("L"), EK172 ("T"), MN645 ("F"), MP116, MP124.
 No. 263 (Fighter) Sqn., Exeter: R8923 ("U"), R8927 ("V"), JR442 ("D"), JR532 ("H"), MN139 ("R"), MN187 ("A"), MN295 ("S"), MN407 ("T"), MN883 ("J"), RB300 ("M"), SW419 ("C"), SW570, SW586, SW588.

No. 266 (Fighter) Sqn., Duxford, Wittering and Warmwell: R7626 ("W"), R7627 ("L"), R7634 ("D"), R7635 ("V"), R7649 ("O"), R7676 ("Q"), R7921 ("K"), R8937 (crashed at Exeter, 8/4/43), DN296 ("K"), EK448 ("A"), JP853 ("K"), MN353 ("J"), MN683 ("R"), MN712 ("Z"), RB451 ("U").
 No. 438 Sqn., R.C.A.F.: DN619 ("G"), EK383 ("N"), EK481 ("H"), JR135 ("J"), MM959 ("B"), MN283 ("L"), MN626 ("A"), RB391 ("Y"), SW398 ("E"), SW414 ("G").
 No. 439 Sqn., R.C.A.F., Dunsfold: R8926 ("B"), R8977 ("D"), EK219 ("X"), JR299 ("S"), JR362 ("F"), JR444 ("J"), JR506 ("X"), MN427 ("Y"), MN464 ("N"), MN516 ("W"), RB257 ("S"), RB441 ("Z"), SW423 ("J"), SW460 ("D").
 No. 440 Sqn., R.C.A.F.: JR432 ("A"), MN428 ("B"), RB377 ("Z"), SW428 ("S").
 No. 486 Sqn., R.N.Z.A.F., Wittering, North Weald and West Malling: R8684 ("B"), R8707 ("V"), R8713 ("T"), R8746 ("P"), EJ973 ("B"), EK511 ("T").
 No. 609 (West Riding) Sqn., A.A.F., Duxford, Biggin Hill and Manston: R7688 ("K"), R7873 ("T"), R8810, R8888, DN406 ("F"), EK225 ("H"), JP851 ("Q"), JR379 ("L"), MN701 ("Z"), MN868 ("W"), SW501, SW504, SW536, SW566.
 Operational Training Units. No. 54: MN753 ("R"). No. 55: DN442, EJ990, EK232, JP578 ("P"), JR185 ("H"), MN266 ("W"), RB481, SW627 ("X"). No. 56: EK173, JP970 ("F"), JR149 ("V"), MN240 ("J"), SW474 ("K"), SW523 ("D"). No. 59: EK221 ("M"), JR371 ("J"), MN804 ("E"), SW531 ("A"), SW636 ("T").
 Random examples of Typhoon accidents: R7646 (crashed at Cranwell during stability trials, 4/5/42); R8705 (crashed during test flight, 15/8/42); R8720 and R8756 (collided in bad weather); DN323 (forced landed after engine failure, 31/12/42); R8769 (crashed during delivery to R.A.F., 19/9/42); MN173 (extensively damaged in fire during engine starting, 1944); MP136 (fire in the air; aircraft exploded during dive bomb attack, 22/10/44); JP551 (aircraft destroyed in fire during engine starting, 24/1/45); RB404 (ditto, 31/1/45); SW456 (fire in the air, pilot safe, 16/3/45).
 Other Notes: R8198, R8222, R8225, R7576, R7618, R7672, DN340, EK122, JR333, MN551, RB306, SW555 (retained for prolonged trials by H.A.L. & G.A.C.); R7638 (Rotol propeller trials); R7578, R7618, R7638, R7712 (engine trials at Napier, Luton); R7684 (No. 17 O.T.U., 1943); R7771 (Sabre IIA with mixed-matrix radiator; trials at Luton); R7846, R8925, DN323 (tropical radiators; trials at Khartoum); R7850 (Napier engine test bed); R7881 (radar-equipped night fighter); R8693 (R.A.E. camouflage and other paint schemes); JR210 (rogue aircraft extensively tested by experimental establishments; painted TR210 in error); MN148 (A.F.D.U.); RB306 (trials with cluster bombs, 1945).

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SPECIFICATION	1st Prototype P5212	Typhoon IA R7576	Typhoon IB R8762	Typhoon IB DN348	Typhoon IB SW555
Date of performance report	6/6/40	17/8/41	26/11/42	9/7/43	13/10/45
Powerplant	2,020 h.p. Napier Sabre I and 3-blade D.H. propeller	2,100 h.p. Napier Sabre I and 3-blade D.H. propeller	2,180 h.p. Napier Sabre IIA and 3-blade Rotol propeller	2,200 h.p. Napier Sabre IIB and 3-blade D.H. propeller	2,260 h.p. Napier Sabre IIC and 4-blade Rotol propeller
Dimensions:					
Wing span	41 ft. 4 in.	41 ft. 7 in.	41 ft. 7 in.	41 ft. 7 in.	41 ft. 7 in.
Length	31 ft. 6 in.	31 ft. 10 in.	31 ft. 10 in.	31 ft. 10 in.	31 ft. 11½ in.
Height (tail down) ..	15 ft. 1 in.	14 ft. 10 in.	14 ft. 11 in.	14 ft. 10 in.	15 ft. 4 in.
Weights:					
Empty	7,109 lb.	7,630 lb.	8,280 lb.	8,690 lb.	8,840 lb.
Loaded (clean)	10,990 lb.	11,502 lb.	11,700 lb.	11,777 lb.	11,850 lb.
Loaded (overload) ..	—	—	—	12,905 lb.	13,980 lb. (U.S. 1,000-lb. bombs)
Performance:					
Max. speeds (at usual operating altitudes) ..	408 m.p.h. at 18,000 ft. and 396 m.p.h. at sea level	406 m.p.h. at 16,600 ft. and 398 m.p.h. at sea level	404 m.p.h. at 10,000 ft. and 398 m.p.h. at sea level	409 m.p.h. at 10,000 ft. and 406 m.p.h. at sea level	413.5 m.p.h. at 11,500 ft. and 412 m.p.h. at sea level
Time to height	5 min. 55 sec. to 15,000 ft.	6 min. 30 sec. to 15,000 ft.	6 min. 20 sec. to 15,000 ft.	5 min. 55 sec. to 15,000 ft.	5 min. 50 sec. to 15,000 ft.
Range with max. fuel ..	405 miles	380 miles	374 miles	910 miles with two 44-gal. drop tanks	510 miles with two 500-lb. bombs
Armament	Nil	12 0.303-in Brownings	4 20-mm. Hispano Mk. I	4 20-mm. Hispano Mk. I	4 20-mm. Hispano Mk. I*
Other data	Car door	Car door	Car door	Car door	Sliding hood