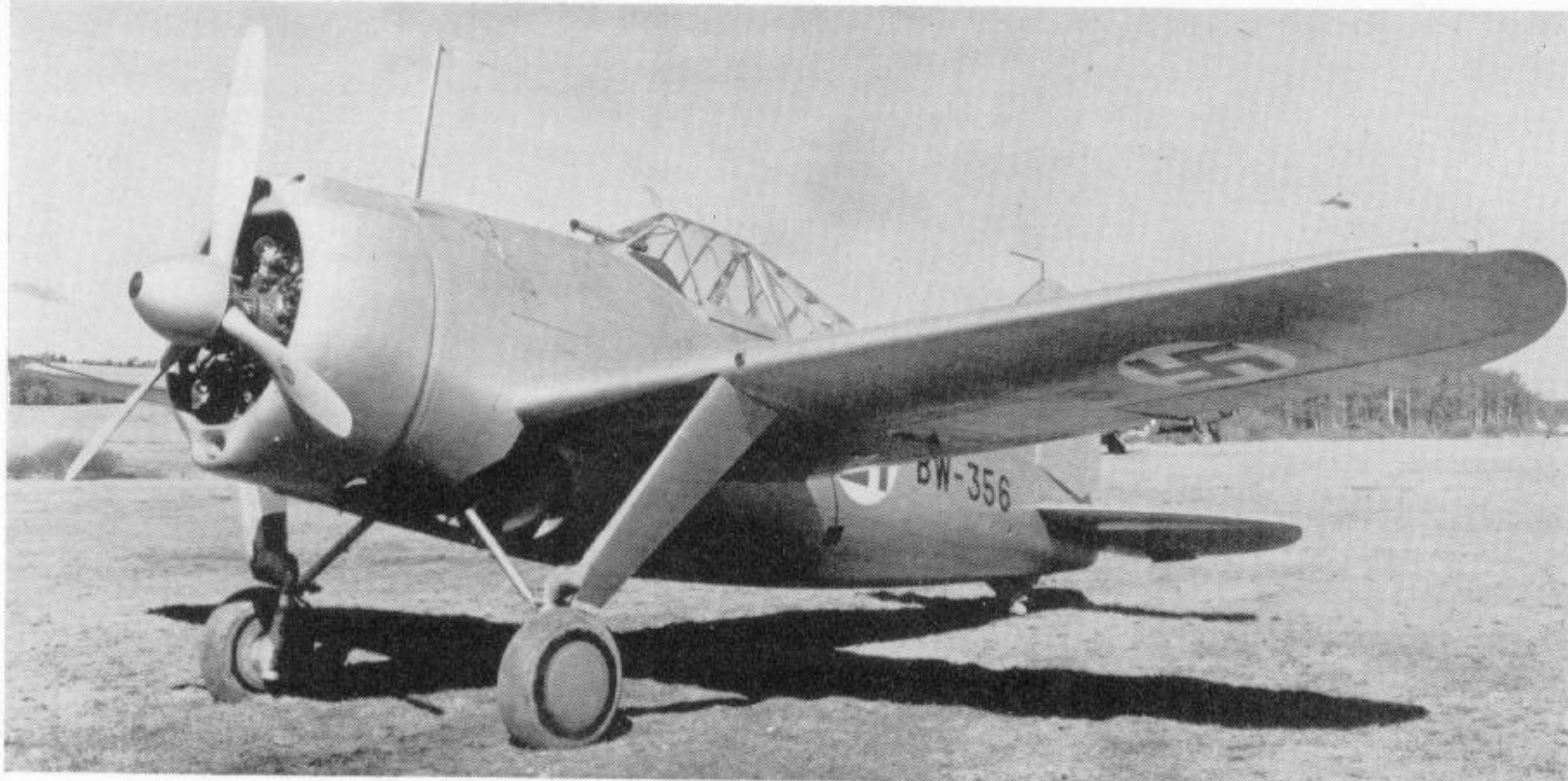


PROFILE

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THE BREWSTER BUFFALO





Natural metal Brewster 239 of HLeLv 24 in late May, 1940. This Finnish unit had just completed re-equipment with the Brewster at this time. Note Fokker C-VE (FO-66) in background.
(Photo: IlmaV. via Kalevi Keskinen)

The Brewster Buffalo

by Christopher F. Shores

IN the mid-1930s the United States Navy was becoming aware that the new monoplane designs appearing throughout the world in increasing numbers were likely soon to outstrip the biplane completely in many areas of performance, notably top speed. The Navy had long been strongly biased against the monoplane, considering the landing speed of machines of this configuration too great for carrier operations. Now, however, as consideration was given to a replacement for the Grumman F3F biplanes just entering service, it was decided to give the monoplane a chance. Consequently, on November 15, 1935, two designs were ordered, one a classic biplane from Grumman, to be known as the XF4F-1, and one a monoplane from Brewster as the XF2A-1. By the following year it had become even more obvious that the development potential of the biplane was nearing an end and the contract for the XF4F-1 was cancelled; a new contract for another monoplane, the XF4F-2, to be powered by a Pratt & Whitney R-1830 engine of 950/1,000 h.p. was given. At the same time the Brewster contract, finally signed on July 27, 1936, was modified to incorporate a more powerful Wright Cyclone G engine, also offering 950/1,000 h.p.

While construction was under way Seversky Aircraft Corporation produced a navalized version of the successful P-35 fighter and offered this to the U.S.N., delivering one example, designated XFN-1, on September 24, 1937. This aircraft, powered by an 840 h.p. Wright R-1820 G-5 engine, managed to reach 267 m.p.h. at 15,000 ft. and landed at a fairly modest 69 m.p.h., but this performance was not

sufficiently in excess of the biplanes then in service to warrant a production order.

At the start of 1938 the XF2A-1 was completed and soon undertook its first flight. A short, stubby, pug-nacious-looking little aircraft, the XF2A-1 was of all-metal construction and of low-mid-wing design. It was covered with a flush-riveted, stressed aluminium skin to all surfaces except the controls, which were fabric-covered. It incorporated such advanced features as split flaps and a hydraulically-operated retractable undercarriage, which retracted inwards, the wheels being housed in the underside of the fuselage; the tail-wheel was also partially retractable. The engine was a Wright R-1820-22 Cyclone producing 850 h.p. and a three-bladed Hamilton Standard Hydromatic propeller was fitted. Armament comprised a .50-in. and a .30-in. Browning machine-gun in the top cowling over the engine, both synchronized to fire through the airscrew arc, but provision was also made for the fitting of a further .50-in. gun in each wing just outboard of the main undercarriage members.

The aircraft was tested and the engine was found to produce 750 h.p. at 15,200 ft., giving a top speed of 277.5 m.p.h.—well below that hoped for. The prototype was then sent to the N.A.C.A.'s Langley Memorial Aeronautical Laboratory for wind tunnel testing—the first such tests to be carried out on a full-sized aircraft in the States. These showed that a considerable increase in speed could be obtained if a certain amount of streamlining, improvement to the design of the engine cowl and other matters of



The first Buffaloes to reach England were ex-Belgian contract machines, these arriving in early summer 1940. AS426 is seen here about to be tested by R.A.E. pilots, together with other early U.S. types delivered to the U.K., a Grumman Martlet I and a Douglas DB-7 Havoc (ex-French contract).
(Photo: Flight International)

detail were to be undertaken. While this work was taking place the opportunity was taken to enlarge the fin and rudder to provide better stability and to raise the cockpit canopy a little to give more headroom for the pilot. The improvements raised maximum speed to 304 m.p.h. at 17,000 ft.

The revised aircraft was accepted by the Navy, and in March began comparative trials with the XFN-1 at Anacostia; while undertaking deck-landing trials during April the aircraft suffered engine failure and force-landed, being extensively damaged, but it had already proved satisfactory, and on June 11, 1938, 54 F2A-1s, fitted with an R-1820-34 engine, were ordered. The production aircraft was fitted with an electric, rather than the Hydromatic propeller, had a larger fuel capacity, and heavier armament. When the original prototype had been repaired it was fitted with an R-1820-40 engine, offering 1,200 h.p., reaching 325 m.p.h. at 16,000 ft. with this new power-plant. Redesignated XF2A-2, it first flew in July 1939, and 43 examples were ordered, these carrying the full four .50-in. machine-gun armament.

Delivery of the first F2A-1s commenced in July 1939, but when war broke out in Europe in September all U.S.N. and Marine Corps fighter squadrons were still operating biplanes. First issue of 11 aircraft was made to VF-3 on U.S.S. *Saratoga* towards the end of the year, but this was to be the only unit to fly this model. At the same time that re-equipment of VF-3 was under way, Finland was engaged in her heroic struggle against the might of the Soviet Union, and, as the F2A-2 was soon expected to be available, it was decided to release the rest of the F2A-1 order to this small nation. Re-engined with an export Cyclone R-1820-G5 engine producing 950 h.p. for take-off and 850 h.p. at 6,000 ft., and fitted with a full armament of four .50-in. Colt Brownings, these aircraft were dubbed B-239 by the manufacturers and in all 43 were delivered to Trollhättan in Sweden early in 1940, being assembled by Norwegian Air Force volunteers and collected by Finnish pilots. More details of the B-239 in Finland will be given later.

Meanwhile orders had been coming in fast from overseas, firstly from the Belgian government, which ordered 40 examples of the B-339, the export version of the F2A-2, and this order was completed between April and July 1940—in fact before the U.S.N. received the first of its F2A-2s in September of that year. A further 170, known as the B-339E, were ordered by the British Purchasing Commission, and delivery of these began in December 1940, while 72 B-339Ds ordered by the Netherlands East Indies government began rolling off the lines in March 1941.

The Belgian aircraft never reached their destination; two were delivered to France and were captured by the Germans still in crates at Bordeaux-Merignac in June 1940. The other 38 were transferred to the United Kingdom, arriving there before any of that nation's own B-339E order. Although 38 serials (AS410–AS437 and AX811–AX820) were allotted to these aircraft, dubbed Buffalo Mark I, it seems that not all arrived. A certain number appear to have been aboard the French aircraft carrier *Bearn* at the time of the Franco-German armistice, and to have been off-loaded on the island of Martinique, where they stood rotting away for the rest of the war. Those which did arrive were passed to the Fleet Air Arm.

Although the F2A-2 offered a considerable increase in top speed over the F2A-1, in other respects it was a poorer aircraft. The F2A-1 had been a pleasant machine to fly, handy and manoeuvrable, and with a good climb rate. Now, even with the more powerful engine, the increase in gross weight of nearly 900 lb. with no increase in wing area reduced climb rate by over 500 ft. per minute, and had a deleterious effect on the manoeuvrability and general handling of the aircraft. Worse was to come, however, for on January 21, 1941, the U.S. Navy ordered 108 examples of the F2A-3. This aircraft had the same engine as the F2A-2, but still more weight caused a drop in performance on every count, top speed and climb rate dropping and landing speed rising. The major change in this version was that the fuselage had been lengthened by 1 ft. ahead of the wing to allow for a larger fuel tank. These aircraft were delivered between



Brewster Buffalo I AS426 taxis out for take-off during tests.

(Photo: Flight International)

July and December 1941, and in March 1942 after the last of 20 B-439s ordered by the Dutch to supplement their B-339Ds had been turned out, production ended with the 507th machine; the B-439 was fitted with a 1,200 h.p. GR-1820-G205A in place of the B-339D's 1,100 h.p. -G105A.

A second U.S.N. squadron, VF-2, received the first of the F2A-2s early in October 1940, these going aboard U.S.S. *Lexington*, and at the same time VF-3 exchanged its F2A-1s for these later aircraft, having operated the original version for less than a year. About a year later, both squadrons began receiving F2A-3s, for a while operating both types, though only VF-2 was to be fully re-equipped.

The first monoplane fighter of the U.S. Navy was not entirely an outstanding success. Though in its early versions it was able to outmanoeuvre the early models of the Grumman F4F, the F2A tended to snap roll viciously when pulling out of a steep dive, and also had a tendency to high speed stalls. More basically, the undercarriage had proved to be a weak point—most important in a deck-landing aircraft—and the Cyclone engine returned a disappointing performance at altitude. All things considered, the F4F seemed to offer more promise for further development, and although one XF2A-4 with a pressurized

cockpit for high-altitude operations was produced, no orders were forthcoming.

By the end of 1941 two more American squadrons had been equipped with F2As, VMF-221, which had a few F2A-2s, but was receiving more F2A-3s, and VS-201, operating on the East Coast with F2A-2s. As more F2A-3s became available, the earlier model was passed to the base at Pensacola where, with much equipment removed, it was used successfully as an advanced fighter-trainer. During the last months of America's precarious peace, VF-2 undertook two tours of duty, one with F2A-2s and one with F2A-3s, the aircraft providing good, fairly trouble-free service, with no serious accidents.

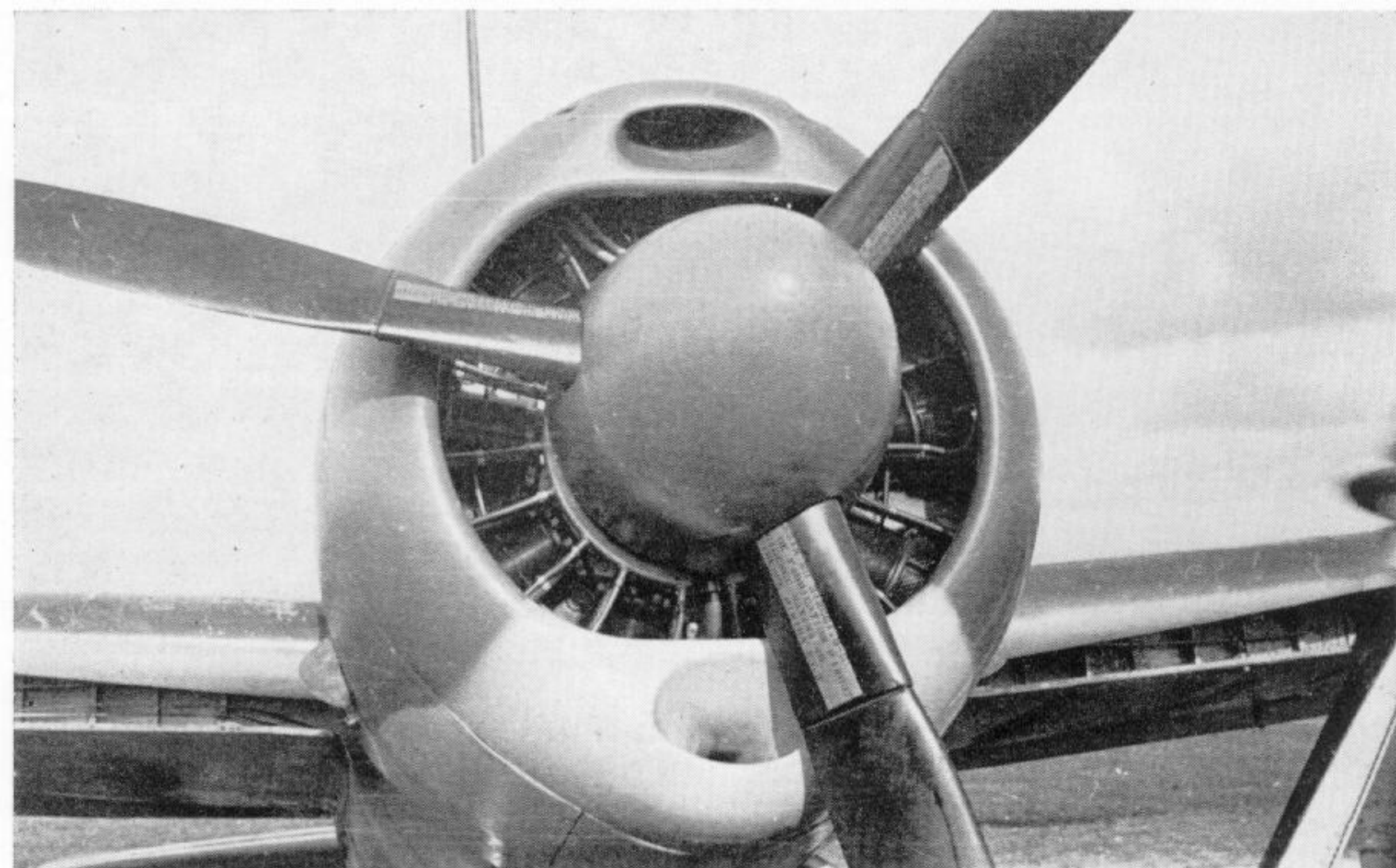
THE BUFFALO ABROAD

The first few aircraft of the British order were delivered to that country, the first three being used for test purposes (W8131-3). Trials at Boscombe Down were sobering, showing a maximum speed of 292 m.p.h. at 20,000 ft. and 270 m.p.h. at 10,000 ft. It was quickly decided that the aircraft was totally unsuitable for use over Western Europe, and the vast majority were delivered direct to the Far East, where

Another view of AS426 just before take-off.

(Photo: Flight International)





Close-up of propeller and engine cowling on an ex-Belgian contract Brewster 339.

(Photo: Flight International)

it was considered the Buffalo should prove capable of dealing with anything the Japanese might be able to put into the air. However, in England the first R.A.F. unit of American volunteer pilots, 71 "Eagle" Squadron, was being formed, and this received a few Buffaloes, to the dismay of the Americans, but these were quickly replaced by Hurricanes and it seems likely that these aircraft were from the ex-Belgian delivery. All 170 aircraft of the main order (serialled W8131–W8250 and AN168–AN217) were, like the ex-Belgian machines, named Buffalo Mark I.

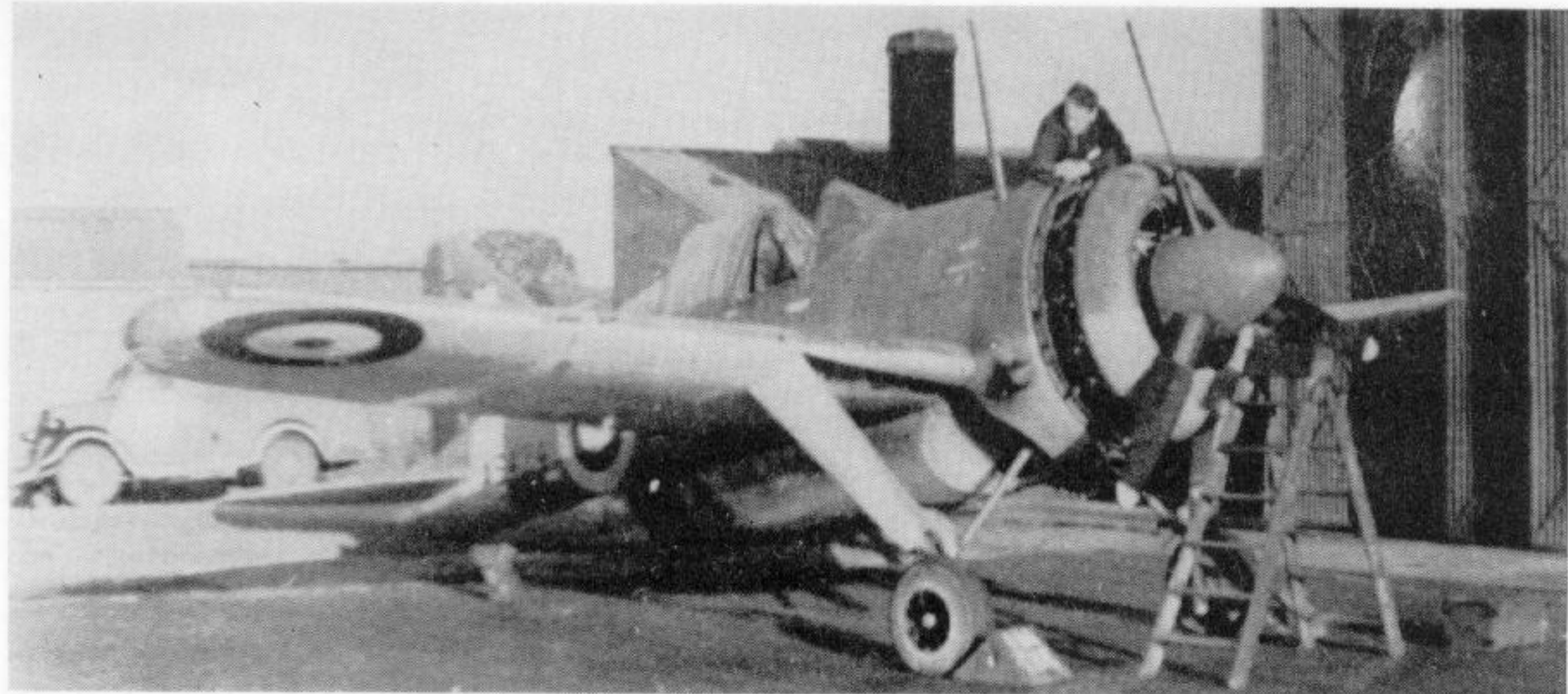
The Fleet Air Arm, despite its shortage of modern fighters, was far from enamoured with the Buffalo, but 18 of the ex-Belgian machines were sent out to the Mediterranean due to shortage of Fulmars, it being intended that they should operate from the deck of H.M.S. *Eagle*; all had arrived at Dekeila by September 1940. Some were supplied to 805 Squadron to partially equip the unit, but after trying out these new fighters, the commanding officer requested that they be exchanged for Sea Gladiators! Six were, however, taken to Crete in May 1941 with the unit's Fulmars, and were based at Suda Bay, but none of these ever left the ground due to unserviceability, sabotage being suspected, and those that were not destroyed at their dispersals were captured by the Germans. Others with some Sea Gladiators formed a land-based squadron, No. 885, in Egypt from March to May 1941, during which time they were non-operational; they then disappeared from service.

THE B-239 IN FINLAND

It was in Finland that the Brewster fighter was first to see action in the air. The first few aircraft to be delivered arrived at Hollola on February 20, 1940,

and were issued to a newly-forming squadron, HLeLv 22 under Capt. Erkki, which was composed of foreign volunteer pilots from many nations, but the fighting ended the following month, before the squadron was ready, and it was disbanded. Instead, the most successful fighter squadron of the "Winter War", HLeLv 24, was ordered to hand its Fokker D.XXIs to the State factory for overhaul, and re-equip with the American aircraft; the pilots were at once transported in batches to Sweden to pick up the rest of the delivery.

The Finns were very pleased with their new mounts, and found them to be extremely stable firing platforms—more so even than the D.XXIs, and were able to often obtain 100 per cent results during air firing practice. By June 1941 the squadron was at a very high level of readiness, and when Finland became embroiled in the "Continuation War" late in that month, was soon in action. HLeLv 24 was a large squadron of some 40 aircraft and was split up into four reinforced flights of about eight aircraft, each flight operating from a different base. Possibly because of the high level of experience and training of the pilots, or perhaps because the B-239 was a handier aircraft than the later models, but more likely due to a combination of both factors, the Brewster machine was extremely successful in Finland, forming the backbone of the fighter defence until the first Messerschmitt Bf 109Gs arrived in 1943; all the greatest of the Finnish aces flew the B-239 for much of the war. Eino Luukkanen, who ended the war as his country's third highest-scoring pilot, commanded the 1st Flight of HLeLv 24 in June 1941, and has given a brilliant account of flying the B-239 in his book *Fighter over Finland*. On June 30, 1941, three of his pilots shot down all of three Tupolev SB-2s over



Fleet Air Arm Buffalo, AS424, undergoing maintenance at a U.K. base.

(Photo: Newark Air Museum Ltd.)



An ex-Belgian Buffalo, AS427, issued to the Fleet Air Arm; this aircraft was serving with a trials squadron when photographed. Note Curtiss Mohawk IV of R.A.F. in foreground and two Westland Lysanders in background.

(Photo: Imperial War Museum)

Detail of the rather unusual configuration of the undercarriage of the Buffalo.

(Photo: Flight International)





This appears to be one of the Fleet Air Arm Buffaloes sent to the Middle East, and here probably seen in a hangar in the Canal Zone; note aircraft of Royal Egyptian Air Force in background. (Photo: R. C. Jones)



The Brewster fighter first saw action with the Finns; this B-239, coded BW-367, served with the 2nd Flight of HLeLv 24 and is seen here on Rantasalmi airfield in August 1941, shortly after the start of the Continuation War. (Photo: A. Donner via Kalevi Keskinen)

Brewster 239 BW-358, of 2nd Flight/HLeLv 24 fitted with skis for winter operations from Tiiksjärvi airfield, January 1942. (Photo: via Kalevi Keskinen)



A repeat attack was made two hours later by seven bombers, again escaping interception, and later two Buffaloes on a reconnaissance mission were “bounced” by a dozen Mitsubishi A5M “Claude” fighters, barely managing to escape. A further reconnaissance by a lone aircraft was intercepted by five A6M Zero-Sens, but again the pilot escaped; by evening only four Buffaloes remained serviceable, and these withdrew at dusk to Butterworth. From here next day they took off to escort Blenheim bombers, but were unable to find their charges, so returned to base. They had just landed when an air raid began, 27 dive-bombers and 27 fighters attacking the airfield. The four Buffaloes at once took off again, but the escorting fighters pounced on them, shooting down two, while a third was badly damaged and crash-landed; one Japanese fighter was claimed destroyed. The lone survivor and the squadron personnel withdrew to Ipoh — Northern Malaya was defenceless in the air by the end of the second day.

The big shock was the quality of the opposition—particularly the fighters. The Commonwealth airmen were faced by the J.A.A.F.’s 3rd Air Division, which included 146 fighters from such crack units as the 59th and 64th Sentais with the Nakajima Ki 43 Hayabusa (the “Oscar”), which had just entered service, and the 11th Sentai with the earlier Nakajima Ki 27 “Nate”; all these units were full of pilots highly-trained and possessing considerable combat experience in both China and Mongolia. They were reinforced by the Imperial Navy’s 22nd Air Flotilla, which included 36 fighters, many of which were the superlative Mitsubishi A6M-2 Reisen, or Zero-Sen; the Navy pilots were no less efficient than their Army counterparts. Throughout the campaign Allied pilots never differentiated between the Reisen and the then even less-known Hayabusa—they were both “Zeros” or “Navy naughts”. The performance of the Buffalo in Malaya was very disappointing, rarely matching even the levels reached in the tests in England. While completely outclassed on nearly every point by most of the opposing fighters, they also had considerable difficulty in intercepting the fast and modern Army Ki 21 bombers, which attacked at high altitude.

Colour illustrations

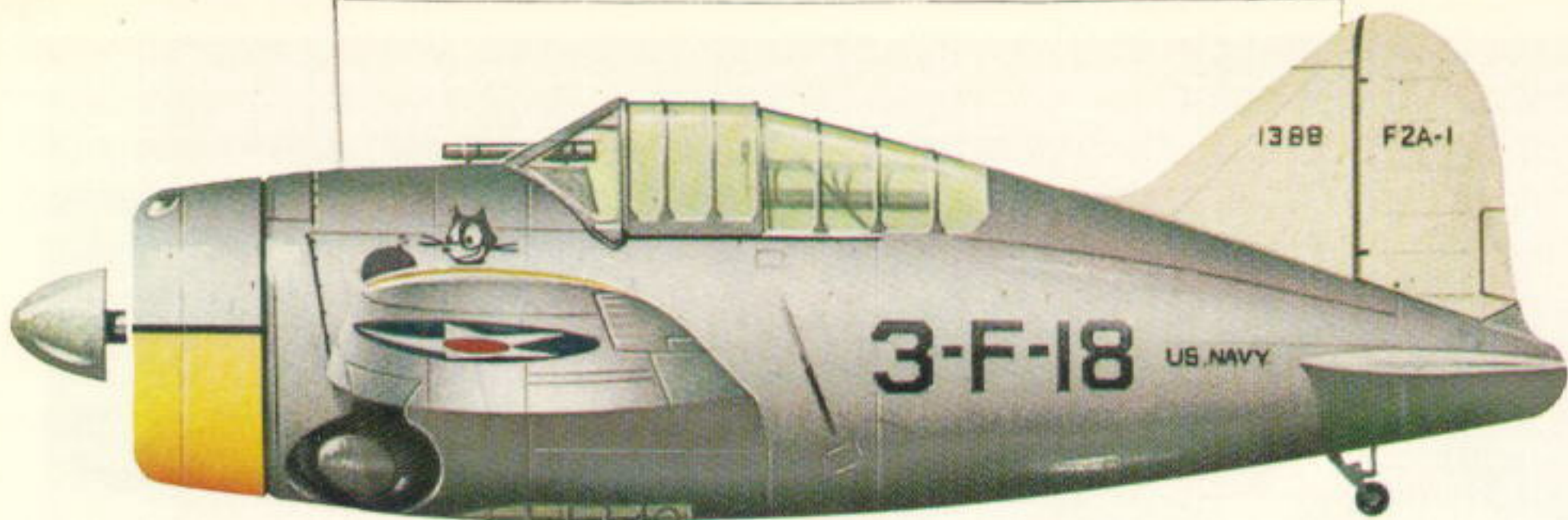
- 1 Brewster F2A-1 of VF-3, U.S. Navy, aboard U.S.S. *Saratoga*, September 1939.
- 2 Brewster F2A-2 of VF-2, U.S. Navy, aboard U.S.S. *Lexington*, late 1940.
- 3 Brewster F2A-2 of VS-201, U.S. Navy, aboard Escort Carrier U.S.S. *Long Island* of the East Coast of the United States in late 1941.
- 4 Brewster F2A-3 of VMF-221, U.S. Marine Corps, Eastern Island, Midway, Central Pacific, June 1942. This aircraft carried the individual aircraft number, 17, in black on the leading edge of each wing, inboard of the under-carriage legs.

In Singapore on December 8 the approach of enemy aircraft had been announced though no air raid transpired, and pilots of 453 Squadron were ordered not to take off. This unit and 488 Squadron, still not fully operational, were detailed to provide fighter cover for the British Far East Fleet units off the east coast. On 10th both units were scrambled as the fleet was under air attack—no standing patrols had been instituted—but arrived just in time to see the survivors from the battleship *Prince of Wales* and the battle-cruiser *Repulse* being picked up by destroyers—the capital ships had both been sunk by bombs and torpedoes launched by I.J.N. twin-engined bombers, Mitsubishi G3M “Nell” and G4M “Betty” types, operating at maximum range from their bases in French Indo-China. Indeed, so great was the range that it was believed at the time that they had been launched from aircraft carriers.

Following this disaster, 453 Squadron was released to provide some cover for the mainland, and on 13th flew up to join 21 Squadron at Ipoh. *En route* three aircraft became lost in a sudden storm, and all

Brewster 239, BW-378, of 4th Flight/HLeLv 24 in Spring 1942. This aircraft was that flown by the flight commander, Capt. Per-Eric Sovelius, who gained 7 of his 14 victories while flying Brewsters. (Photo: O. Riekki via Kalevi Keskinen)

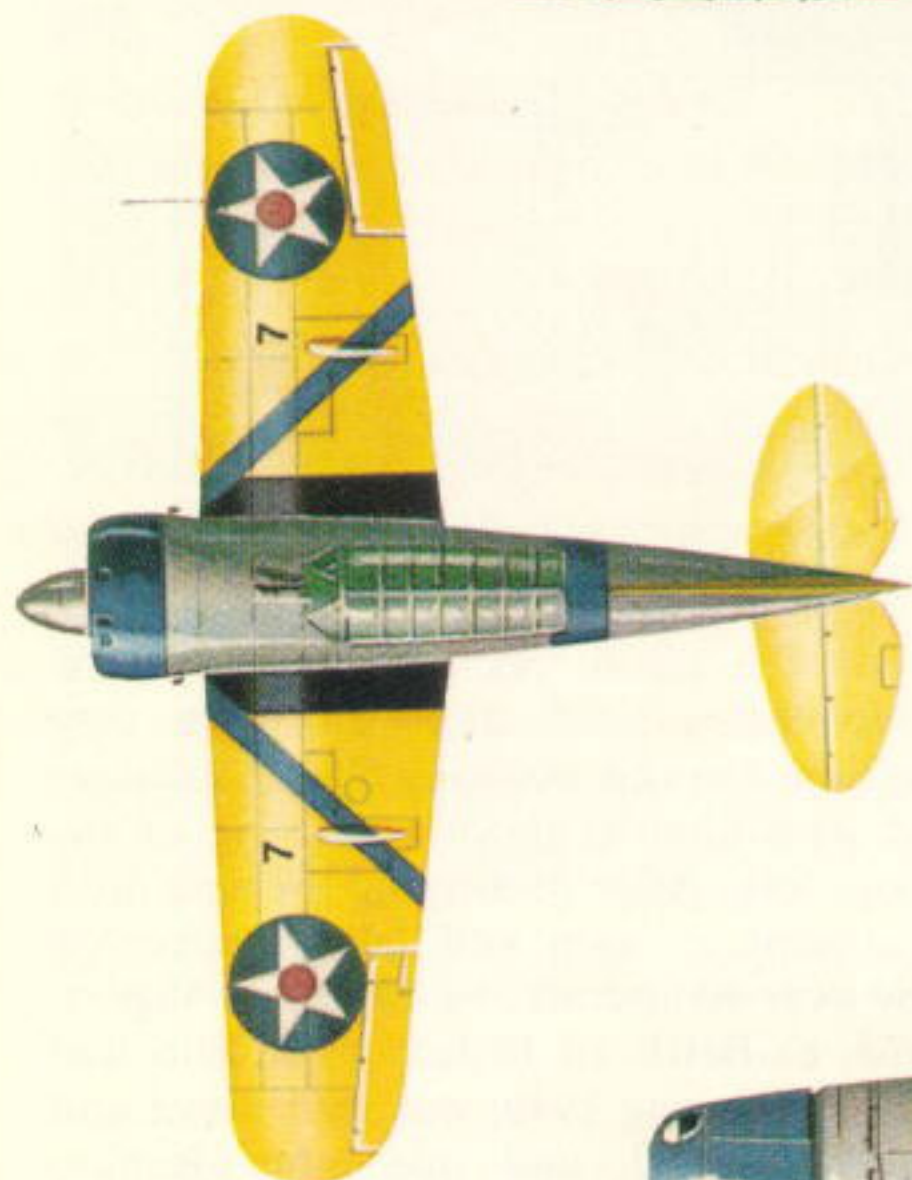




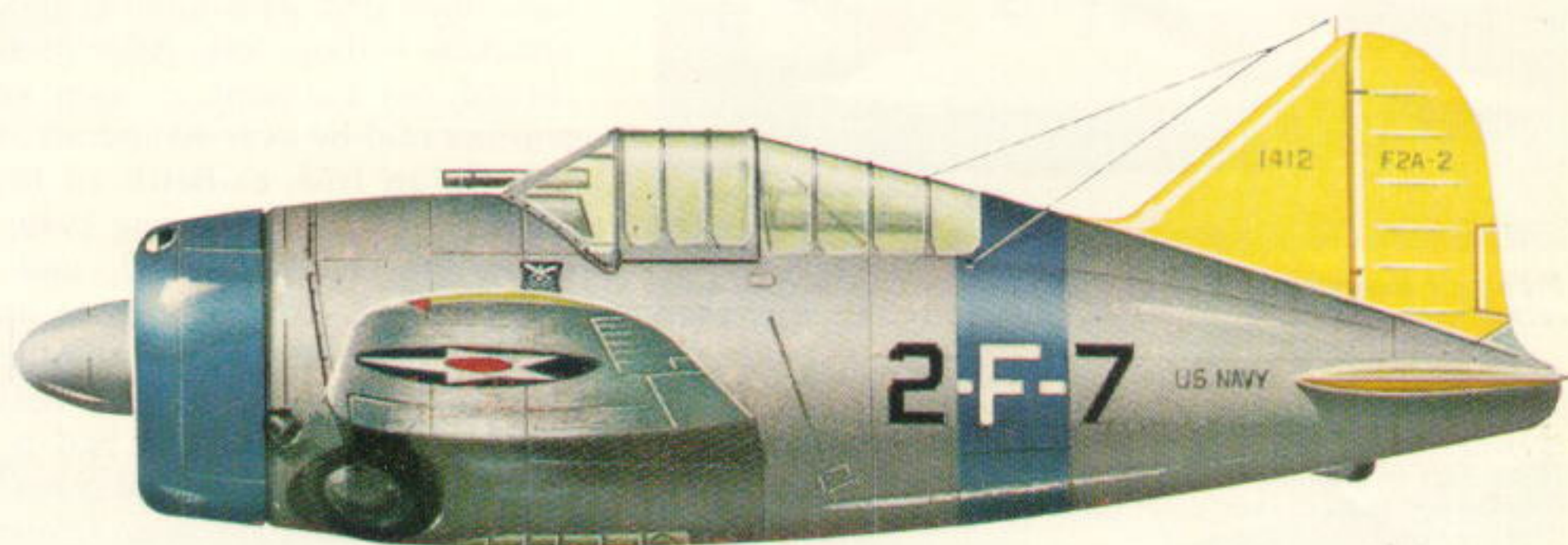
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Prototype Brewster XF2A-1 with original low cockpit canopy. Apparent dark paint on wing upper surfaces is chrome yellow as rendered by early type films. (via C. Macomber)



Prototype Brewster XF2A-1 in flight; note original lower-profile cockpit canopy. (via C. Macomber)

Brewster F2A-2 in camouflaged finish photographed in early 1942. This is probably an aircraft of a training unit. Note PBV Catalina in background. (A. U. Bibee via C. Macomber)



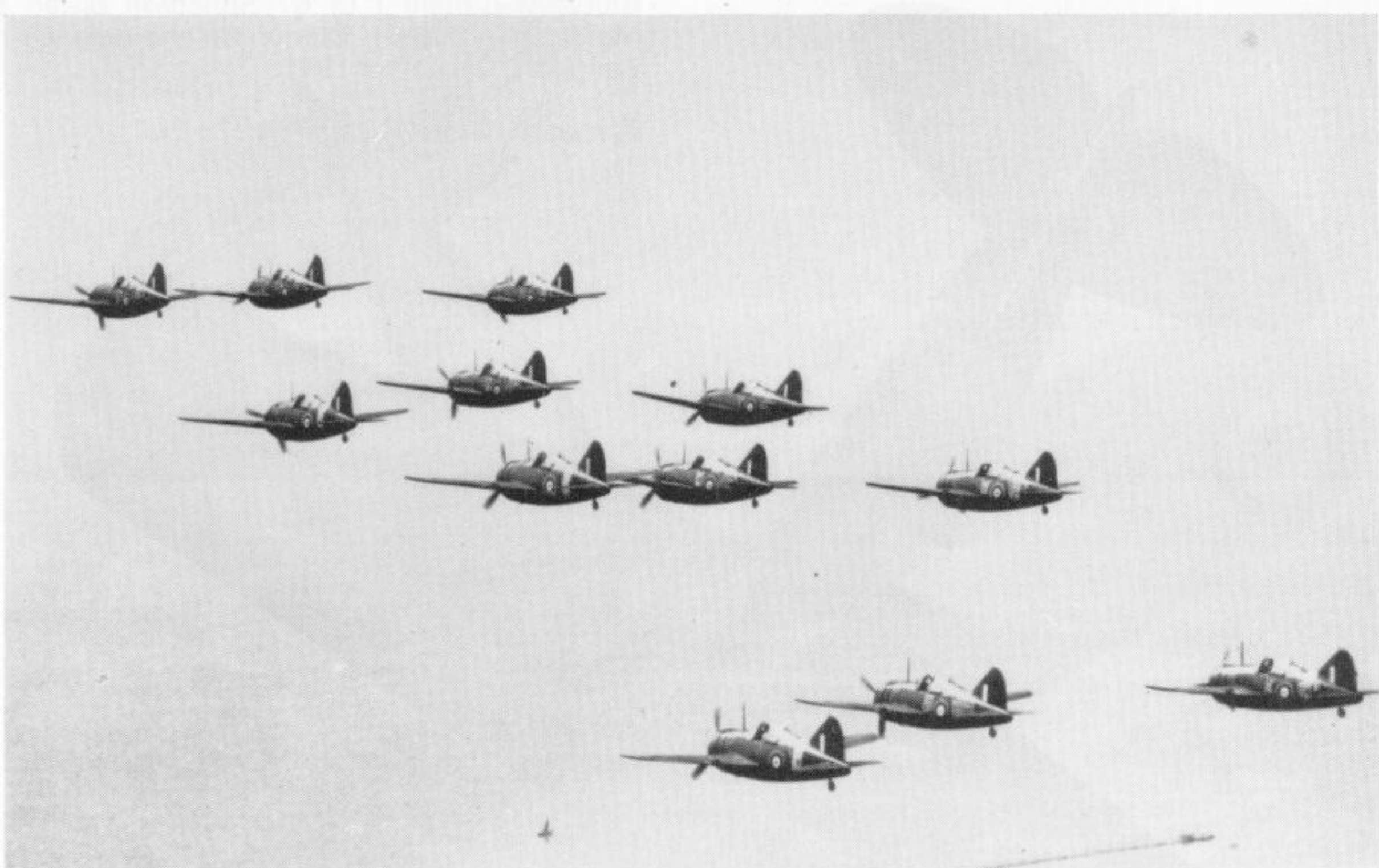
Brewster F2A-2 of U.S. Navy Squadron VF-2 in flight, March 1941.

crashed, two of the pilots being killed; the rest arrived but Japanese aircraft attacked while they were still refuelling. On this occasion three Buffaloes scrambled and were able to shoot down five of the attackers without loss. After re-arming, the squadron carried out a strafing mission and later intercepted another raid by over 40 aircraft; Fl.-Lt. T. A. Vigors, D.F.C., an Irish ex-Battle of Britain pilot who had claimed 9½ victories during 1940, was shot down and baled out, badly burned, and one other Buffalo crash-landed. Three Japanese aircraft were seen to crash into the sea, and as no other claims were made, these were thought to have been brought down by Vigors, who was in too bad a state to recall any details of his combat. One other Buffalo also got off and shot down a Japanese fighter.

Next day four aircraft from 453 Squadron and one from 21 Squadron took off on a strafing mission during which they encountered three Japanese dive-bombers; these turned aggressively on the Australians, shooting down the 21 Squadron aircraft and one of the others, and damaging a third! Following this sobering combat, the two squadrons were down to three aircraft in a fit state to take off on 15th, when 453 Squadron's commanding officer, Sqn. Ldr.

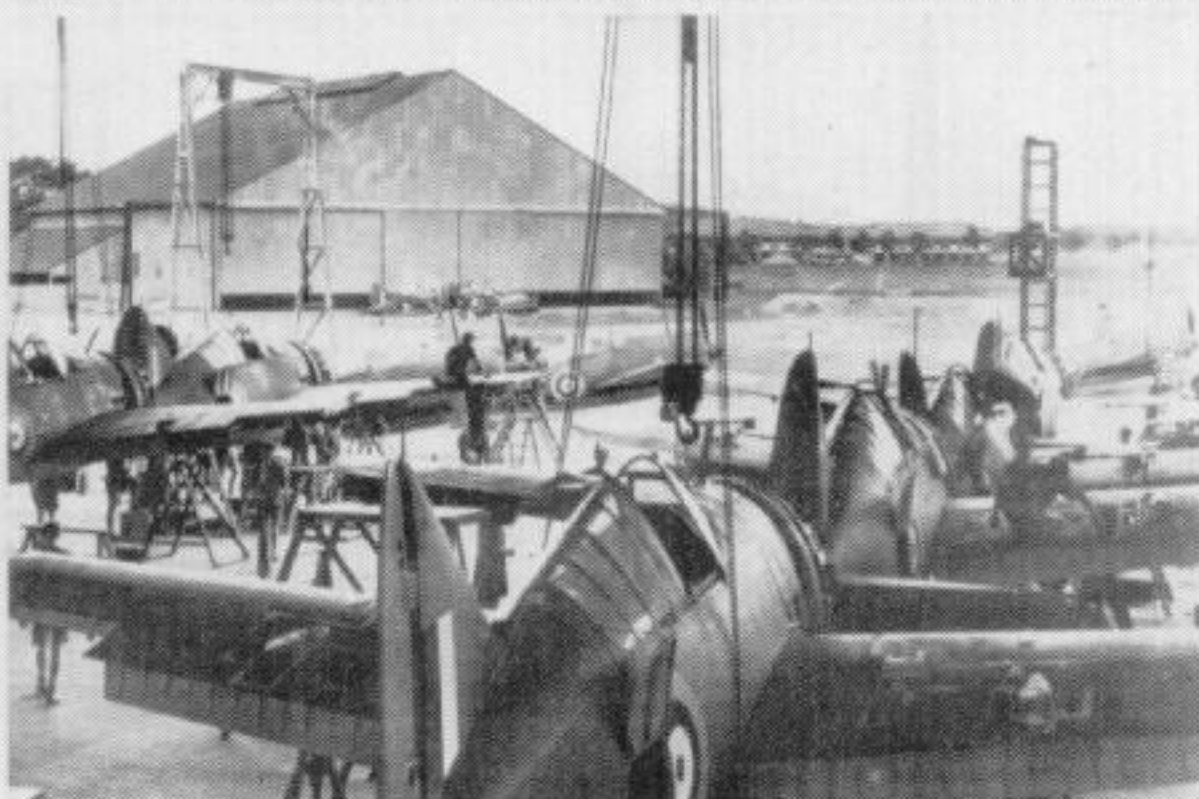
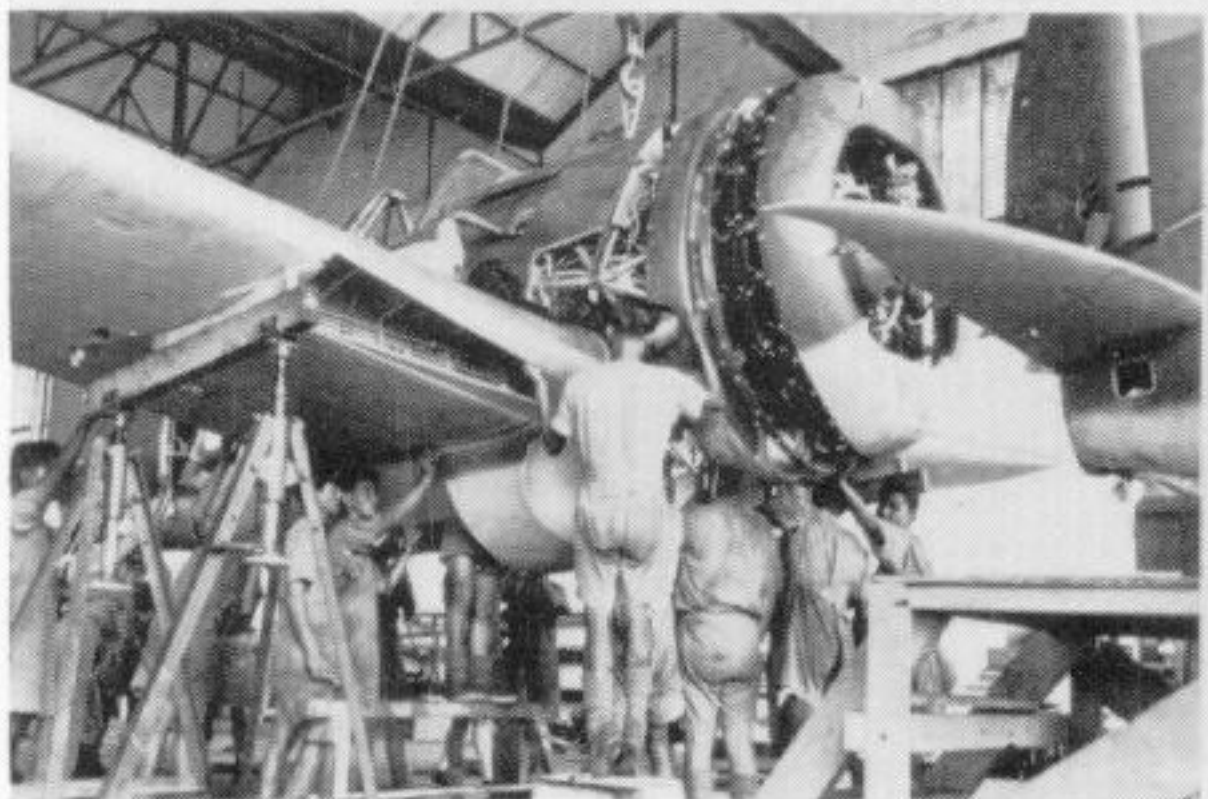
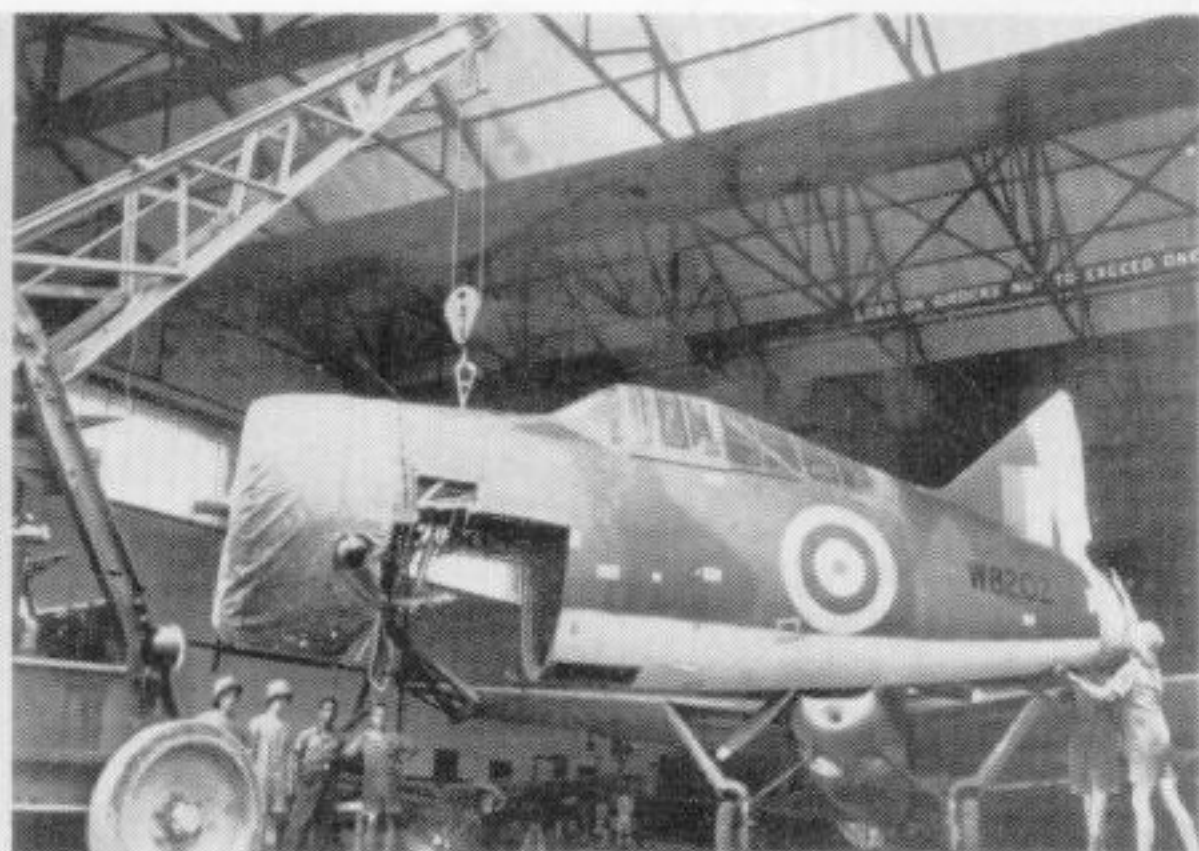
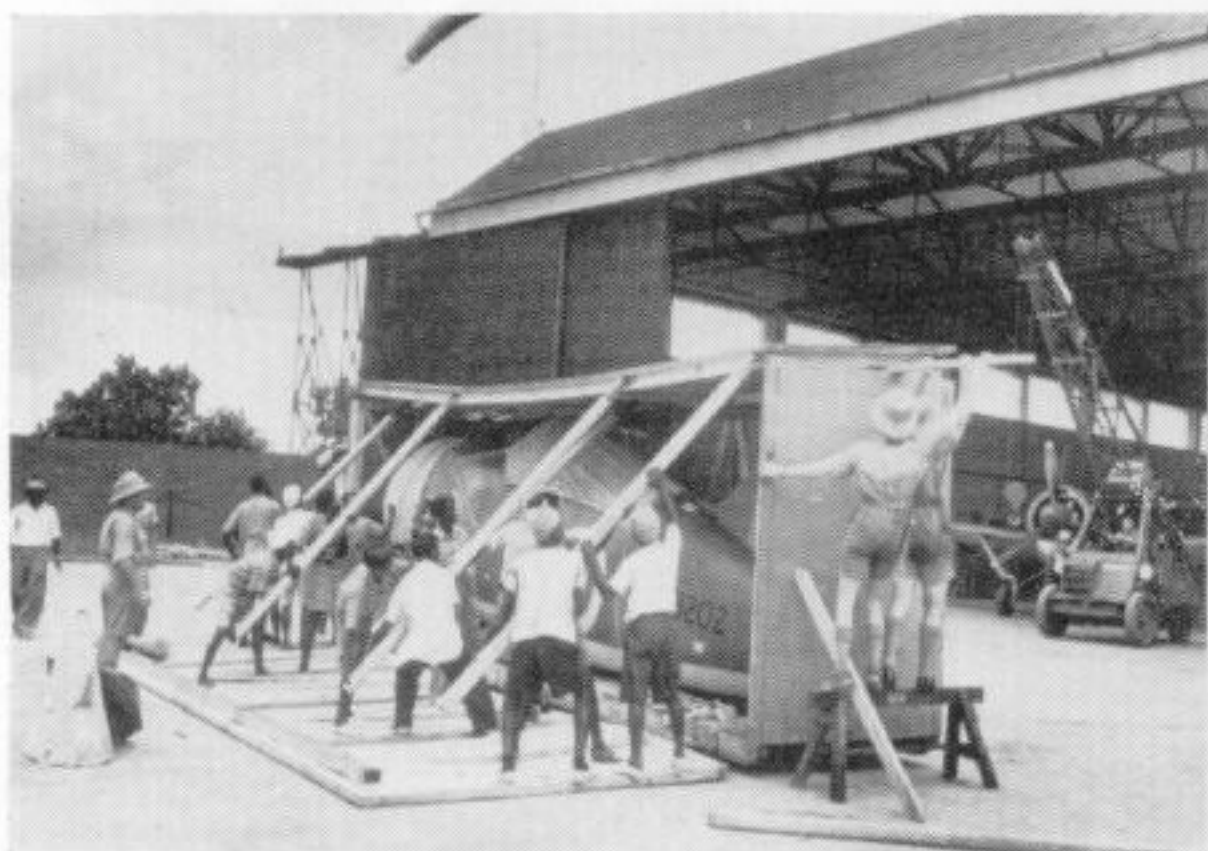
(The National Archives via W. A. Riley and C. Macomber)





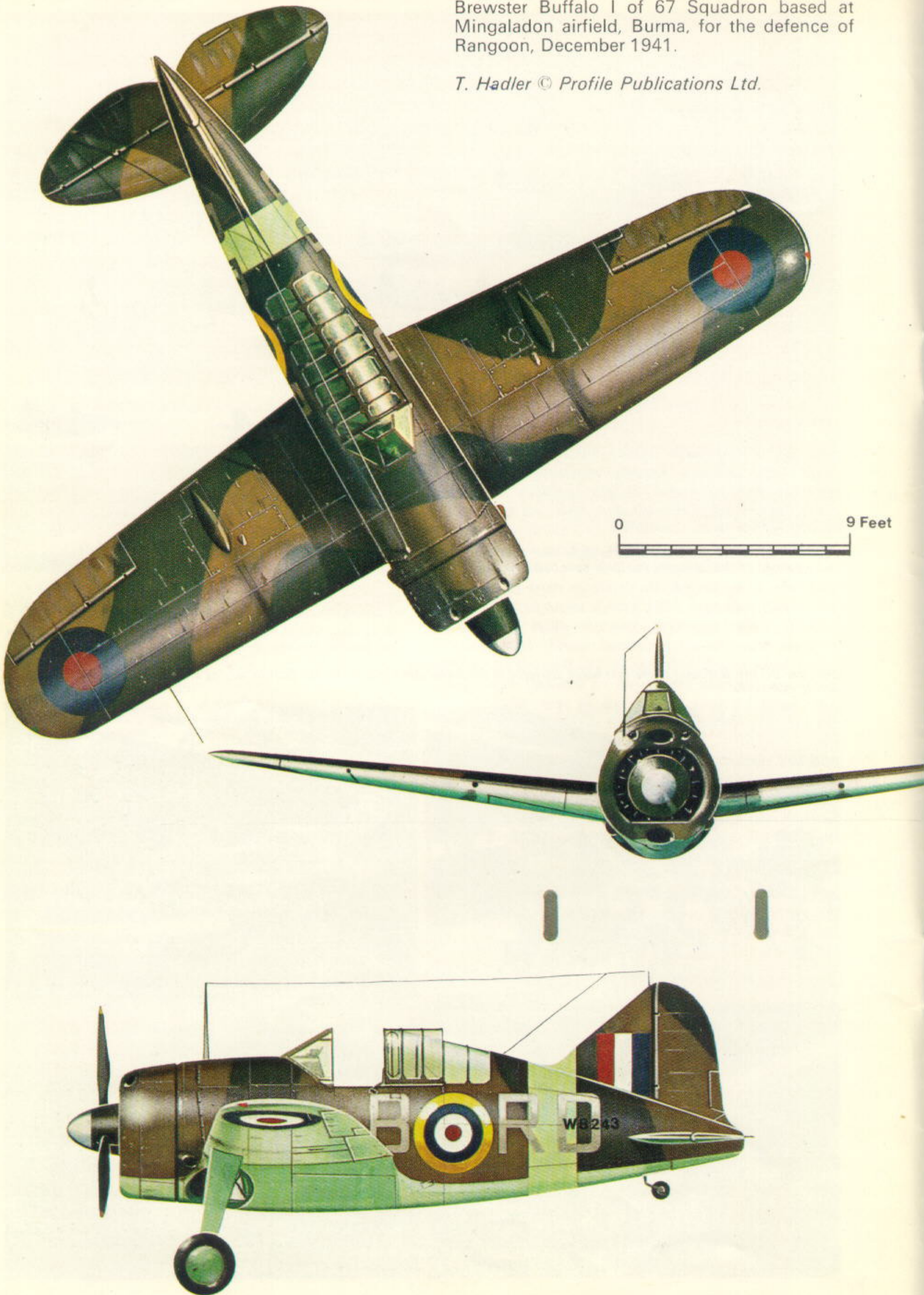
Squadron formation of 12 Buffaloes in flight over Singapore late in 1941; several of the aircraft in this photograph have had squadron codes painted on the fuselages, but these have been obscured by the censor.
(Photo: Imperial War Museum)

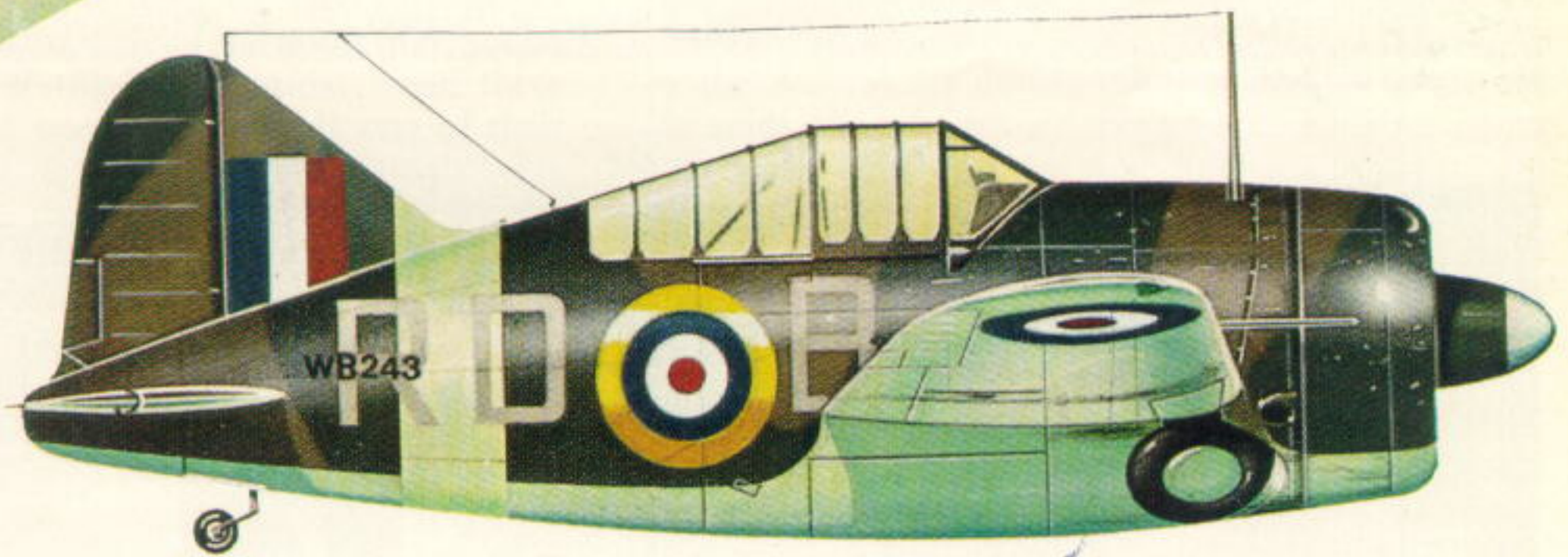
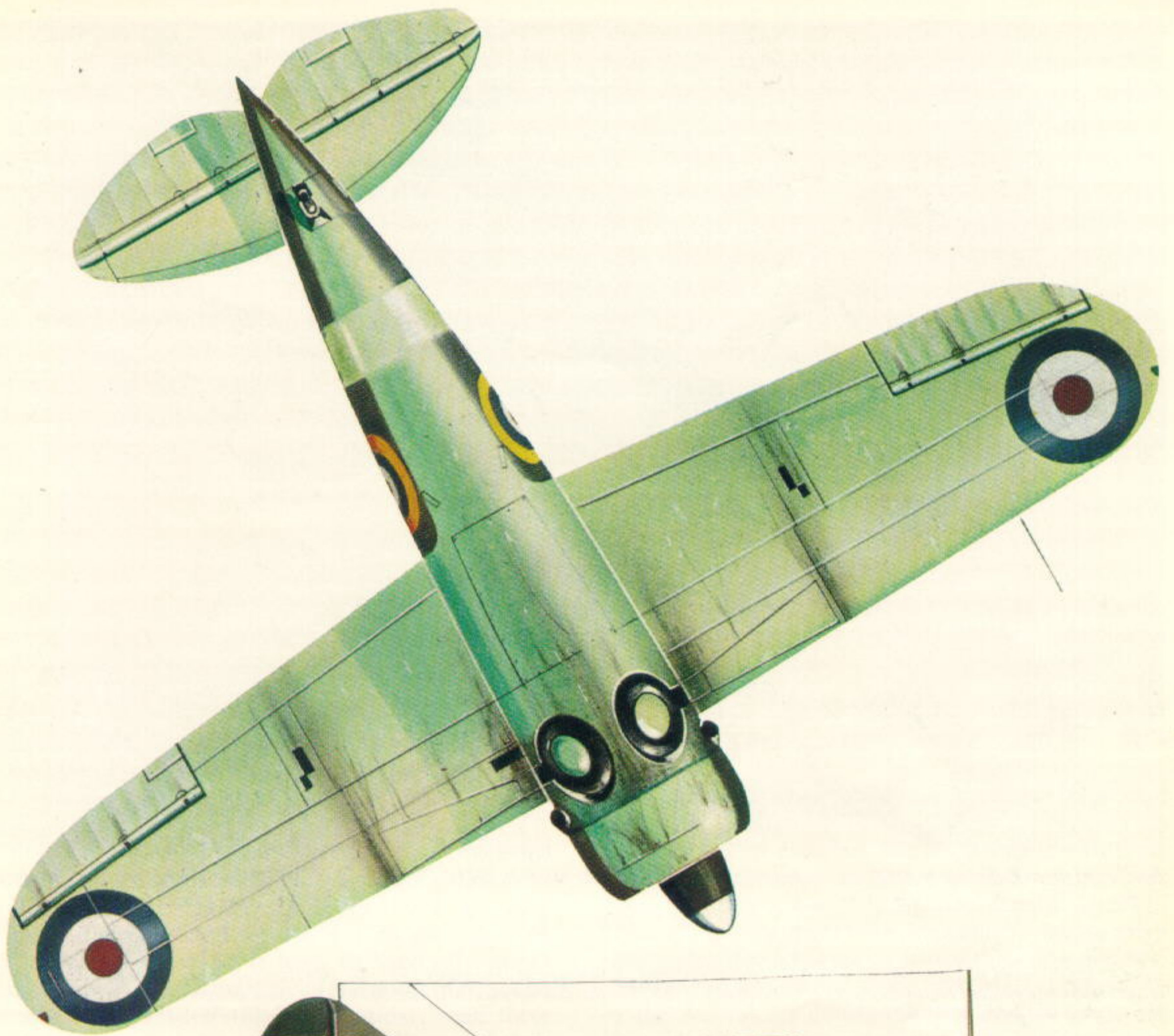
Brewster B-339E Buffaloes of the first batch delivered to the Royal Air Force in the Far East in varying stages of assembly in Singapore during mid-1941.
(Photo: via Charles W. Cain)



Brewster Buffalo I of 67 Squadron based at Mingaladon airfield, Burma, for the defence of Rangoon, December 1941.

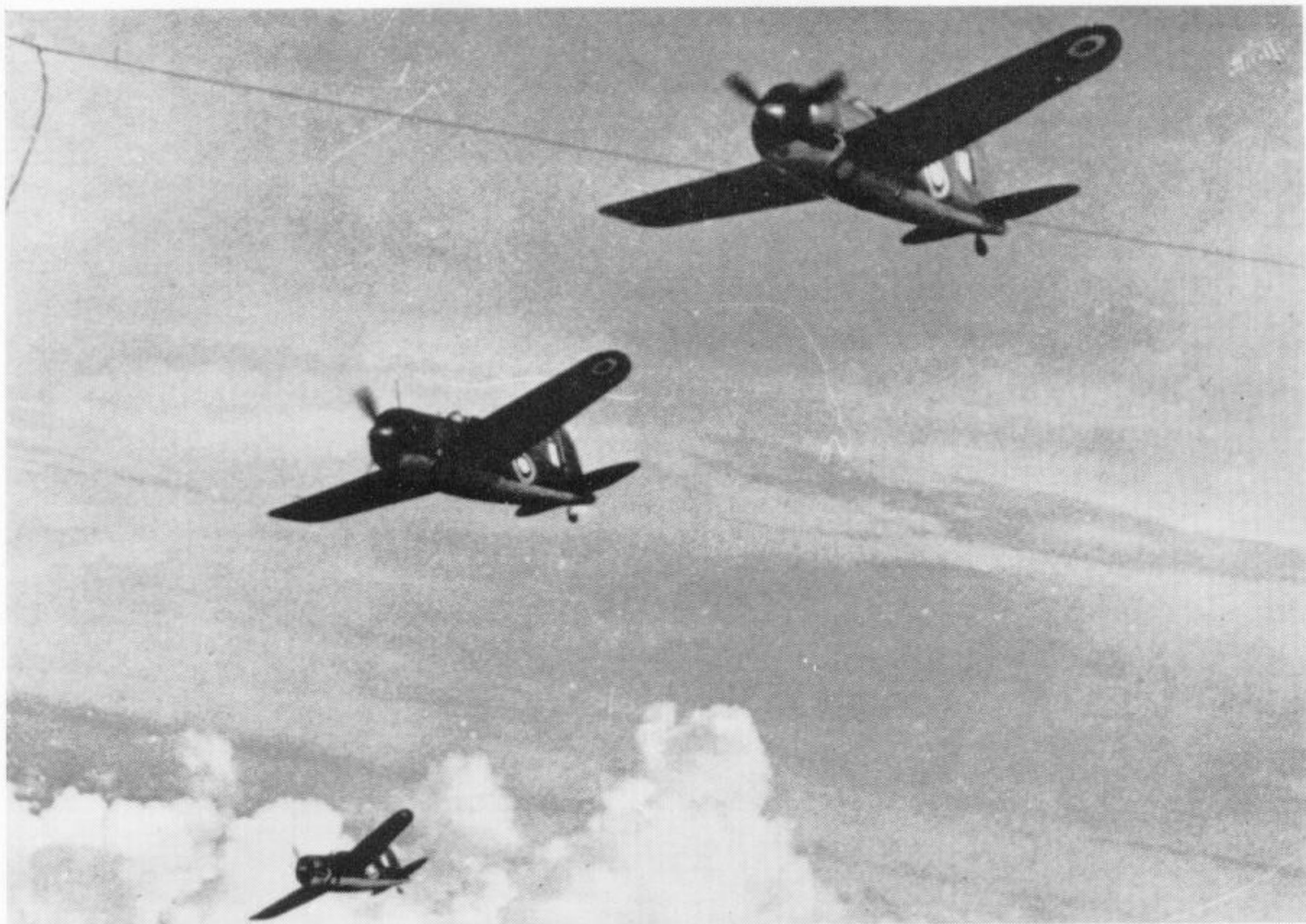
T. Hadler © Profile Publications Ltd.





Brewster B-339D of Group V of the Militaire Luchvaart, Netherlands East Indies, December 1941.





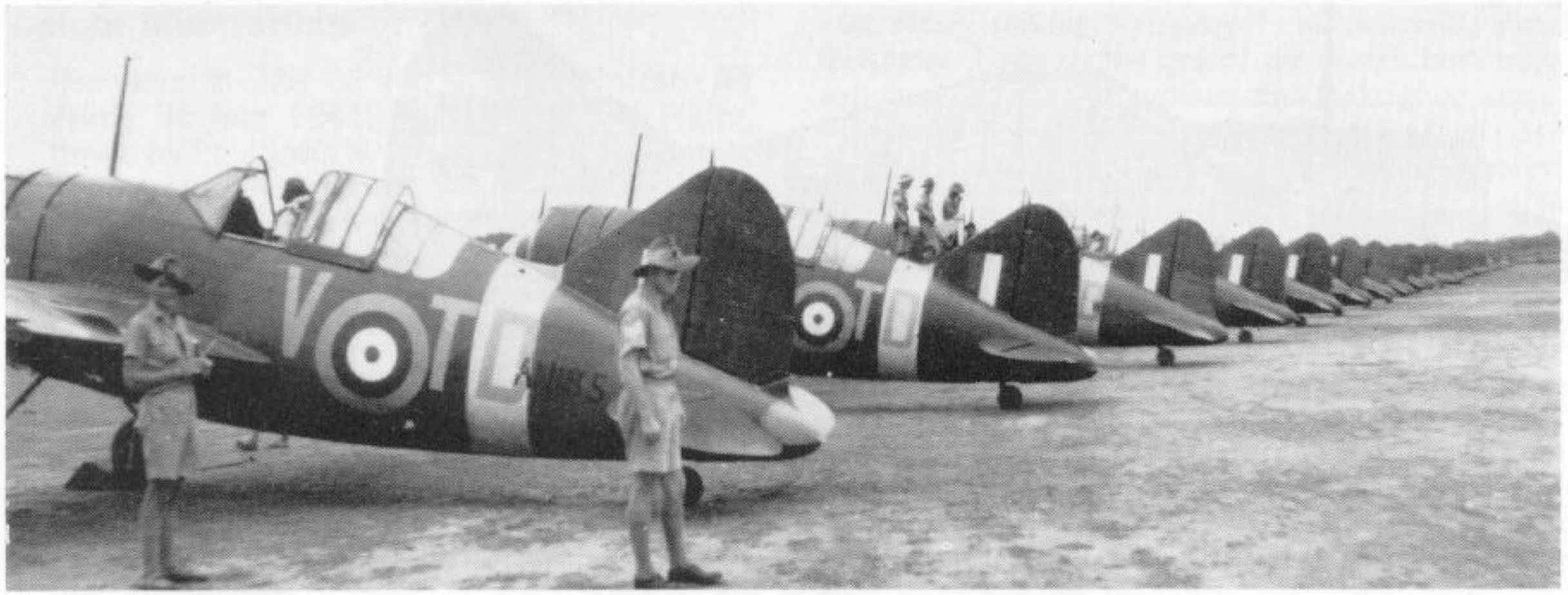
Section of three Buffaloes in flight over Singapore, probably in early summer 1941.

(Photo: Imperial War Museum)

Line of Buffaloes of 453 Squadron, R.A.A.F., at Sembawang, Singapore in December 1941. By this time full squadron code and individual letters had been painted on all aircraft; a close study of AN185, the nearest aircraft, also shows that since delivery, the port underside of the aircraft has been painted black.

(Photo: Australian War Memorial)





Another view of 453 Squadron at Sembawang; the three nearest aircraft are AN185, AN210 and W8209.

(Photo: Australian War Memorial)

Harper, who had just returned from Australia, arrived with ten new Buffaloes, four of which were handed to 21 Squadron. Other reinforcements arrived in Singapore during the day; on 9th three squadrons of Dutch Martin 166 bombers had flown in to join the island's defences, and now squadron 2-VI.G V arrived from Java with nine of its 12 Brewster 339Ds, joining 243 and 488 Squadrons at Kallang.

In Malaya the two Australian squadrons continued to fight against great odds, but they were plagued by other problems; 453 Squadron had sent up only pilots and aircraft, and the overworked ground crews of 21 Squadron found it hard to keep all aircraft serviceable. A typical example of the result of this state of affairs occurred during one combat when three Buffaloes intercepted bombers and only one of their combined total of 12 guns would fire. Orders were now given that the remaining fighters should be used primarily for reconnaissance in support of the Army, being too valuable to be risked in further combat if this could be avoided. On 18th six non-combat worthy Buffaloes were flown down to Singapore, leaving just seven in Malaya, but next day two of these were destroyed on the ground. 453 Squadron moved with the surviving five to Kuala Lumpur and 21 Squadron withdrew to Sembawang. Ten new Buffaloes were flown up to 453, but on 20th several heavy raids were made and six were lost in combat, although ten Japanese aircraft fell in return. Another Buffalo was lost next day, and the squadron then also withdrew to Singapore, joining 21 Squadron at Sembawang.

Here on 24th, 21 and 453 Squadrons were temporarily merged, and re-equipped with 16 new Buffaloes, main duty being reconnaissance for III Indian Corps on the mainland. It was at this stage that an effort was made to lighten the Buffaloes; Very tubes, parachute flare bins and cockpit heaters were removed, and the two .50-in. wing guns were replaced by .303-in. weapons; the amount of fuel and ammunition carried was also cut down. The resulting reduction in weight was in the order of 1,000 lb. and certainly improved performance, though the aircraft still remained no match for the Japanese fighters. At

the same time the fighters on Singapore were incorporated into a new 224 (Fighter) Group. Strength and disposition of the Group at this time was:

<i>Sembawang</i>	21/453 Squadron with 16 aircraft.
<i>Kallang</i>	243 Squadron with 15 aircraft.
	488 Squadron with 14 aircraft.
	2-VI.G V (Dutch) with 9 aircraft.

Meanwhile Dutch Brewsters elsewhere had seen action; on December 19 the flight of 1-VI.G V at Samarinda had escorted Martin bombers to attack Japanese naval units at Miri, one Japanese aircraft being shot down. On 26th Japanese aircraft attacked Tarakan, and the flight here intercepted, claiming two raiders shot down but losing two of their own number.

More reconnaissance work over Malaya was done by the Australians during the first days of 1942, but air raids then began on Singapore, Kallang being heavily bombed for the first time on 9th, and on January 10 the first Japanese aircraft to be shot down over the island was claimed by two New Zealand pilots of 243 Squadron; from then on the Buffaloes were committed mainly to defensive missions. On 12th more raids came over and all squadrons were involved; 488 Squadron in its first combat ran into 27 fighters, losing two Buffaloes with five more damaged. The Dutch were more successful in their first fights over the island, intercepting two raids; on the second three Brewsters attacked nine Ki 27 fighters and shot down four of them, Lt. Deibel claiming two, though he was shot down himself and slightly wounded.

Throughout January the fighting continued, though in the middle of the month the first Hurricanes arrived to take some of the strain. The Australians flew tactical reconnaissance missions and gave cover to Hudsons, Blenheims, Vildebeestes and Dutch Martins, also undertaking some strafing sorties, while the other squadrons continued their interception duties. The Dutch Brewsters were not fitted with armour glass windscreens, and as these became available from crashed R.A.F. aircraft, they were incorporated in the Dutch machines. The B-339Ds also differed in that .30-in. guns were fitted in the engine cowlings in place of the .50-in., though weapons of the latter calibre were still carried in the wings. On



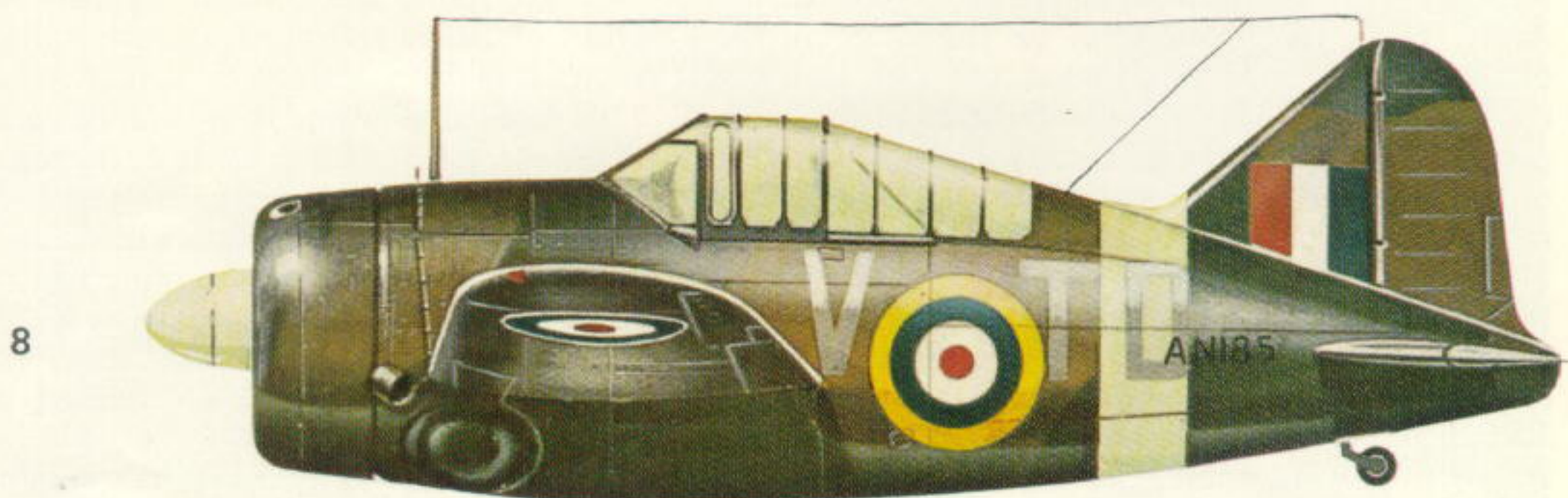
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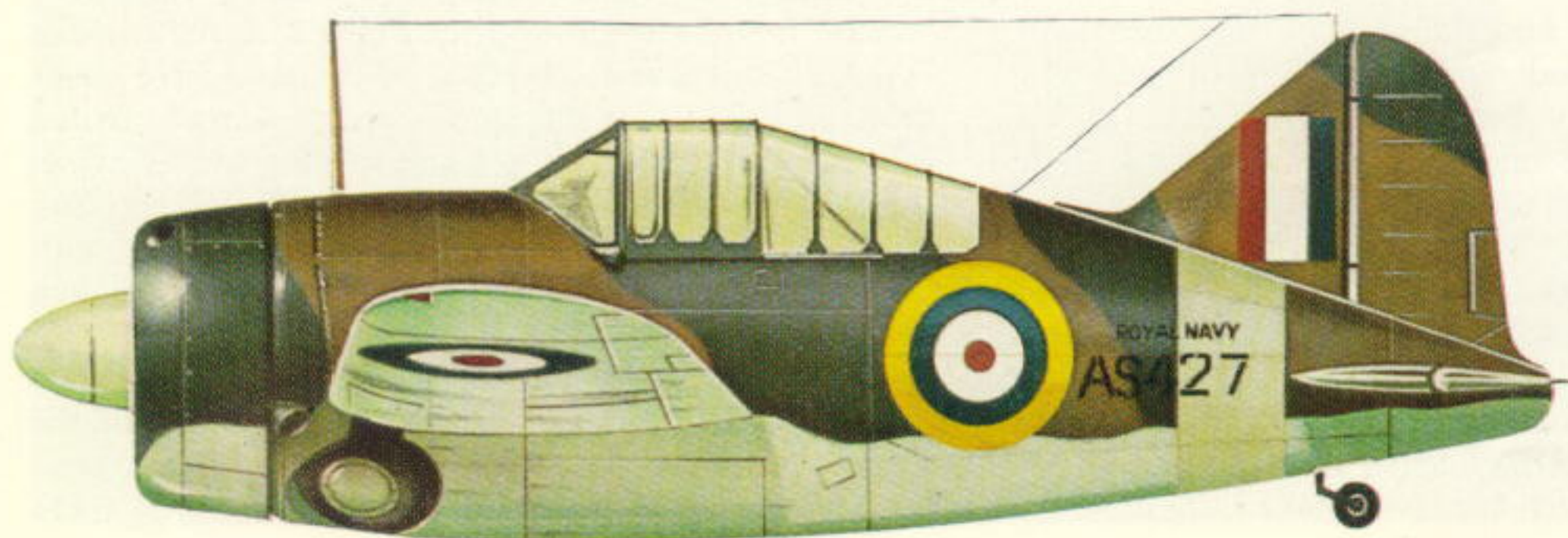
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Colour illustrations

- 5 Brewster B-239 of HLeLv 24, Finnish Air Force, in late 1941. Aircraft of 2nd Flight, flown by Lt. Jorma K. Sarvanto. Note 13 white victory bars indicating Sarvanto's score in the 1940 "Winter War" and 3 red bars indicating victories gained in 1941 while flying the Brewster.
- 6 Brewster B-239 of HLeLv 24, Finnish Air Force, in 1943. Aircraft of Lt. Hans "Hasse" Wind, commander of 3rd Flight, and top-scoring Brewster pilot with 38½ victories.
- 7 Brewster B-239 of HLeLv 26, Finnish Air Force, in summer 1944.
- 8 Brewster Buffalo I of 453 Squadron, R.A.A.F., at Sembawang, Singapore, December 1941. Note that the port underside of this aircraft has been painted black; this was not common to all Buffaloes in the Far East.
- 9 Brewster Buffalo I of the Fleet Air Arm. This aircraft is AS427, an ex-Belgian contract B-339, serving in 711 Squadron, a trials unit, in early 1941.

17th, however, the surviving five Brewsters of 2-VI.G V left the island, flying to Palembang on Sumatra. On 13th the Japanese had raided Ambon, shooting down two of the flight of Brewsters of 3-VI.G IV based there. On 20th all remaining Brewsters of 1 and 2-VI.G V moved to Samarinda in Borneo; over the next week they were to shoot down at least four aircraft for the loss of five of their number, and on 23rd, 20 of them, each carrying a pair of 50 kg. bombs beneath their wings, attacked a convoy in the Mak-

asar Strait, sinking a destroyer and damaging three freighters. Towards the end of the month both units withdrew to Java to recuperate and make good losses.

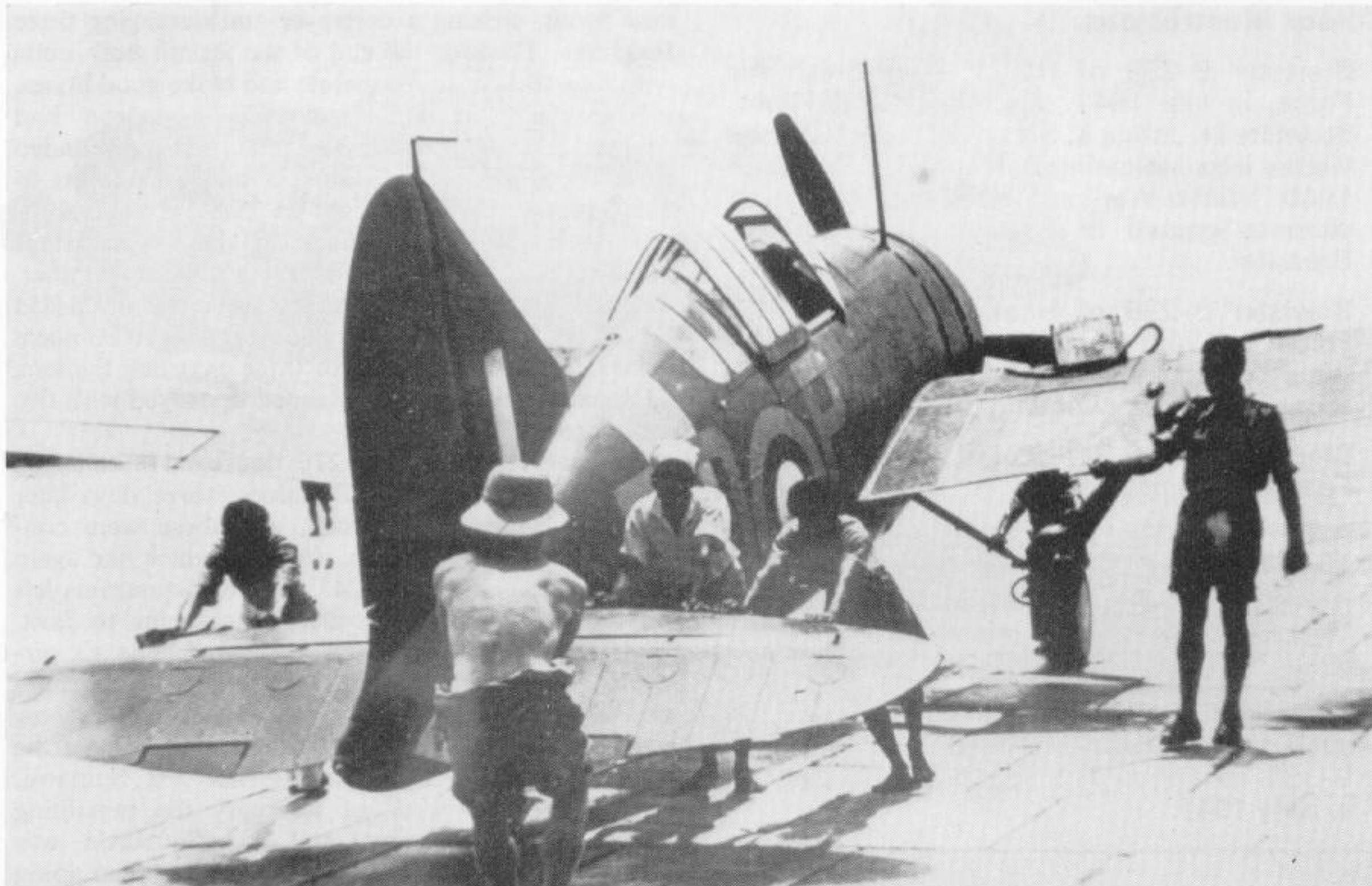
Meanwhile in Singapore 488 Squadron had received nine Hurricanes on January 24 and handed its last two serviceable Buffaloes and their pilots to 243 Squadron. On the night of 25th Japanese ships were seen heading for Endau on the west coast of Malaya and next day every available bomber, escorted by Hurricanes and by Buffaloes of 21/453 Squadron, made a number of attacks. Fifteen bombers were lost, but for the loss of three escorting fighters, 13 Japanese aircraft were claimed destroyed with five more probables.

Two very heavy raids on 27th destroyed or damaged most of 243 Squadron's Buffaloes; three days later only six Buffaloes remained, and these were concentrated in 453 Squadron, while 21, which had again become a separate unit, 243 and 488 Squadrons left for Sumatra without aircraft, thence going to Java, from where they were later evacuated. The six aircraft of 453 Squadron together with eight Hurricanes of 232 Squadron were all the fighters that now remained on Singapore, all other aircraft except the Buffaloes of 4 P.R.U. having left for Sumatra. During the first week of February the remaining defenders wasted away, and 453 Squadron was evacuated direct to Java a few days later, then going back to Australia. The P.R. Buffaloes had flown over 100 sorties, ranging as far north as Singora, the Japanese airfield in Thailand, but on February 7 the last of the unit's Buffaloes was destroyed in an air raid. When the surviving Hurricanes were flown out of the island, the pilots made one Buffalo airworthy, and this accompanied them, but it was the only aircraft of this type to escape destruction or capture when Singapore fell.

During the two months of fighting 453 Squadron

In October 1941, 67 Squadron handed its aircraft to 488 Squadron, R.N.Z.A.F., and moved to Burma. It was some months before the squadron code letters were changed however, and this picture taken in December 1941 shows aircraft of 488 Squadron still carrying the RD code of 67. Pilots walking in front of W8148 are l. to r. P.O. P. D. Gifford, P.O. J. Burton, P.O. F. S. Johnstone, Sgt. E. E. G. Kuhn and Sgt. C. D. Charters. 488 Squadron was based at Kallang on Singapore Island. (Photo: Newark Air Museum Ltd.)





Another Buffalo of 488 Squadron at Kallang in December 1941 also still carrying the markings of 67 Squadron.
(Photo: Newark Air Museum Ltd.)

had shot down at least 34 aircraft with several more probables, Fl.-Lt. R. D. Vanderfield and Sgt. A. W. B. Clare each being credited with five victories. Less is known of the operations of 243 Squadron than of any of the other units, but several New Zealand pilots did well; P.O. G. B. Fiskien (later to become probably the top-scoring Commonwealth pilot against the Japanese) claimed six and P.O. T. B. Marra three, two others getting two apiece; the commanding officer, Sqn. Ldr. F. J. Howell, D.F.C. and Bar, who had claimed 10½ victories over England and France in 1940-41, also added at least one to his total. 21 and 488 Squadrons had been able to claim only a very small number of victories between them.

In Java the Dutch Brewsters fought on, in company with the Curtiss types, British Hurricanes and U.S. P-40s. Further deliveries of Brewsters, including some of the B-439s, had now arrived, the latter being allo-

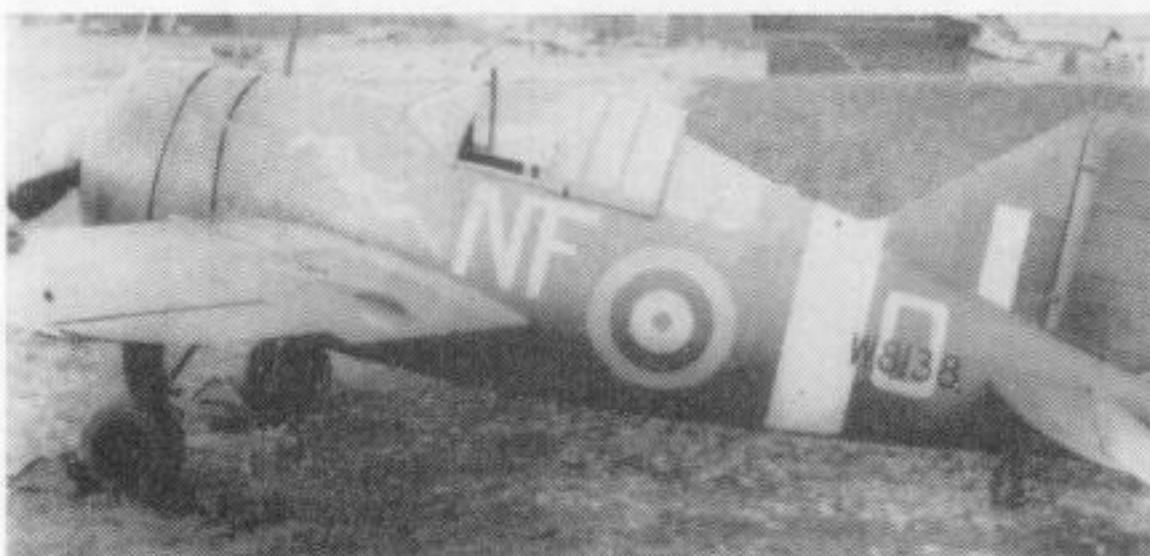
cated four-figure serial numbers to distinguish them from the B-339Ds, and the squadrons were brought up to strength. 1-VI.G. V was reinforced up to 12 Brewsters at Bandoeng, near Andir, 2-VI.G V was reinforced to eight Brewsters at Buitenzorg, near Semplak, and 3-VI.G IV, now brought up to full squadron strength with newly-trained young pilots, had 11 Brewsters and was based at Tjililitan.

The first Japanese air raid on Java was made on February 3, but the Brewsters were not on this occasion involved, but more soon followed and on 9th three Brewsters were shot down and five destroyed on the ground at Tjililitan for the loss of one Japanese aircraft. This put an end to 3-VI.G IV, the three surviving aircraft flying to Buitenzorg to reinforce 2-VI.G V. On 19th, 30 Mitsubishi A6M-2s of the Tainan Air Corps swept over Buitenzorg, shooting down four Brewsters for the loss of one Reisen, while over Andir two more Dutch fighters were shot down.

Markings on Dutch aircraft were changed on 23rd from the orange triangle to a red, white and blue square, and during the latter part of the month the remaining Brewsters withdrew to Ngoro, where they joined seven Dutch Hurricanes. On March 1 they accompanied Martin bombers and R.A.F. aircraft attacking invasion transports to the west of Java, one ship being sunk, but one Brewster lost, and next day they took part in a number of successful strafing missions on Kalidjati airfield and on troops near Pamamoetan.

More Japanese air raids were made on 3rd on Bangoend and Tjimoli, and five Dutch fighters were able to intercept, but at Pameungpeuk four Dutch and one R.A.F. fighters were destroyed by nine Japanese

Buffalo of 488 Squadron at Kallang, now painted with the squadron code. Note leaping dragon personal marking and manner in which N and F of squadron code are linked on W8138. This aircraft was lost in action on January 17, 1942.
(Photo: Newark Air Museum)





Above: Third air force to take the Brewster fighter into action was that of the Netherlands East Indies. This B-339D, fitted with underwing 50 kg. bombs, is awaiting shipment from the U.S. (Note U.S. serial on rudder.)

(Photo: via Hugo Hooftman, Cockpit, The Netherlands)

Right: Brewster F2A-2 of U.S. Navy Squadron VF-3.

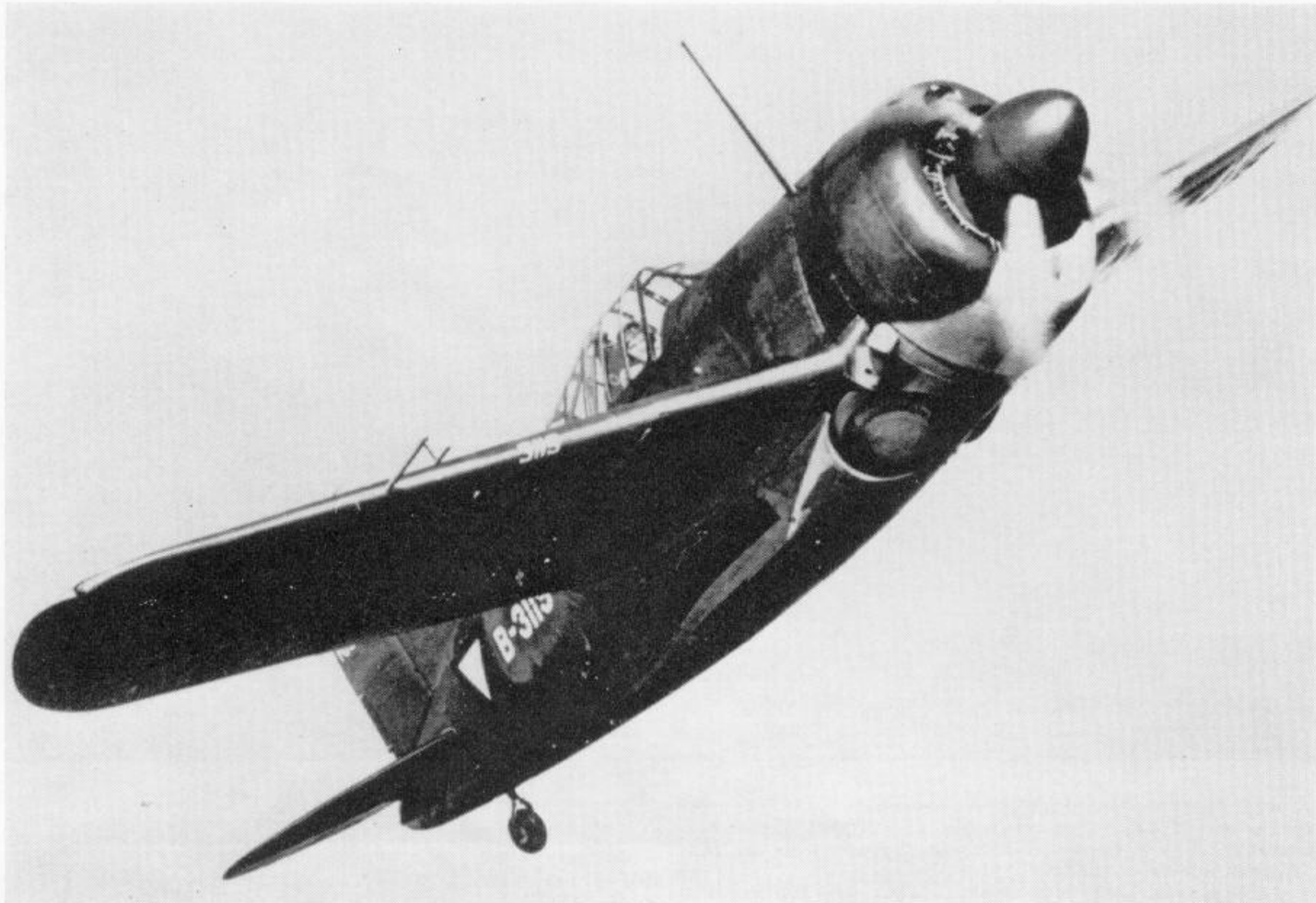
(W. Larkins via C. Macomber)



Below: Buffalo W8198 of 488 Squadron, Kallang. Note that this aircraft does not have the squadron letters joined in the manner used on W8138, but like that aircraft, and the one in the background, features black paintwork to the port underside. This aircraft was lost in action on January 22, 1942.

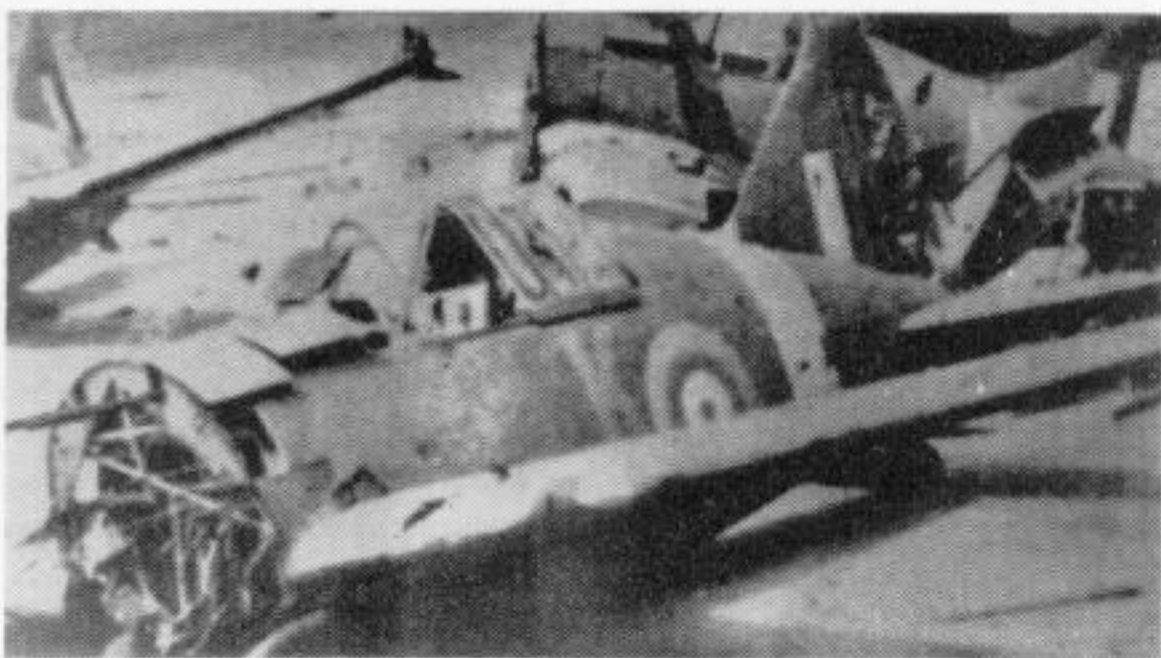
(Photo: Newark Air Museum)





Above: Brewster 439 of the Netherlands East Indies Air Force in flight. Note the manner in which the aircraft number, 3119, is repeated on the wing leading edges without the prefix B- as painted on the fuselage; the American air test registration is still to be seen on the rudder, indicating that this photograph was probably taken before the aircraft were shipped from the U.S.

(Photo: via Hugo Hooftman, Cockpit, The Netherlands)

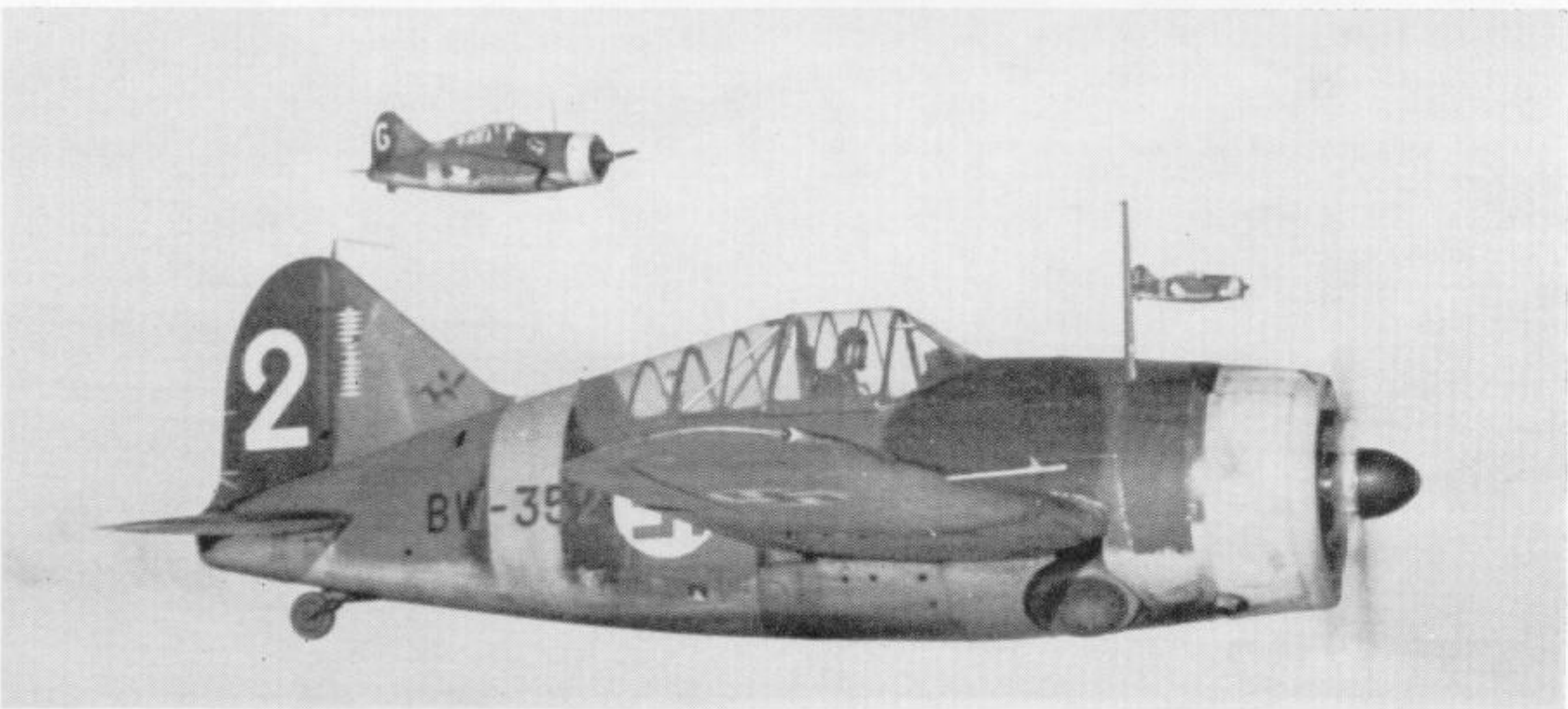


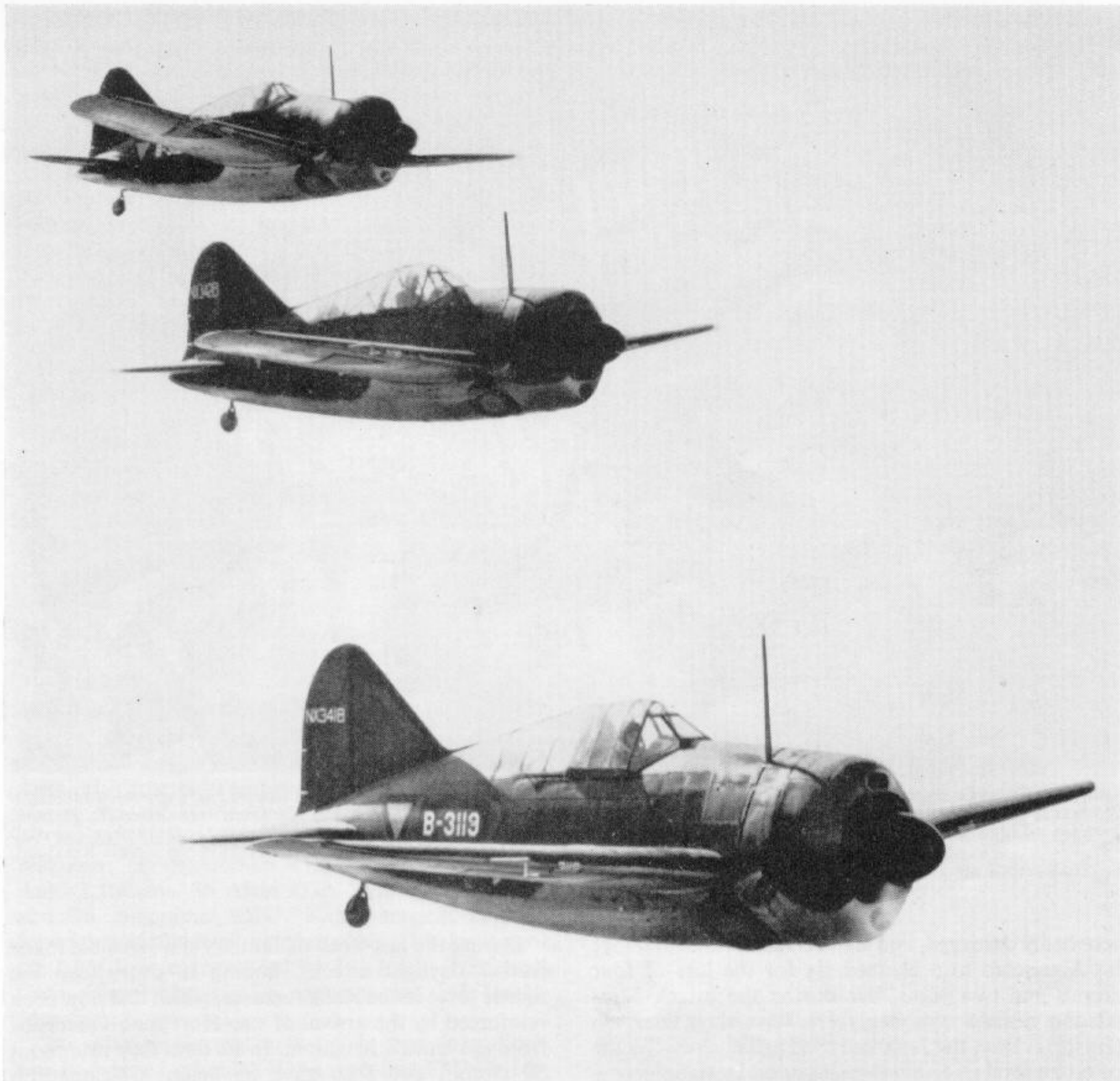
Left: Shot-up and engineless Buffaloes; the aircraft appear to carry no squadron letters, but at least that in the foreground is painted with an individual letter. The serial, AN207, indicates that it was one of the last batch to be delivered, and it was probably held as a reserve. In this case it may well have been issued to a squadron during the heat of battle, no time being available for full painting. Note also that these aircraft do not appear to have the black port undersides.

(Photo: R.C.Jones)

Long after all Brewster fighters had left the front line units of the Allied nations, they fought on in Finland. Here three B-239s of 2nd Flight/HLeLv 24 are seen over Rukajärvi in August 1942. The nearest aircraft, BW-352, is flown by Sgt. Major E. Kinnunen, who gained 19 of his 22½ victories on this type.

(Photo: P. Ervi via Kalevi Keskinen)





Three Brewster 439s in flight, B-3119, 3120 and 3122; these aircraft were amongst those issued to 3-VI.G IV, a unit which was virtually wiped out at Tjililitan during a Japanese air attack on February 3, 1942. B-3119 was one of three aircraft which survived this attack. (Photo: via Hugo Hooftman, Cockpit, The Netherlands)

fighters in a strafing attack. Most aircraft were now leaving for Australia, the defence of Java comprising just seven Brewsters and a few R.A.F. Hurricanes. On March 5, four of the former led by Kapt. J. P. van Helsdingen, who had commanded 2-VI.G V on Singapore, took off to attack the airfield at Kalidjati, flying in two widely dispersed sections. A Japanese fighter appeared and was hit by Lt. Deibel of the second section, disappearing; three more then attacked and Deibel hit two, both of which fell away, but his own aircraft was damaged and he was forced to return to Andir, as was his wingman. Meantime the other pair of Brewsters were attacked by six fighters which shot down and killed van Helsdingen. This was the last operational mission of the Militaire Luchtvaart before the fall of Java on March 8, 1942. Apart from the Brewsters destroyed in action, a number of those delivered from the United States during the fighting were destroyed by bombs while still in their crates at the docks. At least one Dutch Brewster was captured

intact by the Japanese, and was later shipped to the home islands and tested by them.

THE BUFFALO IN BURMA

While the fighting in Malaya was under way, 67 Squadron, forming part of 221 Group, prepared for the inevitable Japanese advance into Burma from bases in Thailand. The squadron had now been joined at Mingaladon by the 3rd Squadron of the American Volunteer Group, flying Curtiss P-40B Tomahawks. 67 flew its first operational mission on December 21, 1941, strafing Girikhan airfield, across the Thai border. Two days later the Japanese launched their first air raid on Burma, Rangoon being the main target for 60 bombers escorted by 20 fighters. Both fighter squadrons intercepted, 67 claiming six confirmed and three probables for no loss, though A.V.G. records indicate that several of the British Buffaloes



Nearly all Finland's greatest fighter pilots flew the Brewster 239 for at least part of their combat careers; here are three successful members of 3rd Flight/HLeLv 24, in June 1942, l. to r. Over Sgt. J. Huotari (9½ on Brewsters, 16½ total), top-scorer Flt. Mstr. E. Juutilainen (33 on Brewsters, 94 total) and Over Sgt. E. Vesa (8 on Brewsters, 28½ total). In the background is Juutilainen's aircraft BW-364. (Photo: SA-kuva via Kalevi Keskinen)

were badly damaged, and some crashed while landing; the Americans also claimed six for the loss of four aircraft and two pilots, but during the attack Mingaladon airfield was badly hit. Two days later, on Christmas Day, the Japanese tried again, changing the ratio to a total of 40 bombers escorted by 80 fighters—all Nakajima Ki 27s. The first of two attacks was intercepted by the A.V.G. which claimed 17 victories, and this unit claimed 11 more during a second raid, the total of 28 claims being made for the loss of two aircraft and no pilots; 67 Squadron was also in action, this time mainly protecting the airfield from attack, and six to eight of the attackers were claimed, although this time five Buffaloes were lost, four of the pilots being killed. This loss of four pilots was very serious for the squadron as while small reserves of Buffaloes were available, there were no replacement pilots.

The heavy losses inflicted by the Allied fighters during these two raids put a temporary end to daylight missions by the Japanese, and the Buffaloes then undertook other duties, escorting Blenheims to attack airfields, communications and supply lines; so poor was the performance of the Buffalo by this time that the Blenheims frequently had to slow down in order to allow the escort to keep up! The fighters also undertook a number of P.R. sorties, after one of which they attacked Mesohit airfield in Thailand, strafing aircraft on the ground; a week later on another reconnaissance mission P.O. Brewer intercepted a Japanese aircraft on similar duties over Tavoy, and shot it down in flames.

During the last week of January the Japanese made further daylight attacks, hoping to overwhelm the fighter force in the Rangoon area, which had now been reinforced by the arrival of two Hurricane squadrons from the United Kingdom. In six days they lost about 50 aircraft and then gave up again; 67 Squadron performed well during this week, claiming a number of victories including at least one fighter on 23rd and a complete flight of four bombers on 24th. A further month later the Japanese tried again, making attacks on 24th and 25th February, but again incurring heavy losses. When Rangoon fell the surviving fighters including three Buffaloes, four P-40Bs and 20 Hurricanes, withdrew northwards, but by March 67 Squadron was worn out and had virtually no pilots or aircraft left. Little detail is available about the squadron's claims in this campaign, but one of the flight commanders, Fl.-Lt. D. J. C. Pinkney, D.F.C., an ex-Battle of Britain Spitfire pilot, is believed to have claimed three victories before he was shot down and killed. By the time the first Burma campaign ended a total of 22 Buffaloes and Hurricanes had been shot down in combat, all other losses being to bombs while on the ground.

After the retreat from Burma finished, 146 Squadron in India, which had re-equipped with some Curtiss Mohawks during March 1942, exchanged these in April for Buffaloes, but a month later Hurricanes were received, and the aircraft then disappeared from front line service in the South-East Asia area.

THE BREWSTER F2A IN THE PACIFIC

Thus it was that by the middle of March 1942 almost all the Brewster fighters of the British Commonwealth and Dutch air forces had been wiped out, and the few that remained were not to see any further combat. In American service, however, the aircraft had yet to fire its guns in anger. Already in the U.S. Navy no further squadrons were being equipped with F2A-3s, and many of the later production aircraft were being delivered direct to training establishments. The carrier *Lexington* had left Pearl Harbour on December 5, 1941, to ferry Marine SB2U-3 bombers to Midway Island, so missing the Japanese attack on 7th, and *Saratoga* was also out of harbour on an exercise. During the rest of December VF-2 prepared on several occasions to take part in attacks on Japanese island bases, but these were always called off for one reason or another. By February 1942 the last F2A-3s had been replaced by F4F Wildcats in all three Navy fighter squadrons.

The one Marine fighter unit to receive F2A-3s, VMF-221, still had its aircraft, however; on December 25, 1941, this squadron, originally destined for Wake Island but forestalled by the Japanese invasion of this, was delivered instead by *Saratoga* to Midway's Eastern Island as part of Marine Air Group 22. The squadron had on strength some 28 fighters, and on June 5, 1942, 26 of these, 20 F2A-3s and six F4F-3s, were ready for take-off when at dawn the first attack to be launched against the island by Admiral Yamamoto's huge task force appeared. The carrier element of the force, comprising no less than six carriers, was commanded by Admiral Chuichi Nagumo; he despatched a strike composed of 36 A6M-2 Reizens, 36 Aichi D3A "Val" dive-bombers and 36 Nakajima B5N "Kate" torpedo-bombers (operating in the level-bomber rôle). This force took off from four carriers, led by Lt. Joichi Tomonaga from *Hiryu*; the fighter element was led by Lt. Masaharu Suganami.

The Marine fighters took off in two formations, one comprised of eight F2As and five F4Fs led by



Above: The greatest Brewster pilot of them all; Lt. Hans Wind, commander of 3rd Flight/HLeLv 24 by the tail of his aircraft, BW-393, in September 1943. "Hasse" Wind claimed 38½ of his total of 78 victories while flying various Brewsters.

(Photo: SA-kuva via Kalevi Keskinen)

Below: With the arrival of Bf 109Gs, all HLeLv 24's surviving Brewster 239s were handed to HLeLv 26 to replace that unit's Fiat G-50s. BW-375 is seen at Immola in June 1944, immediately after the change-over. (Photo: SA-kuva via Kalevi Keskinen)



Major Floyd B. Parks, the other of 12 F2As and one F4F led by Capt. Kirk Armistead; Parks' formation was vectored straight on to the bombers, while Armistead's was ordered to climb to the west. At 06.16 hours when 30 miles out from Midway at 14,000 ft., Capt. John F. Carey in the first formation spotted many D3As with Zero cover 2,000 ft. below, and giving the "Tally Ho!" dived down with Lt. Marion Carl and 2/Lt. Clayton M. Canfield, followed by the rest of the 13 fighters; after an initial attack on the bombers, they became involved with the Zeros, only Carey, who had been wounded, Carl and Canfield landing back at base. Ten minutes after this first attack, Armistead's formation attacked the Japanese air groups, hitting the leading formation and seeing two or three bombers falling in flames. They were then also badly bounced by the escorting Zeros, and five more American fighters were shot down. In all, 13 F2As and two F4Fs were destroyed, and of the 11 which managed to get down in one piece, eight were so badly damaged as to be unfit to take off again; Major Parks was amongst those killed in this action.

Thus in one blow the island's fighter defences had been virtually wiped out for the negligible loss to the attacking forces of two bombers, one dive-bomber and two fighters; the Japanese fighters somewhat overestimated their resounding success, claiming

initially that they had shot down 40 American fighters. It was the end of the Brewster fighter in Allied front line service.

Only in North-Western Australia did the Buffalo continue to serve with the Allies, 17 being delivered to the R.A.A.F. (serials A51-1 to A51-17), some, if not all of these being ex-Dutch order aircraft. A number were used for reconnaissance purposes, flying from the Darwin area with the R.A.A.F.'s 1 P.R.U. (later 87 Squadron) during 1942-43, and they also served with 25 Squadron for a while. 1 P.R.U. operated a mixed bag of Buffaloes, Wirraways, Republic P-43 Lancers and Lockheed Lightnings from the airfield at Coomalie, and at the end of 1942 at least four were still in service with this unit.

Vilified and cursed, the Brewster Buffalo was not in fact a bad aircraft, merely an indifferent one. It was its fate to be the weapon of inexperienced pilots outnumbered by highly-experienced and competent foes, equipped with superlative aircraft. Its performance in Finland where, no less outnumbered, but in the hands of combat veterans, it redeemed itself completely, proved perhaps that the quality of an aircraft is of no more importance than the experience and training of its pilots—a fact too rarely considered by those recording the history of World War II, despite the weight of evidence showing it to be so.

	PERFORMANCE DETAILS				
Model	XF2A-1	F2A-1	F2A-2	F2A-3	Buffalo I
Engine	R-1820-22	R-1820-34	R-1820-40	R-1820-40	GR-1820-G105A
H.P.	750 at 15,200 ft.	750 at 17,000 ft.	900 at 14,000 ft.	900 at 14,000 ft.	1,100
Wing span	35 ft. 0 in.	35 ft. 0 in.	35 ft. 0 in.	35 ft. 0 in.	35 ft. 0 in.
Length	25 ft. 6 in.	26 ft. 0 in.	25 ft. 7 in.	26 ft. 4 in.	26 ft. 0 in.
Wing area	209 sq. ft.	209 sq. ft.	209 sq. ft.	209 sq. ft.	209 sq. ft.
Weight gross	5,017 lbs.	5,055 lbs.	5,942 lbs.	6,321 lbs.	6,840 lbs.
Weight empty	3,711 lbs.	3,785 lbs.	4,576 lbs.	4,732 lbs.	4,479 lbs.
Max. speed	277.5 m.p.h. at 15,200 ft.	301 m.p.h. at 17,000 ft.	323 m.p.h. at 14,000 ft.	321 m.p.h. at 14,000 ft.	324 m.p.h. at 14,000 ft.
Ceiling	30,900 ft.	32,500 ft.	34,000 ft.	33,200 ft.	30,675 ft.
Climb	2,750 ft./min.	3,060 ft./min.	2,500 ft./min.	2,290 ft./min.	3,070 ft./min.
Landing speed	67 m.p.h.		78 m.p.h.	81 m.p.h.	
Range normal		1,095 mls.	1,015 mls.	965 mls.	
Range max.		1,545 mls.	1,670 mls.	1,680 mls.	
Armament	1 x .50 in., 1 x .30 in.	2 x .50 in.	4 x .50 in.	4 x .50 in.	4 x .50 in.

Acknowledgements: The author wishes to thank the following people for assistance with information and/or photographs; their help was quite invaluable. Kalevi Keskinen; Hugo Hooftman, Editor of *Cockpit*; John W. R. Taylor; Eino Ritarante; R. C. Jones of I.P.M.S; J. D. Brown; also J. J. Halley and James W. Goss of 'Air-Britain'.

Series Editor: CHARLES W. CAIN

Still in service in April 1946; Brewster 239, BW-261, of HLeLv 31 at Pori, carrying the new Finnish national markings instituted after the armistice with Russia in September 1944.

(Photo: B. Hielm via R. Holland)

